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Diseases of Fruit and Nut Crops
In the United States in 1924

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BUREAU OF PLANT INDUSTRY

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DISEASES OF FRUIT AND NUT CROPS IN THE UNITED STATES IN 1924

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INTRODUCTION

The work of the Plant Disease Survey is of great and increasing value to every person engaged in plant pathological investigations. During the short time that the author was present in the Plant Disease Survey office, the records there were consulted by a number of men, and some of them, including at least one representative of a great industrial firm, were asking for temerary desk space so that they might spend a day or more in detailed study of the diseases of certain hosts, or certain groups of diseases.

This statement may seem out of place here but it is mentioned to call your attention to the fact that state men, United States Department of Agriculture men, and men in the employ of important industrial development, are appreciating the value of the records which the Plant Disease Survey is accumulating and classifying.

Another reason for mentioning it here is to point out that such men are asking why there are not more data concerning certain diseases, why some states do not send in reports, and whether we cannot improve the records somewhat. Opinions concerning collaborators will be formed from the data which they have furnished or failed to furnish.

During the next few years there is going to be a tremendous increase in the use of the records of the Plant Disease Survey office and everyone of us (collaborators) who does his best to turn in accurate and valuable data, will be amply repaid in more ways than one.

Of course, it is understood that plant disease problems are of more importance in some states than others, and that the facilities and funds are inadequate for much plant disease survey work in most of the states. That phase of the problem is one which we must keep in mind, but in the meantime we can all do our best with the facilities that are available.

THE DISEASE SITUATION IN GENERAL

There seems to have been very little injury from fungous diseases in the Pacific Coast States. This is undoubtedly due to the long continued dry weather from which that region has been suffering. The Eastern States had an unusual amount of rain during the late spring of 1924 which resulted in a very heavy infection of scab and rust on apple. Fire blight of apple was not particularly severe and it is believed that this is at least in part due to the cold, wet weather, which interfered with insect activities during the early part of the growing season. Bitter rot of apple and peach brown rot were less serious than usual, apparently correlated with dry weather during late June, July, and August.

The finding of apple blotch in New York is a matter of considerable interest, and it is more than likely that infected nursery stock has been shipped into many of the northern states.

SOME OF THE NEW, OR NOTEWORTHY DISEASES REPORTED DURING 1924
(See general part of report for more specific data)

*Tranzschelia punctata on Prunus serotina from Missouri.
Cercospora mali - on apple from Mississippi.

Coniothyrium (probably C. pirinum) - Associated with a fruit spot on apple from Illinois.
*Phoma pomi - On apple leaves from New Jersey.
Bacillus amylovorus - On plum in Ohio and South Dakota.
Rhytisma vitis - On grape from New York.
*Gloeosporium rufomaculans - Causing a severe rot on nearly mature peaches in Florida.
Cuscuta sp. - On raspberry from Wisconsin.
Leather rot of strawberry, caused by Phytophthora cactorum - Reported from Kentucky, Tennessee, Louisiana, Arkansas, Missouri, and Illinois.
*Sclerotinia vacciniii-corymbosi - On blueberry from Indiana.
Fusarium sp. (cubense ?) - Causing wilt of banana in Florida.
Phytophthora faberi - On coconut in Florida associated with bud rot.
Measles - On pear from Florida.
* Specimens accompanied report.

FRUIT DISEASES OF 1924

DISEASES OF POME FRUITS

APPLE

SCAB CAUSED BY VENTURIA INAEQUALIS (CKE.) ADERH.

Distribution and relative prevalence

The apple scab was very widespread in 1924 and the total amount of injury is given as greater than any year for which we have records, except 1922. The damage was greatest in the states bordering the Great Lakes; those in the Applachian Mountain section, and the Middle Atlantic states. Orton (Pennsylvania) says "One of the worst years in history." Thurston on May 15 reports 80% fruit infection and 100% leaf infection in Adams and Cumberland Counties, Pennsylvania. Jehle says that in Maryland

> "This year it appeared in unusually severe form. ** The affected parts were dwarfed and curled, giving the tree an abnormal appearance which was not recognized as scab by several orchardists but was mistaken for spray burn, blight, and other troubles. On the trees which were most severely injured, all of the young fruit dropped and a large portion of this loss was undoubtedly due to the presence of the disease. Later many of the infected leaves dropped and many of the twigs and fruit spurs died."

Hesler reports,

> "Scab is especially heavy on fruit in eastern Tennessee this year.

Usually leaf scab is rare in this state, but this year it is very abundant, dwarfing and deforming the leaves."

Giddings and Sherwood state,

> "In some orchards in West Virginia there is more scab than we have ever seen before. There is already (June 24) serious defoliation in unsprayed or poorly sprayed orchards of susceptible varieties."

The leaf injury in some West Virginia orchards was so severe that it was reported to the Experiment Station as sun scald, spray burn, and blight. Such injury was found on some trees which were said not to have been sprayed. In other cases it may have been spray burn following scab as has been noted in previous years. Fromme in Virginia states that it was one of the worst seasons for apple scab in his experience and that unsprayed trees showed 100% infection. The disease was reported as causing very little injury in the Pacific Coast states. The infection was also indicated as slight in northern Vermont and New Hampshire. Lutman says that almost complete absence of scab in northern Vermont is noted as very unusual.

The only states from which no reports of scab were received are Oregon, Nevada, Arizona, Utah, Wyoming, Montana, Florida, Texas, and Oklahoma although it is probable that scab occurred in some or all of them.

Economic importance and losses

As already indicated the great amount of injury resulted in serious losses. Adams cites scab as the limiting factor for clean fruit in Delaware. Guba, giving reports for various counties in New York state, says, "A grade fruit cut down 70% by apple scab in Genesee County. Very serious in well sprayed orchards; leaf count showed 10% or more scabby leaves."

Table 1. Estimated losses from scab, as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
20	New York, Kentucky	4.5	South Dakota
18	Virginia	4	Indiana
15	Pennsylvania, Wisconsin	3.5	Maryland
12.5	Michigan	3	Vermont, Connecticut Minnesota
12	New Jersey		
10.5	Ohio	2.5	Illinois
10	Delaware, Iowa	2	Alabama, New Mexico
7	North Carolina	1.5	Kansas
6	West Virginia, Georgia	1	New Hampshire, North Dakota, South Carolina
5	Nebraska		

Table 2. Development of fungus, date of observed infection and development of host.

State	Ascospores mature in field	Ascospore discharge	Infection first observed	County of first observation	Delolcpment of apple trees			
					Delayed dormant	Prepink	Pink	Calyx
Me.	May 13	May 13	June 12		May 10	May 19	May 30	June 13
N. H.	April 8		June 4	Hillsborough				
Vt.		May 13						
Mass.		April 30	May 30					
Conn.			May 27	New Haven				
N. Y.			May 20	Dutchess	Apr. 29- May 5	May 12-15	May 21-26	June 2-5
N. J.			May 15	Atlantic				
Pa.			May 15	Adams				
Del.			May 3	Sussex	April 8	April 23	May 1	
Va.		April 18	May 9					
W. Va.		April 19	May 7		April 19		April 30	May 12
Tenn.			May					
N. C.			June 28	Mecklenburg				
S. C.			Sept. 23	Anderson				
Miss.			July 30	Lee				
Ohio	March 31	April 9	May 7	Butler	April 21		May 3	
Ind.			June 11	Montgomery				
Ill.			May 6	Johnson				
Mich.	April 28	May 12						
Wis.	March 14	May 6	May 15	Dane			May 16	
Minn.		April 22	May 4	Washington				
Iowa			May 20	Story				
S. Dak.			June	Brookings				
N. Mex.			Aug. 15	Chaves				

Weather relations

The 1924 season seems to have been particularly favorable for apple scab development throughout the eastern United States. In ceratin sections, particularly in the New England area, there was dry weather occurring seon enough to check later scab development. Clinton (Connecticut) says, "Threatened early to be very bad but dry weather checked further spread." Tyler, reporting from Nassau County, New York, on August 11 stated that apple scab had had no chance to spread for six weeks past. Stokdyk (Kansas) states, "Dry season at ascospore discharge period held it in check." In the Pacific Coast states scab injury has been negligible and this is probably a result of unusually dry weather. Most sections of the eastern states did not benefit from dry weather until mid-season. Adams (Delaware) reports prolonged cool wet weather with twelve days of rain in April, seventeen in May, and fourteen in June. Fromme says that the disease was especially severe in the northern part of Virginia where over ten inches of rain fell in the month of May. Schneiderha (5), reporting for northern Virginia, says, "Studies of incidence of scab on apple fruits during 1924 show three infection cycles during the early season, cessation of spread in the middle of the summer and renewed activity in the fall." He found (6) that, "Discharges of ascospores occurred only during rainfall and that the majority of rains within the period of discharge were accompanied by spore discharge." The following table gives the number of spore discharges of which he had records for the past three seasons.

Table 3. Periods of ascospore discharge according to Schneiderhan (6).

Number of periods in each month					Total discharge period (days)
Year	April	May	June	July	
1922	4	9	3	0	56
1923	1	4	5	3	94
1924	3	7	4	0	61

Giddings reports that in eastern West Virginia, "The weather was so wet that in many cases the spray hardly had time to dry before there was further rain." The disease was held in check by hot dry weather during the late summer in much of the eastern territory. There were, however, late rains which induced some infections which were developing as late as harvest time.

Varietal susceptibility

The following table gives a list of apple varieties the susceptibility of which was reported by collaborators during 1924. Some apparent discrepancies may be noted in this table but that is another indication of the fact that we do not have a sufficiently detailed knowledge of diseases and their host relations.

Table 4. Susceptibility of apple varieties to scab, 1924. (Reporters for the various states are as follows: Connecticut, Clinton; New York, Guba; New Jersey, Martin; Delaware, Adams; Kentucky, Valleau; Ohio, Hesler, Stover; Indiana, Gardner; Wisconsin, Vaughan; Minnesota, Department of Plant Pathology; New Mexico, Crawford.)

Apple -- Scab

Variety	States reporting	Variety	States reporting
	Susceptible		
Astrachan	Connecticut	Newton Pippin	New York
Baldwin	Massachusetts	Northwestern Greening	Wisconsin
Ben Davis	New York, New Jersey	Red Astrachan	New Jersey
Crabs	Connecticut, Minnesota	Rhode Island Greening	New York
Delicious	Kentucky, Indiana	Rome Beauty	New Jersey, Ohio, Indiana
Dudley	Wisconsin	Stark	Delaware, Ohio
Early Harvest	Delaware	Stayman	Delaware, Kentucky, Indiana
Fall Pippin	Connecticut, New York	Wealthy	Minnesota
Fameuse	Wisconsin	Winesap	New Jersey, Delaware, Kentucky
Jonathan	New Mexico		
McIntosh	Massachusetts, Connecticut, New York, New Jersey, Ohio, Wisconsin		
	Medium to light		
Baldwin	All reported by Connecticut	Pewaukee	All reported by Connecticut
Delicious		Porter	
Gravenstein		Pound	
Greening		Stagmore	
King		Wagener	
King David		Wealthy	
Pearlman			
	More resistant		
Greening	Minnesota	Rome Beauty	Kentucky
Grimes Golden	Kentucky		
	Resistant		
Black Ben	Wisconsin	Yellow Transparent	New Jersey
Gano	Wisconsin	York Imperial	New Jersey
Grimes Golden	New Jersey		
Most crabs	Wisconsin		

Twig infection was reported from three states. Clinton says, "Have proved that scab carried over winter in Connecticut in the twigs of such susceptible varieties as Fall Pippin, McIntosh, and Greening in its Fusicladium stage and this method is as serious a menace as the asco stage on old leaves." Jehle found infection upon twigs and fruit spurs in a Stayman and Stayman Winesap orchard in Maryland. Adams also reported twig infection in Delaware.

Osmun reports that susceptibility of Baldwin is unusual for Massachusetts. Martin reports that in one orchard in New Jersey Winesap was practically defoliated while Yellow Transparent, Grimes Golden, and York Imperial were only slightly affected. In another orchard he found heavy scab infection on Grimes, Ben Davis, and Red Astrachan. Grimes is usually considered resistant, but both Grimes and York have been reported authentically as susceptible in some previous years. It is particularly interesting to find Grimes showing such a striking difference in susceptibility in two orchards in the same small state.

Control

A great deal of difficulty seems to have been experienced in efforts to control the apple scab during the 1924 season. This is partly due to the large amount of rainfall occurring during the period when the applications should have been made. Guba, reporting for New York, says, "After the delayed dormant period (April 29 to May 5) we had rain continuously up to May 20." From West Virginia it was reported that, "They tried to spray in some of the commercial orchards when the men had to wear rubber boots and wade through water."

Another important factor which interfered with satisfactory control in many cases was inadequate equipment. From the numerous reports bearing on this subject it would seem highly desirable to take up the question of adequate equipment as a matter of first consideration with the commercial apple growers. Martin reports one case in New Jersey in which an orchard was sprayed four times with a barrel sprayer but early and complete defoliation was observed on the McIntosh variety and heavy defoliation of the Winesap. In another orchard in the same locality sprayed on the same date but with a power sprayer no scab was found. Other instances of similar inefficient work are given. Jehle says that in Maryland, "No orchards have been observed which were free from a moderate amount of scab but the amount was less in orchards which were thoroughly sprayed at the proper time. In general, scab was controlled better where nozzles were used than with guns." Hesler reports an orchard which showed a loss of 2500 bushels on account of scab in 1922 and heavy infection in 1923, but in which the disease was well controlled by thorough and timely spraying with Bordeaux during 1924. Scab was generally very prevalent in the surrounding territory.

Reports concerning the use of dusts and sprays show considerable variation. Folsom reports from Maine, "Abundant infection on fruit in poorly sprayed commercial orchards. Lime-sulfur spraying with four or five applications beginning with the pink or prepink, or five sulfur-arsenic dustings beginning with the prepink, reduced scab percentages from 40 to 4. Control nearly complete in some sprayed and dusted commercial orchards and on sprayed and dusted experimental plots."

In New York some counties reported good results from the use of the dust and others did not. Virginia reported very poor control with dust. Fromme says, "In another orchard of Black Twig which received seven sprays and seven dusts under comparative conditions (the dust being applied according to the advice of the dust salesmen) there is only 5% of blemish-free fruit in the dusted block as compared with 85% in the sprayed block. The injury is chiefly due to scab." West Virginia also reported very poor scab control where sulfur dust was used.

The importance of timely applications was brought out very strongly by a large number of states. Guba says, "Pre-blossom application most important in eastern New York. Delayed dormant most important in western New York." Orton says, "All spraying experiments in Pennsylvania emphasized the importance of a prepink application this year. The delayed dormant was not apparently of much importance." Valleau (Kentucky) reports, "Considerable evidence that the prepink spray is necessary for control." McClintock (Tennessee) - "Much less serious where thorough pink bud spray was applied." H. C. Young (Ohio) - "Failure to control can be at least partially contributed to lack of timing of pre-blossom sprays." Gardner (Indiana) - "Sprays gave good control. Prepink necessary." Vaughan (Wisconsin) - "Prepink spray helped in scab control but was not applied early enough for complete control."

In this connection Keitt and Jones (3 & 4) (Wisconsin) report interesting data

> "Ascospores were caught at intervals from May 6 to June 29 (apples bloomed June 2-18). The maximal occurrence of ascospores was recorded May 13, when during a rain they were caught through a four hour period at the average rate of 289 per cubic foot of air. The major portion of the season's discharge occurred before the blooming period. ** Infection began in very early stages of unfolding of cluster buds, about 20 days before the 'pink' spray was applied. ** Under extreme conditions one 'prepink' treatment may be insufficient."

It is very evident that in most states the extremely early spray applications were of the utmost importance in scab control.

K. M. Curtis (1), reporting upon work done in New Zealand, found that leaf burying assists materially in scab control, that leaf burning reduced the amount of initial infection by more than 50%, and that spraying the dead leaves under the trees at just about the date of ascospore discharge gave about 60% control of initial infections. This is an interesting feature in connection with the ordinary orchard spray program.

Spray and dust injuries were reported from several states. Bennett of Michigan says, "Leaf infection was especially abundant and spray injury following this has caused considerable damage." Whetzel (7) (New York) - "Severe foliage injury followed applications of spray or dust. copper or sulfur, made during hot weather on trees infected with scab (in 1923). ** No cases of this type of foliage injury due to dust application to scabby leaves had been noted prior to 1923, but in July numerous cases were observed, and in every instance the burning was associated with scabby foliage. The injury was in proportion to the amount of scabby foliage, not to the kind of spray or dust used."

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BLOTCH CAUSED BY PHYLLOSTICTA SOLITARIA ELL. & EV.

Geographic distribution

Apple blotch was reported from approximately the same range of territory as usual, but an interesting report was received from New York state. Thomas (2) found it upon seedling nursery stock at Williamson, New York. His report is as follows:

> "In one count of 100 trees, 86 showed blotch cankers. Probably 40 to 50% of these were quite badly cankered. The buds on this stock were in the main, unsuccessful. To what extent the disease was responsible I could not ascertain. Most of the injury is on the first year wood but there had been some spread to the growth of the season of 1923. Another planting on the same farm of seedlings obtained from a nursery in Shenandoah, Iowa showed an occasional tree with blotch canker."

McClintock also reports that blotch is coming into Tennessee in large amounts on apple seedlings from Kansas. In view of the probable earlier shipments of infected stock into such an apple producing state as New York and the fact that the disease does not occur to any economic extent north of the 42nd parallel, it is a question whether climatic conditions are such as to favor its spread in the northern states. It is possible, on the other hand, that the disease has not as yet become well established in those states. Anderson and Tehon report that blotch infection was abundant in the southern part of Illinois and extended farther north than usual. In West Virginia and in Ohio the disease is reported to have been working gradually northward and to have become more severe farther north in those states in recent years. The question of varieties may also be important, and all possible data should be secured along these various lines so that we may better judge the probable further spread of this disease.

Relative prevalence

Only three states, West Virginia, Maryland, and New Jersey, reported more injury from blotch than in 1923. Ohio, Kentucky, Tennessee, Arkansas, and

Kansas reported less injury this year. In Delaware and Kentucky the disease was said to occur principally in neglected orchards. In West Virginia and Virginia it was reported especially on Northwestern Greening.

Table 5. Estimated losses from blotch as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
10	Alabama	1.5	Maryland, Arkansas, New Jersey, Oklahoma
8	Kentucky		
5	Kansas, Illinois		
3	Ohio, Iowa, North Carolina	1	Mississippi, Nebraska
2	West Virginia, Indiana, Texas	Trace	Virginia

Weather conditions

Several collaborators report the disease as appearing somewhat later than usual. Moisture conditions were generally reported as favorable for the development of blotch, but temperature conditions during the earlier part of the season were mostly unfavorable and were, undoubtedly, an important factor in preventing a very serious amount of blotch throughout the region usually subject to this disease.

Dates and counties of earliest reported appearance, 1924.

May	Williamson	Tennessee	July 1		Kansas
June 15	Lawrence	Indiana	July 9	Monmouth	New Jersey
June 18	Albemarle	Virginia	July 10	Kent	Delaware
June 20	Butler	Ohio	July 21	Marshall	Iowa
June 28	Mecklenburg	North Carolina	July 24	Winston	Mississippi

Table 6. Susceptibility of apple varieties to blotch, 1924. (Reporters for the various states are as follows: New Jersey, Martin; Pennsylvania, Orton; Virginia, Fromme; West Virginia, Sherwood; Illinois, Anderson & Tehon; Iowa, Porter; Kentucky, Valleau & Magill; Tennessee, McClintock & Hesler.)

Variety	States reporting	Variety	States reporting
	Susceptible		
Ben Davis	Virginia, Kentucky	Smith Cider	New Jersey, Pennsylvania, West Virginia, Kentucky
Dutchess	New Jersey, West Virginia, Tennessee	Stark	West Virginia
Ewalt	Pennsylvania	Stayman	Kentucky
Northwestern Greening	Virginia, West Virginia, Iowa	Transparent	Illinois
		Wealthy	New Jersey
Red June	Tennessee	Winter Banana	West Virginia
Rome Beauty	Kentucky		

Apple - Blotch

Variety	States reporting	Variety	States reporting
Resistant			
Delicious	New Jersey, Kentucky	Winesap	Kentucky
Rome Beauty	New Jersey	York	Kentucky

Martin reports that fruit infection was observed in New Jersey on Rome Beauty, English Codling, Hagelow, Baldwin, Winesap, Gravenstein, Grimes Golden, Stark, and Maiden Blush. He also mentions a case in which fruit infection on Maiden Blush trees was considerably more important on the side adjacent to some severely infected Smith Cider trees, indicating that the latter variety was carrying the infective material and that the Maiden Blush would probably not have suffered any serious injury if the trees had been planted by themselves or at some distance from the more susceptible variety. Sherwood states that Rome Beauty and Ben Davis showed considerable susceptibility in the southern part of West Virginia. These two varieties were reported susceptible in Kentucky also.

Gardner of Indiana reports fruit infection on Florence Crab, McIntosh, Springdale and McMahon. He also reports twig infection on the following varieties:

Hightop Sweet
Pease
Milwaukee
Baldwin
Florence Crab
McIntosh
McMahon
Springdale
Tolman
Early Harvest
Huntsman
Domine
Tetofsky
Summer Rambo
Red Astrachan
Ralls
Thaler

Control

There seems to have been no difficulty in controlling blotch by reasonably careful and thorough spray applications. Guba (1), reporting on work done in Illinois, says:

> "The first blotch spray or what is very frequently termed the two-weeks spray in southern Illinois must be on the trees not later than two weeks after 75% of the blossoms have fallen. Lime sulfur and Bordeaux mixture are equally effective. For Dutchess and Yellow Transparent a two, three, four, and six weeks spray schedule is recommended and for Benoni a two, three, four, six, and eight weeks schedule."

Other reports concerning control are:

Ohio: It seems to be very easily controlled by most of the sprays. In one orchard where lime sulfur is used, blotch is under complete control. Colloidal sulfur is also controlling it. (Young)

Kentucky: Very severe in uncared for orchards but generally controlled where proper sprays have been applied. (Valleau)

Tennessee: Held in check even on such susceptible varieties as Dutchess by thorough spraying with Bordeaux mixture. (McClintock)

Arkansas: Well controlled by thorough spraying. Few to 2% on well sprayed susceptible varieties. (Dept. Plant Path.)

Kansas: Excellent control in well sprayed orchards. Lime sulfur at petal fall gave good control of blotch. (Stokdyk)

Good control of apple blotch has also been secured by lime-sulfur sprays in commercial orchards in West Virginia. It is evident that timeliness and thoroughness as well as the material used are important.

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BITTER ROT CAUSED BY GLOMERELLA CINGULATA (STON.) SPAULD. & SCHRENK

Geographic distribution, relative prevalence, and losses

The bitter rot disease was reported almost entirely from the central eastern and Atlantic coast states. In New York, Guba reports, "Severe infection on Delicious (home orchard) in Chenango County. This is a new locality for apple bitter rot. Disease present in this orchard for some years." Anderson and Tehon note that its appearance in Pike and Adams Counties, Illinois marks an unusual advance northward. Two states, Maryland and Virginia, report an increased amount of bitter rot over 1923. In Maryland the disease is said to occur mostly in the eastern two-thirds of the state. Three states, Maryland, Delaware, and Illinois, report more than average amounts. Ohio, Indiana, Illinois, Kentucky, West Virginia, Delaware, South Carolina, Tennessee, Arkansas, Virginia, and Alabama all report less than last year and all but three report less than an average year.

Table 7. Estimated losses from bitter rot as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
5	North Carolina	1	Virginia, Delaware, Alabama, South Dakota, Ohio
4	Georgia		
2.5	South Carolina		
2	Mississippi	.5	Illinois
1.5	Maryland		

Dates and counties of earliest reported appearance, 1924

June 24	Virginia	Frederick	July 19	Delaware	Sussex
June 28	North Carolina	Mecklenburg	July 23	South Carolina	Oconee
July 1	Indiana	Knox	July	Tennessee	Maury
July 3	Illinois	Adams	August 1	Pennsylvania	Dauphin
July 5	Mississippi	Pearl River	August 22	New Jersey	Monmouth
July 15	Arkansas	Howard	Sept. 2	Wisconsin	Walworth

Weather relations

It is evident that conditions did not favor the development of bitter rot during 1924. Fromme reports that in Virginia infection started early and plentifully but that midsummer weather was not favorable to excessive spread. McClintock in Tennessee says, "Dry weather and more thorough spraying served to hold the fungus in check, even on late varieties." Gardner (Indiana) reports, "Scattering infection appeared on Grimes in Knox County in July but never developed into an epiphytotic because of cool weather." Anderson states, "In southern Illinois there were heavy rains from July 12 to 22 and conditions seemed ideal for an outbreak of bitter rot. Fortunately, although the disease appeared in many orchards during this time, the dry weather during the latter part of July and throughout August served to hold this disease in check."

Table 8. Varieties of apple susceptible to bitter rot as reported in 1924.

State and Authority	Variety	State and Authority	Variety
Pennsylvania Orton	York Stripe	Illinois Anderson	Transparent
Tennessee Hesler	Roxbury Russet Liveland Raspberry King David	Missouri Maneval	Willow Twig Ben Davis Grimes Golden
McClintock	Grimes Golden		

Control

Adams from Delaware reports on control data: "Bordeaux applied June 5, 19, August 7, gave practically complete control on King David. Copper dust June 12, July 14, and 29 gave within 2% control. Later applications of dust would have been better. Bordeaux gave 60% defoliation. Copper dust no defoliation and less russetting of fruit."

Hurt (Virginia)(1) reports reduction of bitter rot infections by removing mummies.

Literature cited

1. Hurt, R. H. The importance of removal of mummies and affected fruit in apple bitter rot control. (Abstract) Phytopath. 15: 56. Jan. 1925.

BLACKROT OF APPLE CAUSED BY PHYSALOSPORA CYDONIAE ARN.

Geographic distribution and relative prevalence

In general this disease was reported about the same as in 1923 and approximately the same as an average year. New Jersey, Indiana, Illinois, Arkansas, and Alabama reported the disease as more prevalent than 1923 and more prevalent than an average year. Mississippi was the only state reporting less than usual.

Zeller (2) has published a brief history of the disease as it occurs in Oregon. He reports both the canker and leafspot as endemic but states that its economic importance is limited because of the dry summer climate. Cuba reports, "Blackrot frogeye leafspot is quite common in New York." Jehle says, "It is present in practically all Maryland orchards." Sherwood (West Virginia) reports, "Unusually heavy infection on foliage." Gardner says, "Equals scab in importance in Indiana." H. C. Young (Ohio) - "Of considerable importance." and Anderson (Illinois) - "Important as a fruitrot."

Types of injury

In some previous annual summaries there have been efforts to divide the injury according to whether foliage, fruit, or wood was affected. There is undoubtedly a very great amount of confusion concerning injury caused by the so-called blackrot fungus. Even the leafspot can hardly be stated with any degree of accuracy to be due to Physalospora cydoniae. There are certainly several types of these leafspots. Just what the primary and, in some cases, secondary factors may be which produce them is a question which is far from being settled. There is a great mass of circumstantial evidence of the strongest kind indicating that a high percentage of leafspot is due to a fungus which overwinters in dead twigs, or bacterial blight cankers. It would undoubtedly be of great value to the Plant Disease Survey if collaborators would send in specimens of the various types of leafspot injury which they find and include a note as to the relative prevalence of each type.

New York, New Jersey, West Virginia, and Maryland report serious foliage injury. In Minnesota, Illinois, and West Virginia twig infection occurred following fireblight, and New Jersey also reports twig injury. In New York the disease was important only as cankers. Illinois reports it as injurious on fruit. In Indiana blackrot was noted following rust infection on Rome Beauty fruit. This type of injury has been very common in West Virginia, and was reported also from Arkansas.

Losses and importance

Martin reports that in New Jersey, "Some orchards were defoliated 50% by June 24." Guba reporting on July 1 says, "In some orchards in Rockland County, New York, blackrot leafspot is serious, causing defoliation in some instances." Sherwood (West Virginia) reports, "Leafspot is severe on old trees carrying cankered twigs in spite of spraying. On younger trees which have been kept well pruned the leafspot infection was less." Fromme - "Not as serious in Virginia as anticipated from earlier reports and most commercial orchards not seriously injured."

Table 9. Estimated losses from blackrot as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
5	Maryland	1	Vermont, Connecticut, New York, New Jersey, Virginia, South Carolina, Mississippi, Illinois, Michigan
4	Ohio, Indiana, Arkansas, Georgia		
3	North Carolina, Iowa		
2	West Virginia, Pennsylvania (leafspot)		
1.5	Delaware	.5	Alabama

Weather relations

In view of the different types of injury it is rather difficult to get evidence concerning the relations of the weather to the disease in all of its aspects. The early part of the season was particularly wet in the eastern states but the temperature was very low. Later in the season when the fruit-rot was likely to develop there was generally too little moisture. Gardner reported that in Indiana high rainfall late in the season was very favorable.

Dates and counties of earliest reported appearance, 1924

April	West Virginia	Pendleton	June 10	New Hampshire	Rockingham
May 6	New Jersey	Cumberland	June 14	Minnesota	Mower
May 12	Pennsylvania	Adams (leafspot)	June 15	Arkansas	Washington
May 12	Virginia	Frederick	July 2	Iowa	Linn
May 14	Delaware	Sussex	July 9	Indiana	Lawrence
June 3	Connecticut	New Haven	July 21	New York	Dutchess
June 4	Illinois	Montgomery	July 25	Pennsylvania	Adams (blackrot)
			Sept. 1	Michigan	Livingston

Varietal susceptibility

Table 10. Susceptibility of apple varieties to blackrot as reported in 1924.

State and authority	Varieties
	Fruit severely affected
Pennsylvania - Orton	York
Arkansas - Dept. Pl. Path.	Crabapples
Indiana - Gardner	Calyx-end rot of Transparent, Delicious. Arkansas, Gideon
	Fruit affected
Delaware - Adams	Calyx-end rot of Rome Beauty, Ben Davis; rot of Crimson Beauty, Transparent, Liveland Raspberry
Indiana - Gardner	Calyx-end rot of Wealthy, Jonathan, Rambo, numerous others; rot following rust infection on Rome Beauty
Minnesota - Sect. Pl. Path.	Greening
	Leaf infection
New Jersey - Martin	Starr, Hagloe, Baldwin, Ben Davis, Red Astrachan, Rome Beauty, Winter Banana, Twenty Ounce, Smith Cider, Stayman Winesap
Delaware - Adams	Stayman, Stark, Williams, Winesap, Transparent
Tennessee - Hesler	Kinnard
Minnesota - Sect. Pl. Path.	Greening

Control

In general there seems to have been little difficulty with control measures.

Pennsylvania: Was held in check satisfactorily by lime-sulfur scab schedule with prepink. (Orton & Walton)

Maryland: The disease was checked by a thorough application of concentrated lime-sulfur solution 1-40 during the pink bud stage. In an orchard in Worcester County, one in Caroline County, and one in Charles County, a portion of the orchard was not spraye during the pink bud stage. In all of the unsprayed trees in t es orchards there was a severe infestation of leafspot which will result in a loss of from 20 to 50% of the leaves. In the same orchards where the pink-bud spray was applied there was very little leafspot and there will be little or no defoliation. (Jehle)

Tennessee: Held in check to some extent by sprays used for blotch. (McClintock)

Indiana: The disease not controlled by scab sprays. (Cardner)

Literature cited

1. Shear, C. L., N. E. Stevens, and M. S. Wilcox. Botryosphaeria and Physalospora on currant and apple. Jour. Agr. Res. 28: 589-598. May 1924.

2. Zeller, S. M. Sphaeropsis malorum and Myxosporium corticola on apple and pear in Oregon. Phytopath. 14: 329-333. July 1924.

RUST CAUSED BY GYMNOSPORANGIUM JUNIPERI-VIRGINIANAE SCHW.

Geographic distribution and relative prevalence

Rust was reported through the same general territory as usual but was more destructive in several sections. Pennsylvania, New Jersey, Maryland, West Virginia, Virginia, Kentucky, Indiana, Illinois, Tennessee, Arkansas, and Missouri report more rust than in 1923. All of the states except Pennsylvania, West Virginia, Virginia, and Arkansas report more than for an average year. Vermont, New York, Wisconsin, Minnesota, Iowa, and Georgia report less rust than in 1923.

Maryland, West Virginia, and Arkansas all report rust infection as the most severe for many years. In the former state, according to Temple (July 15), "There will be more premature defoliation due to rust than at any other time during the past ten years." Giddings reports in West Virginia, "Very uniform and heavy infection but it occurred late and is just beginning to show up (June 23). Rust is more prevalent than it has been for several years. Young rust galls which will mature in 1925 were found June 25." Indiana, Illinois, Missouri, Arkansas, Tennessee, and Kentucky, comprising a block of adjacent states, report severe injury from the disease this year. Weber reports rust found on trees at Gainesville, Florida.

Losses and importance

During the past season there was an unusual amount of fruit injury reported from a number of states, including Virginia, West Virginia, Tennessee, Arkansas, Indiana, and Kansas.

Maine: One to five percent infection in Yellow Transparent fruits from one locality. (Folsom)

West Virginia: A large amount of fruit infection and frequent cases where it is difficult to identify from external symptoms. (Giddings)

Varietal susceptibility

Table 10. Susceptibility of apple varieties to blackrot as reported in 1924.

State and authority	Varieties
	Fruit severely affected
Pennsylvania - Orton	York
Arkansas - Dept. Pl. Path.	Crabapples
Indiana - Gardner	Calyx-end rot of Transparent, Delicious. Arkansas, Gideon
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Indiana - Gardner	Calyx-end rot of Wealthy, Jonathan, Rambo, numerous others; rot following rust infection on Rome Beauty
Minnesota - Sect. Pl. Path.	Greening
	Leaf infection
New Jersey - Martin	Starr, Hagloe, Baldwin, Ben Davis, Red Astrachan, Rome Beauty, Winter Banana, Twenty Ounce, Smith Cider, Stayman Winesap
Delaware - Adams	Stayman, Stark, Williams, Winesap, Transparent
Tennessee - Hesler	Kinnard
Minnesota - Sect. Pl. Path.	Greening

Control

In general there seems to have been little difficulty with control measures.

Pennsylvania: Was held in check satisfactorily by lime-sulfur scab schedule with prepink. (Orton & Walton)

Maryland: The disease was checked by a thorough application of concentrated lime-sulfur solution 1-40 during the pink bud stage. In an orchard in Worcester County, one in Caroline County, and one in Charles County, a portion of the orchard was not sprayed during the pink bud stage. In all of the unsprayed trees in these orchards there was a severe infestation of leafspot which will result in a loss of from 20 to 50% of the leaves. In the same orchards where the pink-bud spray was applied there was very little leafspot and there will be little or no defoliation. (Jehle)

Tennessee: Held in check to some extent by sprays used for blotch. (McClintock)

Indiana: The disease not controlled by scab sprays. (Gardner)

Literature cited

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2. Zeller, S. M. Sphaeropsis malorum and Myxosporium corticola on apple and pear in Oregon. Phytopath. 14: 329-333. July 1924.

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Maryland, West Virginia, and Arkansas all report rust infection as the most severe for many years. In the former state, according to Temple (July 15), "There will be more premature defoliation due to rust than at any other time during the past ten years." Giddings reports in West Virginia, "Very uniform and heavy infection but it occurred late and is just beginning to show up (June 23). Rust is more prevalent than it has been for several years. Young rust galls which will mature in 1925 were found June 25." Indiana, Illinois, Missouri, Arkansas, Tennessee, and Kentucky, comprising a block of adjacent states, report severe injury from the disease this year. Weber reports rust found on trees at Gainesville, Florida.

Losses and importance

During the past season there was an unusual amount of fruit injury reported from a number of states, including Virginia, West Virginia, Tennessee, Arkansas, Indiana, and Kansas.

Maine: One to five percent infection in Yellow Transparent fruits from one locality. (Folsom)

West Virginia: A large amount of fruit infection and frequent cases where it is difficult to identify from external symptoms. (Giddings)

Indiana: In many cases, particularly Gideon, the fruit lesions showed no waxy, yellow color nor fruit bodies, and often appeared as a puckering and internal browning of the tissues about the calyx-end. Sections showed the rust mycelium, however.

On Rome fruit very destructive effects were produced by the rust. The fruits were often greatly deformed and stunted, particularly by pedicel and stem-end lesions and there was much cracking of the tissues in the rust lesions. Many fruits were blighted when very small by pedicel infection. Abundant petiole and stem infection was also found on Rome.

Delicious fruit was seriously deformed by calyx-end rust lesions. Since this is a high priced variety, real losses were caused. (Gardner)

Table 11. Estimated losses from rust as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
8	Virginia	1	Delaware, Maryland, South Carolina, Illinois, Iowa, South Dakota
5	West Virginia		
2.5	Nebraska		
2	North Carolina.		
1.5	Arkansas	.5	Connecticut, Pennsylvania, Georgia, Ohio, Kansas.

Dates and county of earliest reported appearance, 1924

May	Connecticut	New Haven	June 15	Indiana	Orange
May 9	Virginia	Montgomery	June 24	New Jersey	Burlington
May 10	South Carolina	Edgefield	June 28	North Carolina	Mecklenburg
May 16	Delaware	Sussex	June 30	Iowa	Monroe
May 18	Illinois	Johnson	July 4	North Dakota	Richland
June 2	Pennsylvania	Adams	July 24	Mississippi	Lee
June 6	New York	Ulster	Sept. 5	New York	Essex
June 12	Minnesota	Houston			

Weather relations

The extremely wet spring was very favorable to rust infection, but the low temperature which prevailed throughout most of the eastern states certainly was a factor in preventing even far more serious losses than were reported. The development of rust galls, as well as of apple foliage, was held back by the cold weather so that the amount of infection was considerable.

Vaughan of Wisconsin reports, "It seemed to be too cold at the time of spore discharge in June, and the amount of infection was slight for this state."

Varietal susceptibility

New York: Dutchess County - Rome Beauty and Wealthy affected. Ulster County - Varieties most susceptible in order named are: Winter

Banana, Wealthy, Jonathan, Rome Beauty, York Imperial, Hubbardston, Winesap, Newton Pippin. (Guba)

New Jersey: Found on Rome, Wealthy, Winter Banana, Smokehouse. (Martin)

Pennsylvania: York, Winter Banana very susceptible. Fruit of Winter Banana very susceptible. Rambo and Smokehouse much more resistant. Red Astrachan shows trace of infection. (Orton)

Delaware: Rust on fruit of York, Early Ripe, Liveland Raspberry. (Adams)

Maryland: Leaves and fruit of Winter Banana variety very susceptible; also York. (Jehle & Temple)

Kentucky: Stark Golden Delicious as susceptible as Wealthy and Rome Beauty. (Magill)

Tennessee: Kinnards show numerous infections on leaves, but lesions very small. (Hosler)

Arkansas: Much defoliation on susceptible varieties among which Ben Davis, Jonathan, and Bell Flower were noted. Fruit on Ben Davis affected 10%. (Dept. Pl. Path.)

Indiana: Calyx-end infection of rust was very serious in the varieties Dutchess, Delicious, Wealthy, Rome Beauty, Jonathan, Gideon, Red June; and was observed on the varieties Winesap, Stayman, Grimes Golden, Stark, Transparent, Esopus, Rambo, Arkansas, Ben Davis, Salome, Springdale, Florence crab, Wagener, Sweet June, Rhode Island Greening, Dr. Matthews, Excelsior, White Pippin, Indian, Peter, Domine, Winter Banana, Iowa Blush. In addition, leaf infection was noted on Missouri Pippin, Yellow Bellflower, Ronk, Fanny. (Gardner)

Kansas: Noted on Jonathans and Wealthy. Some fruit injury on Jonathans in commercial sections. (Stokdyk)

Wealthy was reported also from Massachusetts, Minnesota, and Iowa, and crabapples from Minnesota and North Dakota, as very susceptible; while Greenings were said to be resistant in Minnesota.

Control

New York, West Virginia, Virginia, and Arkansas report evidence of benefits from red cedar eradication.

Virginia: Marked contrast is seen between localities where red cedars have been removed and those in which there has been no concerted eradication. In the former localities the losses will be of slight importance. (Fromme)

Indiana: Scab sprays did not prevent rust. The Bordeaux blotch spray seemed to be more effective but none gave good control of calyx-end fruit infection. (Gardner)

BLISTER CANKER CAUSED BY NUMMULARIA DISCRETA (SCHW.) TUL.

Blister canker is a type of disease not likely to cause sudden losses nor to change suddenly in the amount of injury it produces. In 1924 Illinois reports more injury than usual and Ohio and Pennsylvania less. Delaware, Virginia, West Virginia, Tennessee, Michigan, Arkansas, Iowa, Missouri, and Kansas report approximately an average amount of injury.

Collaborators in a number of states including New York, Delaware, West Virginia, and Indiana note that it is particularly injurious only in old or seriously neglected orchards.

Virginia: Most important canker. (Fromme)

Arkansas: Appears to be becoming less prevalent, possibly due to better pruning and care and few plantings of Ben Davis. (Dept. Pl. Path.)

Illinois: The pest of Ben Davis, which is practically the only variety which suffers severely. (Anderson & Tehon)

Missouri: Twenty acres of a sixty acre orchard killed. (Maneval)

South Dakota: Causing much loss in eastern section of the state. (Petry)

Kansas: Blister canker can be found in any part of the state, ultimately directly or indirectly is the cause of the death of most of the trees. (Stokdyk)

Susceptible varieties

Table 12. Apple varieties affected by Nummularia discreta as reported, 1924

State and authority	Varieties affected
West Virginia - Giddings	Ben Davis
Ohio - H. C. Young	Yellow Transparent, Jonathan, Baldwin
Arkansas - Dept. Pl. Path.	Ben Davis
Indiana - Gardner	Ben Davis, Yellow Transparent, Twenty Ounce, Grimes
Illinois - Anderson & Tehon	Ben Davis
Iowa - Porter	Northwestern Greening, Ben Davis
Missouri - Maneval	Rome, Ben Davis, Jonathan, Missouri Pippin

Literature

1. Anon. Illinois blister canker. Iowa Agr. Exp. Sta. Rept. 1923: 47. 1923.

2. Swartwout, H. G. Treatment of apple canker disease. Mo. Agr. Ex Sta. Bul. 210: 57. 1924.

FIREBLIGHT CAUSED BY BACILLUS AMYLOVORUS (BURR.) TREV.

Geographical distribution

Apple fireblight seems to have been more prevalent than usual in central United States including Indiana, Illinois, Kentucky, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Arkansas, North Dakota, South Dakota, Kansas, and Colorado, and also in Georgia and Alabama; and Delaware and Maryland. It was about the same or less than usual in the other eastern states and below average in the far western states. More blight than in 1923 was reported from Illinois, Minnesota, South Dakota, Iowa, Missouri, Kansas, Colorado, Texas, Arkansas, Delaware, Alabama, and Georgia. The states of Wisconsin, Indiana, Ohio, Virginia, West Virginia, Pennsylvania, New York, and Massachusetts report less injury.

Economic importance and losses

Table 13. Estimated losses from fireblight as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
7	Texas, South Dakota	1.5	Wisconsin, Kansas, Pennsylvania
6	North Dakota		
5	Iowa, Michigan, Kentucky, Maryland, Mississippi	1	Vermont, Delaware, South Carolina, Arizona
4	Minnesota, Arkansas	.5	Connecticut
3	North Carolina	Trace	Virginia, New Jersey, Colorado
2.5	Georgia		
2	New York, Ohio, Illinois, Alabama Nevada		

In Minnesota, according to the Section of Plant Pathology, fireblight was the most serious disease of apple. Illinois, Kansas, and Missouri report it as more severe than for many years. In Kansas blossom blight was serious in commercial apple sections on Jonathan. In some sections of Colorado and in Arkansas both blossom and twigblight were very important, and blossom blight was common on resistant varieties in the latter state. Petry reported that some orchards in the western part of South Dakota were destroyed by fireblight. In New York young orchards suffered greatest damage from the disease.

The following report by Gardner of Indiana regarding the relation to [illegible] in pear is interesting:

> "In a planting of young Dutchess, Knox County, fireblight was serious in 1922 and 1924 while in 1923 when there was such a bad epiphytotic it was not serious in this block. There is a large pear orchard one-half mile distant which blossomed in 1922 and 1924 but not in 1923. There is a large apiary between. Blight in the Dutchess seems to be correlated with the seasons when this pear orchard blossoms."

V. H. Young in Arkansas and Learn in Colorado also noted that blight was especially severe near pear trees.

Blossom and twigblight were both reported from practically every state reporting the disease. Both were important in Tennessee, Minnesota, South Dakota, Colorado, and Arkansas, while blossom blight was more serious in Missouri, Kansas, and Kentucky, and twigblight in Delaware, New York, West Virginia, and followed by canker in Pennsylvania. Spurblight when the apples were about the size of cherries caused considerable loss locally in Tennessee. Infection of the fruit was important in Illinois and was reported also from Georgia and Colorado. A significant report concerning the collar blight phase of the disease in Pennsylvania is quoted below.

Pennsylvania: Little blossom blight, some twigblight which was generally followed by canker development. Most important phase is the root or collar blight which appears to be on the increase. We believe that collar blight is again returning to its upward swing. Apparently this phase of fireblight lies a year or two behind the epiphytotics of twigblight. (Orton)

Indiana: Serious locally as twigblight of Jonathan: blossom blight of Grimes. Limiting factor with Jonathan variety in Indiana. Frequently destroys Grimes bloom but does not kill the wood. Jackson noted numerous cankers on apple limbs in Posey and Vanderburg Counties (Gardner)

Colorado: Twigblight more common to young Jonathan and blossom blight to older Jonathan. One orchard 25% loss of fruit was estimated. (Learn)

Dates and counties of earliest reported appearance, 1924

April	Arkansas	Washington	June 19	Montana	Flathead
April 25	Illinois	Johnson	June 19	Minnesota	Washington
May 6	Mississippi	Lee	June 24	Wisconsin	
May 12	Virginia	Nottoway	June 24	Connecticut	New Haven
May 16	South Carolina	Spartanburg	June 25	Iowa	Lee
May 17	Indiana	Gibson	June 30	North Dakota	Cass
May 18	Virginia	Montgomery	June 30	Pennsylvania	Center
May 20	Ohio	Lorain	July	South Dakota	Brookings
June 13	Colorado	Delta	July 1	New York	Wayne
June 17	New Jersey	Middlesex			

Apple - Fireblight

Weather relations

It would appear that the temperature relations were quite unfavorable in the eastern United States. Moisture conditions were generally favorable but in most sections the temperature was very low. This may have been of primary importance as a factor which prevented the activity of insects and the carrying of inoculum.

Delaware: Cool and wet weather very favorable. Driving rains and wind were factors in spreading infection. (Adams)

Virginia: At Crozet it was almost non-existent during the wet season of 1924 and very prevalent in the dry season (spring) of 1923. (Fromme)

Wisconsin: Much less than usual. Is this lack of blight to be correlated with the cool season? (Vaughan)

Michigan: Practically no blossom blight. First seen July 15; season exceptionally cool and rainy. (Coons)

Collaborators in Arkansas, Michigan, and Illinois comment upon the very late development of the disease during the 1924 season. This was evidently due to the late active growth of apple trees, since they were held back early in the season by the cold weather. Learn reported that moisture in Colorado was below normal but that, "Previous to the period of blight infection there was quite a little rain for a week followed by a hot humid condition." Oozing of fireblight canker was reported by Guba, May 14 in Ulster County, New York and by Vaughan in Wisconsin on May 10. The unusually dry weather of the Pacific slope doubtless accounts for the small amount of injury occurring there.

Varietal susceptibility

Table 14. Susceptibility of apple varieties to fireblight as reported in 1924.

State	Varieties affected	State	Varieties affected
	Most susceptible varieties		
New York	Gravenstein, Rhode Island Greening	Ohio	Wagener, Rhode Island Greening, Rome Beauty, Jonathan, Baldwin
Delaware	Winesap, Cole, Jonathan, Transparent, Stayman	Indiana	Jonathan, Grimes
Tennessee	Yellow Transparent, Early Williams	Illinois	Jonathan, Transparent
		Minnesota	Greening, Transcendent crab
Arkansas	Jonathan, Maiden Blush, Grimes	Iowa	Yellow Transparent
		Kansas	Jonathan
		Colorado	Jonathan, Gano, Ben Davis
	Noted on		
New York	Alexander, Twenty Ounce, Rhode Island Greening	Indiana	Duchess
		Colorado	Winesap

State	Varieties affected	State	Varieties affected
	Resistant		
Delaware	Liveland Raspberry.	Minnesota	Wealthy (blossom),
Tennessee	Early Harvest, Early Ripe		Greening (twig)
	Blossom blight on		
New York	Fall Pippin	Minnesota	Greening, Whitney
Tennessee	Yellow Transparent, Early Williams	Kansas	Jonathan
		Colorado	Jonathan
Indiana	Grimes		

Twigblight was observed on Jonathan in Colorado, Indiana, Tennessee, and Iowa, and on Wealthy in Iowa. Body blight on Willow Twig was reported from Illinois.

FRUITSPOT CAUSED BY PHOMA POMI PASS.

Fruitspot was reported as severe in some orchards in New Jersey, especially in Burlington County. In one orchard of Wealthy in this county it was severe although the trees had received regular spray applications. In Pennsylvania it was generally distributed but was not important except on susceptible varieties, and was not troublesome at all in sprayed orchards. Apparently dry weather held it in check. In Delaware it was said to be very severe on late apples, with heaviest infection appearing where no August spray was applied. West Virginia reported it as rather unimportant but apparently increasing generally in amount. In Kentucky it was important on King David, which was the only variety on which it was observed in commercial orchards. It was less prevalent than usual in Ohio. In other states reporting it Massachusetts, New York, Arkansas, Illinois, Michigan, and Missouri - It was not important. Dates of first appearance noted are, August 15 in Burlington County, New Jersey, and August 21 in Sussex County, Delaware. The greatest amount of loss reported is one-half percent from New Jersey, Delaware, Pennsylvania, and Maryland.

Table 15. Apple varieties susceptible to fruitspot as reported in 1924.

State and authority	Varieties
Pennsylvania - Orton	Grimes Golden
New Jersey - Martin	Wealthy, Delicious, Paragon, Smith Cider, Cooper Market, Stayman, Penrock, New, Bellflower
Delaware - Adams	Grimes Golden, Jonathan
Kentucky - Magill	King David
Ohio - H. C. Young	Rome Beauty

Recent literature

Brooks, Charles. Phoma fruitspot of apples. Amer. Fruit Grow. Mag. 44(2): 14, 28, 53. Feb. 1924.

Thomas, R. C. A new fruit spot of the apple - the Brooks' spot. Proc. Ohio State Hort. Soc. 56: 92-96. 1923.

BITTER PIT, NON-PARASITIC

Bitter pit is undoubtedly general throughout the apple growing section of the United States but there is a serious question as to whether most pathologists distinguish between it and fruitspot. Some collaborators reported it as, "Not recognized." It was said to be more injurious than last season in Delaware, Maryland, Kentucky, Arkansas, and Oregon, and less prevalent in New Hampshire, Massachusetts, New York, Pennsylvania, Virginia, West Virginia, and Indiana.

Estimated losses reported by collaborators were Virginia 3%, West Virginia 1%, Maryland and New Jersey 0.5%.

New York: Important locally and only on certain varieties, especially on trees not bearing a full crop. (Guba)

Pennsylvania: Nearly always of importance on Baldwin. (Orton)

Delaware: Very severe on late harvested Grimes. (Adams)

West Virginia: Noted on York Imperial particularly, appearing much later in the season than usual. (Sherwood)

Kentucky: In commercial plantings only found on Grimes where it caused considerable injury. (Magill)

Arkansas: Important on Grimes. Noted also to some extent on other varieties in spite of greater rainfall than usual. (Dept. Pl. Path.)

Oregon: Bitter pit is very prevalent in the apples in western Oregon this year. The season has been dry, and I presume the blemish will show up wherever the crop was dependent upon rainfall or where the irrigation water was deficient. Two cars of Willamette Valley apples the other day ran about 20% blemished by bitter pit. (R. L. Ringer, Sept. 15, in U. S. Dept. Agr. Bur. Econ. Fruit & Veg. Div. Letter, Sept. 26.)

Table 16. Varieties susceptible to bitter pit as reported in 1924.

Variety	States reporting
Grimes Golden	Delaware, Kentucky, Arkansas, Ohio, Indiana
Baldwin	New Hampshire, Ohio, Pennsylvania
Stark	Ohio, Indiana
Jonathan	Ohio
York Imperial	West Virginia
Windsor Chief	Wisconsin

JONATHAN SPOT, UNDETERMINED

Jonathan spot was reported as less severe in Indiana, more severe in Minnesota, and about as usual in North Dakota. It was said to be injurious to stored fruit in Idaho, Iowa, Pennsylvania, and Connecticut.

Arkansas: Apples obtained from several places showed symptoms of Jonathan spot superficially but unlike it showed discoloration of the fibro-vascular bundles. (Dept. Pl. Path.)

Pennsylvania: Methods of handling fruit appear important in producing or preventing this trouble. (Orton)

Varieties reported susceptible were Jonathan from Pennsylvania, Iowa, Arkansas, Indiana, and Kansas; and Wealthy from Minnesota and North Dakota.

CROWNGALL CAUSED BY BACTERIUM TUMEFACIENS EFS. & TOWN.

The symposium on crowngall at the Cincinnati Meeting aroused much interest in this disease. The statements of several collaborators are given below:

Connecticut: Dug up one of the trees in the crowngall experimental orchard and found very little gall showing; it has spread little or none during the 6 to 8 years the trees have been set out. (Clinton)

New York: Apple stem tumor was noted on young (7 year old) apple trees of Tioga variety in Wayne County. Disease is exactly similar to the one described and illustrated by Nellie A. Brown in Journal of Agricultural Research, 27: 695-698, but its presence cannot be ascribed to the causes given. Disease is very serious on tree, producing large wart like growths. (Guba)

Delaware: Rootrot follows soft galls causing injury in Sussex County. (Adams)

Tennessee: Early Harvest, Wealthy, Horse, and Rome Beauty are susceptible varieties. Serious in nurseries, 50% maximum. (McClintock)

Michigan: One nursery reports loss of 25% of this year's trees. (Bennett)

Iowa: Local in nurseries, 25%. (Porter)

South Dakota: Susceptible wild varieties not affected, indicating that the causal organism is not normally present in large areas. (Petry)

Arkansas: Nurseries complain of large losses, many growers complain that trees affected with it are shy bearers. (Dept. Pl. Path.)

Mississippi: Abundance of nursery stock infected; 90% maximum. (Neal)

New Mexico: Fifty percent. (Crawford)

Arizona: General, 6% reduction in yield. (R. B. Streets)

Recent literature

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SOOTY BLOTCH AND FLYSPECK CAUSED BY PHYLLACHORA POMIGENA (SCHW.) SACC. AND LEPTOTHYRIUM POMI (MONT. & FR.) SACC.

This was not particularly prevalent or injurious in any large areas. The report from Illinois indicates that it was much more prevalent than in 1923. Pennsylvania, West Virginia, and Missouri mention it as less common. It would seem likely that the midsummer dry weather which prevailed in much of the eastern apple growing areas was an important factor preventing development of sooty blotch.

The disease is reported as injurious in neglected and unsprayed orchards in Arkansas and Delaware.

Pennsylvania: Sooty blotch occurred on Russet and Greening. (Orton)

Indiana: Sooty blotch is serious on Winesap, Stayman, Black Twig, and Stark in Orange County. (Gardner)

Illinois: This is the most general attack of sooty blotch ever recorded in this state. A comparison of sooty blotch and flyspeck indicates a striking difference in occurrence. (Anderson & Tehon)

POWDERY MILDEW CAUSED BY PODOSPHAERA LEUCOTRICHA (ELL. & EV.) SALM.

Geographic distribution

As usual, although reported from a number of states scattered throughout the country, powdery mildew was of little or no importance in all except four, all in the West - Colorado, New Mexico, Arizona, and Idaho.

Connecticut: Apparently not uncommon in early summer on twigs but no serious injury. (Clinton)

Pennsylvania: Chiefly in nursery stock. Dry weather probably checked it. Jonathan especially susceptible. (Orton)

West Virginia: More on Gano, Jonathan, Rome Beauty, and Ben Davis than other varieties, but infection generally not severe. (Sherwood & Giddings)

Colorado: Very general in Mesa County about Grand Junction and in several orchards. Fifty to seventy-five percent of the leaves infected. Severe enough on some trees to cause young shoots to die. Many orchards show the leaves to be curled up and fungus growth beneath gives a white appearance. Some growers attempt to control it by spraying. No varietal susceptibility noticed. (Learn)

New Mexico: Of considerable importance locally. Blossoms, leaves and terminals killed. Three percent loss reported. Jonathan and Ben Davis susceptible, Winesap somewhat resistant. (Crawford)

Idaho: Quite common in unsprayed orchards. (Hungerford)

Dates and counties of earliest reported appearance, 1924

April 24	West Virginia	Berkeley	June 6	Illinois	Jersey
May 1	Virginia	Albemarle	June 9	Colorado	Mesa
May 6	New Mexico	Chaves	July 10	Wisconsin	Rock
May 31	Delaware	New Castle	Aug. 5	Pennsylvania	Lawrence
June 4	Connecticut	New Haven			

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BROWNROT CAUSED BY SCLEROTINIA CINEREA (BON.) SCHROET.

Brownrot was reported as unimportant from a number of states east of the Mississippi from Massachusetts to Wisconsin and Alabama, and from Arkansas and Iowa. It follows insect or fungous injury in New York, and is associated with codling moth injury in Illinois, according to collaborators. Gardner stated that in Indiana the disease was noted only on Esopus as a storage rot. In Massachusetts, Delaware, and Arkansas it was reported as occurring mostly on early varieties. The variety Red Astrachan was mentioned as especially susceptible in New York and Delaware, Yellow Transparent in Arkansas, and Greenings and Russet in Pennsylvania.

ROOTROTS

Black rootrot caused by *Xylaria* spp.

Black rootrot was reported from Massachusetts, New York, Pennsylvania, Virginia, West Virginia, Kentucky, Tennessee, Georgia, Ohio, Alabama, and Michigan.

New York: Important everywhere, especially serious on King and causing 1% loss. The rot is secondary; the primary cause is usually winter injury. (Guba)

Virginia: Same as usual, 1%. (Fromme)

Kentucky: About 2% of the trees per year die in most orchards, presumably due to this disease. The following varieties have been found dying; Winesap, Stayman, King David, Ben Davis, and Rome. No reports of Delicious dying so far. (Magill)

West Virginia: Is seen only in eastern section, mostly on Ben Davis. Appears to be closely connected with injuries such as those due to mice. (Sherwood)

Tennessee: Continues to kill trees here and there in many orchards. (McClintock)

Illinois: Somewhat more prevalent than usual causing greater injury to young orchards in Johnson County. (Anderson & Tehon)

Mushroom rootrot caused by *Armillaria mellea* (Vahl) Quel.

Mushroom rootrot was very common on neglected trees in home orchards in Delaware. In Pennsylvania it is usually found following collar blight on the roots. It was said to be important on recently cleared land in West Virginia and Arkansas, and was reported also from Georgia, Michigan, and Minnesota (sporophores found on bark at base line).

Other rootrots

"In Kentucky a rootrot due to *Sclerotium rolfsii* Sacc. occurred in grafts which were set in a bed and manured heavily with manure containing chips." (Valleau)

"*Ozonium omnivorum* Shear was very important in the black lands of Texas where apples cannot be grown on account of this disease. Four percent loss." (Taubenhaus)

FROST INJURY

Frost injury was reported as important from Washington, Idaho, South Dakota, Minnesota, Illinois, Indiana, Ohio, West Virginia, Pennsylvania, Massachusetts, and Mississippi.

Blossom injury

Blossom injury was reported from Massachusetts and Connecticut as slight. Clinton says that wet cool weather at blossoming time is a more important factor than frost in reducing the set in Connecticut. Crawford of New Mexico reports it as very important, causing 20% reduction. Hungerford of Idaho reports heavy losses to early blossoming varieties, but later blossoming varieties produced an average crop. Dana of Washington says, "Late spring frosts have been very general over eastern and central Washington apple districts. The injury was so serious as to influence many growers to stop spraying." West Virginia and Pennsylvania report considerable blossom injury.

Leaf injury

Leaf injury is specifically reported from Massachusetts, Delaware, and West Virginia.

Massachusetts: In many instances killing or seriously injuring the first leaves. (Osmun)

Delaware: Common on first leaves in blossom clusters of early opening varieties such as Early Ripe. (Adams)

Other types of frost and winter injury

Alabama: Severe winter injury following general freeze. Many young trees killed. (Miles)

West Virginia: Grimes Golden, Winesap, and Ben Davis particularly affected. Some russett on fruit. (Sherwood)

Ohio: Noted freezing of 8 to 12 year old Grimes, Baldwin, Stayman; general. (H. C. Young)

Indiana: Frost bands and russett in southern Indiana. Much confused with Bordeaux injury but occurred on unsprayed trees of Ben Davis, Grimes Golden, Winesap, Arkansas, and Rome Beauty. Chenango banded in Miami County. (Gardner)

Wisconsin: Low temperature in December killed buds in northern section. (Vaughan)

Minnesota: Serious bud, twig, and root injury in apple section; 5% loss estimated. (Dept. Pl. Path.)

South Dakota: Winter frost has killed some trees. Early frost combined with rainy weather reduced stand of fruit. (Petry)

Illinois: About December 20, 1924 the central and western portion of this state was visited by an "ice storm" rain freezing on the branches followed by a heavy wind. It was the worst ever experienced in this section of the country. ** It caused great injury to fruit trees. I would estimate the damage to fruit trees at $75,000 to $100,000. (Anderson)

Injury to trees themselves was also reported from Pennsylvania, Tennessee, Ohio, Michigan, and Washington.

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OTHER DISEASES

Fruitrots, spots, etc. (References 3, 4, 22, 23, 24, 27, 32, 34)

Alternaria sp., rot - Washington; coremold - Indiana.
Cephalothecium roseum Cda., pinkrot - New York, Illinois.
Coniothyrium sp. (probably C. pirinum (Sacc.) Sheldon) fruiting on fruitspot - Illinois.
Cork (nonpar.) - Washington
Droughtspot (crinkle; nonpar.)- Delaware, on Stayman, Stark, York, Ben Davis; Minnesota.
Fusarium sp., corerot - Indiana.
Penicillium sp., rot - Connecticut.
Phytophthora cactorum (Leb. & Cohn) Schroet. rot - Pennsylvania

Leaf diseases (30)

Cercospora mali Ell. & Ev. - Mississippi, Texas.
Coniothyrium sp. - Illinois.

Corticium stevensii (Noack) Burt, hypochnose - Alabama, Mississippi.
Septoria piricola Desm. - Illinois (abundant in one locality)

Bark and wood diseases (8, 11, 13, 21, 33, 37, 40)

Measles (undet.) - West Virginia, Maryland, Missouri, New Mexico, Arizona.
Myxosporium corticolum Edg. - Pennsylvania, South Dakota, Oregon.
Rosette (undet.) - Important in many sections of Idaho.
Schizophyllum commune Fr. - Minnesota, Washington.
Septobasidium pedicillatum (Schw.) Pat. - Mississippi
Septobasidium retiformis (Berk. & Curt.) Pat. - Texas.
Stereum purpureum Pers. - Washington

Miscellaneous (25, 28, 35)

Chlorosis due to excess of lime - Texas.
Fertilizer injury from applications of sodium nitrate - South Carolina
Spray injury and dust injury due to copper sprays and dust - Ohio, Connecticut, Delaware, Indiana. More specific spray injury combined with scab injury may be found reported under that disease.

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PEAR

BLIGHT CAUSED BY BACILLUS AMYLOVORUS (BURR.) TREV.

Pear blight seems to have been unusually severe in some of the southern states including Florida, Georgia, Alabama, Arkansas, and Kansas; in two of the central states - Wisconsin and Illinois; and in three of the eastern states - Maryland, New Jersey, and Delaware. It is reported as less severe in New York, Connecticut, Ohio, Kentucky, New Mexico, and Idaho.

Gardner comments upon the fact that in Indiana pears are not a commercial crop, probably because of this disease. It might be noted further that in the commercial orchard sections of West Virginia, and presumably in other states, the growing of pears is discouraged because of its association with fireblight on apples. In West Virginia pears which were near commercial apple orchards have been watched closely for the past fifteen years and it has been found that wherever the pears were destroyed, the amount of injury from apple fireblight was reduced to a minimum. It is particularly easy to meet such a problem in sections where the commercial apple orchards are large, as the cooperation of a few growers can render extensive areas free from pears which might carry infection.

Table 17. Estimated losses from blight as reported by collaborators, 1924.

Percentage loss	States reporting
60	Arkansas
50	Georgia, South Carolina
35	Mississippi
20	Alabama, North Carolina
15	Kentucky, Illinois
8.5	Maryland
5	Arizona
4	West Virginia, Texas
3	Ohio
2	Michigan, Kansas
1.5	Delaware
1	New York, Vermont, Connecticut

Dates and counties of earliest reported appearance, 1924

April	Louisiana	East Baton Rouge
May 6	North Carolina	Lenoir
May 27	Arizona	Santa Cruz
May 28	South Carolina	Anderson
June 5	Illinois	Calhoun
June 14	Wisconsin	Washington
June 15	Colorado	Montrose
June 16	New Jersey	Middlesex
June 17	Ohio	Scioto
July 10	New York	Wayne
July 29	Connecticut	New Haven

New York: General, but severe only locally and in young orchards. (Guba)

Delaware: Very severe on Kieffers. (Adams)

Tennessee: Very general this year over eastern Tennessee. (Hesler) Chinese and Japanese varieties are resistant as are seedlings of these varieties. (McClintock)

North Carolina: Plantings left in sod are less affected. (Fant)

Georgia: General; most of the old orchards in south Georgia entirely killed long ago, others are lingering. (Boyd)

Florida: More plentiful during the past season than ever before. It was well distributed over the state. Certain varieties of Sand pears supposed to be resistant have been found badly diseased this season. (Weber)

Alabama: Leaf, fruit, blossom, crown, body, and twig blight occurred. The sand or Pineapple pear is practically immune and not included in the loss estimates. (Miles)

Illinois: Keiffer and Garber are less susceptible than other varieties. (Anderson & Tehon)

New Mexico: Much less severe than last year. All pear orchards that were badly blighted were pulled up in spring. Blight was carefully cut out under supervision of a hired inspector. (Crawford)

Idaho: Due to the exceptionally dry season, there was less of this disease than usual. (Hungerford)

California: General except near coast. Outbreak in Santa Clara Valley this year. (Horne)

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SCAB CAUSED BY VENTURIA PYRINA ADERH.

Pear scab was reported as more severe than usual in the group of states including Wisconsin, Illinois, Michigan, Ohio, and West Virginia, and also from Connecticut, New Jersey, Pennsylvania, and Delaware. In most of these states, however, it was actually important only locally or on certain varieties. Other states reporting it are New Hampshire, Vermont, New York, Maryland, Virginia, Ohio, Indiana, Idaho, Washington, and California.

Connecticut: Conidial stage found on old twigs, proving that it was carried over winter on them. Bad on Flemish Beauty; little on Seckel. (Clinton)

New York: General, but serious only locally and on Flemish Beauty. Very few orchards of this variety in the state. More general on all varieties on Long Island. (Guba)

Pennsylvania: General; very serious. (Orton)

Delaware: Common with neglected plantings. (Adams)

Illinois: Abundant on susceptible varieties in northern Illinois. (Anderson & Tehon)

California: Very slight this year. One severe attack reported in Santa Cruz Mountains. (Horne)

Table 18. Estimated losses from scab as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
.5	Michigan, Pennsylvania	1	Maryland, West Virginia, South Carolina
3	New Jersey, Ohio		
2	Connecticut, Vermont	.5	New Hampshire

Dates and counties of earliest reported appearance, 1924

June 3	New York	Ontario	July 28	Illinois	Cook
June 6	Connecticut	New Haven	Aug. 20	New Hampshire	Strafford
June 18	Pennsylvania	Mercer	Sept. 2	New Jersey	Middlesex

LEAFBLIGHT CAUSED BY FABRAEA MACULATA (LÉV.) ATK.

Apparently leafblight was important in only three states. In Delaware and New Jersey it was said to be serious in unsprayed orchards on both leaves and fruit, and caused a loss of 6% in the former state, and 20% in the latter. Defoliation was very prevalent during August in Delaware, where spraying of pear trees is generally neglected, according to Adams. Temple and Jehle estimated a loss of 5% for Maryland. McClintock reported that in Tennessee leafblight was serious on nursery trees, especially on French and American stocks while Chinese and Japanese varieties were not so badly affected. In Alabama also it was serious on nursery stock, but was otherwise unimportant. Other states reporting the disease are Connecticut, Pennsylvania, West Virginia, Illinois, and Michigan.

Dates of first appearance reported are May 28, Kent County, Delaware; June 6, New Haven County, Connecticut; August 2, Blair County, Pennsylvania; and August 8, Burlington County, New Jersey.

LEAFSPOT CAUSED BY MYCOSPHAERELLA SENTINA (FR.) SCHROET.

Leafspot was reported from New York, New Jersey, Pennsylvania, Delaware, Virginia, Alabama, Ohio, Illinois, Michigan, and Kansas. While it was said to be more common than usual in Illinois and Michigan, the loss caused was only a trace. No loss higher than this was estimated in any state. In New Jersey it was said to be severe in some orchards. Fromme stated that it was prevalent on unsprayed trees at Winchester, Virginia. In Alabama it was unimportant except locally in nurseries. Sand and Kieffer nursery stock were apparently very susceptible, according to Miles. Anderson and Tehon reported that it was not at all serious on Kieffer in Illinois.

Dates of earliest appearance reported are June 12, Dutchess County, New York; June 29, DeWitt County, Illinois; July 3, Burlington County, New Jersey.

WEATHER INJURY

Frost injury to blossoms caused loss in New Mexico and Idaho. A loss of 25% was estimated in New Mexico. Some orchards were saved partially by the use of smudge pots, according to Crawford. Frost banding of fruit was reported from Washington. Other states reporting frost injury are West Virginia, North Carolina, Arkansas, Michigan, Kansas, and Arizona.

Winter injury - Severely cold temperatures during January 1924 killed 50% of the pear blossoms in Illinois. (Anderson & Tehon)

Leaf burning due to drought and high temperatures - Washington.

OTHER DISEASES AND INJURIES

Armillaria mellea (Vahl) Quel., mushroom rootrot - Mississippi.
Bacterium tumefaciens EFS. & Town., crowngall - Florida, New Mexico.
Botrytis cinerea Pers., fruitrot - Washington, attacks fruit still on trees. (Heald)

Cephalothecium roseum Cda., pinkrot - following scab in Illinois.
Cercospora sp., leafblotch - caused some defoliation in Florida. (Weber)
Chlorosis due to excess of lime - Texas.
Corticium stevensii (Noack) Burt. hypochnose - Alabama
Diplodia sp., twigblight - caused extensive dieback of twigs and some large branches in Florida; usually attacking the weaker portions of the trees. (Weber)
Gymnosporangium sp., rust - West Virginia, Illinois.
Measles, cause undet., was reported by Weber from Florida. This seems to be the first report of the finding of measles on pear.
Nectria galligena Bres., European canker - Washington.
Ozonium omnivorum Shear, rootrot - caused a loss of 4% in Texas, and 2% in Arizona.
Physalospora cydoniae Arn., blackrot - Delaware, West Virginia, Arkansas, Illinois, Michigan.
Roughbark disease, probably physiological - Washington.
Septobasidium retiforme (Berk. & Curt.) Pat., canker - Alabama, Texas.
Spray injury - due to Bordeaux, Connecticut; to lime-sulfur, New York, Washington.

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QUINCE

LEAFBLIGHT CAUSED BY FABRAEA MACULATA (LÉV.) ATK.

Leafblight was reported from Connecticut, New York, New Jersey, Pennsylvania, Delaware, West Virginia, Kentucky, Tennessee, South Carolina, Alabama, Indiana, Illinois, and Michigan. It was not regarded as important in any of these states although a loss of 2% was reported from Pennsylvania and 1% from New York. In the latter state spores of the fungus on old leaves which were wintered outside appeared to be mature about June 1. Dates when the disease was first observed were May 6, Oconee County, South Carolina; June 10, Tippecanoe County, Indiana; and July 22, Burlington County, New Jersey.

FIREBLIGHT CAUSED BY BACILLUS AMYLOVORUS (BURR.) TREV.

Fireblight was reported from Connecticut, New York, New Jersey, Pennsylvania, Delaware, West Virginia, Alabama, Louisiana, Texas, Arkansas, Ohio, Illinois, Michigan, and Kansas. Losses estimated were 3% in Michigan, and 1% in New York, West Virginia, and Illinois. In Arkansas 1924 was said to be "the worst year for fireblight in many years." Stokdyk reported 2% injury in some plantings in Kansas. Dates of earliest reported appearance in 1924 were June 10, Randolph County, Illinois; June 16, Middlesex County, New Jersey; June 25, Sussex County, Delaware; and July 20, Wayne County, New York.

OTHER DISEASES

Bacterium tumefaciens EFS. & Town., crowngall - New Jersey.

Glomerella cingulata (Stonem.) Spauld. & Schrenk, bitter rot - Kansas.

Gymnosporangium sp., rust - New Hampshire, Connecticut, New York, Pennsylvania (loss for state 3-4%; the fruit in one twenty-acre orchard was completely destroyed by this disease - Orton & Kirby), Delaware, West Virginia (very few quinces raised but fruit infection unusually severe; loss 3% - Giddings), Kentucky, Alabama, and Kansas.

Phoma pomi Pass., fruitspot - Always present in Adams County, Pennsylvania but this year of less importance due to dry summer. (Walton)

Physalospera cydoniae Arn., blackrot - Fruitrot always present and generally troublesome in southeastern Pennsylvania where most of the quinces in state are grown. Insect punctures are generally responsible for invasion of fungus. (Walton)

DISEASES OF STONE FRUITS

PEACH

BROWNROT CAUSED BY SCLEROTINIA CINEREA (BON.) SCHROET.

In general, peach brownrot appears to have been less injurious than during 1923. New York, New Jersey, Delaware, Maryland, Indiana, and Arkansas report more injury, while Pennsylvania, West Virginia, Kentucky, Tennessee, South Carolina, Georgia, Ohio, Illinois, Kansas, Louisiana, and California report less.

Fromme reported an unusual occurrence of the blossom blight in an orchard at Leesburg, Virginia, where it caused 25% damage. In one orchard in New Jersey Carman suffered severe injury from blossom blight, while Elbertas adjoining were only slightly affected. Blossom and twigblight were reported also from Connecticut, New York, Delaware, Mississippi, Ohio, and Illinois. According to Hutchins there was much less fruitrot than usual in Georgia; whereas Weber stated that it was very destructive in Florida.

Table 19. Estimated losses from brownrot as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
*30	South Carolina	3	Connecticut
10	Alabama	2.5	Pennsylvania
8	New Jersey, North Carolina	2	Michigan, Ohio, New Mexico
7	Maryland, Arkansas	1.5	Texas, Delaware
6	Virginia	1	Kansas, Illinois, New York
5	Louisiana, Georgia		
4	Kentucky, Mississippi		

Dates and counties of earliest reported appearance, 1924.

May 7	Virginia	Loudoun	June 2	New Jersey	Burlington
May 12	Indiana	Warrick	June 16	Connecticut	New Haven
May 22	Pennsylvania	Franklin	June 17	South Carolina	Oconee
May 28	Delaware	Kent	June 17	New York	Ontario
May 29	Illinois	Pulaski	July 1	Mississippi	Oktibbeha
June	Tennessee	Knox	July 10	New Mexico	Dona Ana

It is evident that dry weather during the summer was a very important factor in reducing the amount of loss from brownrot in the 1924 season. This was stated to be the case in a number of states in which damage due to brownrot was comparatively slight, including Pennsylvania, West Virginia, Tennessee, Louisiana, Ohio, Illinois, and California. Ludwig reported that in South Carolina, "At Clemson College Mayflowers were damaged more than Elbertas, as drier weather had set in by the time the Elbertas were ripening." In Pennsylvania, according to Orton and Kirby, "Greatest loss occurred in early varieties; Red Bird is very susceptible." Collaborators in Kentucky and Arkansas also stated that brownrot was less prevalent on late varieties; on the other hand late varieties were most affected in New Jersey.

There are no special statements given concerning control, but Neal in Mississippi reported that where spraying was thorough and timely the disease was rare; and Stokdyk said that spraying held it in check in Kansas. A number of reports state that brownrot was severe in unsprayed orchards. The quotation from New Jersey given below is of interest in this connection.

<u>New Jersey:</u> In Cumberland County a severe hail storm was experienced in July. As soon as the storm was over one orchard was dusted

with an 80-20 dust at the rate of a quarter of a pound to the tree. Two days were required to cover about 340 acres. In this orchard the owner states that there was not more than 4 or 5% brownrot although more than that amount fell to the ground. In an adjoining orchard which was not dusted until several days after the storm at least 20% of the fruit rotted on the trees and at least 50% fell to the ground. (Dept. Pl. Path.)

Delaware: Apothecia mature May 2: infection of young fruit general in many orchards May 28. Developing fruit showed infection resulting from curculio injury during June. (Adams)

Illinois: Conditions seemed very favorable for the development of brownrot until within two or three weeks of harvest. It is probable that the dry weather before harvest aided materially in reducing losses from brownrot. (Anderson)

California: Very rare this year. Occurs near the coast and in decreasing abundance to the great valleys, in spring as a blossom blight and canker and in fall as a fruitrot. (Horne)

Recent literature

Barss, H. P. Brownrot and related diseases of stone fruits in Oregon. Oregon Agr. Exp. Sta. Circ. 53: 1-18. 1923.

Berkeley, G. N. Brown rot of stone fruits. Canadian Hort. 47: 165. July 1924.

Ezekiel, Walter N. Presence of the European brown-rot fungus in America. (Abstract) Phytopath. 15: 55. Jan. 1925.

Fant, G. W. The brown rot canker and twig blight of the peach. Ann. Rept. New Jersey Agr. Exp. Sta. 43 (1921/22): 547-548. 1924.

———— The manner of infection of peach twigs by the brown rot fungus. Phytopath. 14: 427-429. Sept. 1924.

Zundel, G. L. Pertinent pointers on brown rot of stone fruits. Better Fruit 18(10): 7, 25. April 1924.

LEAFCURL CAUSED BY EXOASCUS DEFORMANS (BERK.) FCKL.

The reports indicate that leafcurl was not unusually severe during the past season, except in a few states. Bennett stated that in Michigan there was the worst attack in years. In South Carolina, according to Ludwig, it was much worse than usual and was present to some extent even in properly sprayed orchards. Adams reported that bud and twig infection were very prevalent in Delaware. In Georgia there was less in the northern part of the state but somewhat more in the central part. Illinois, Kentucky, and Tennessee report very much less, and Ohio and Alabama less, than usual. In Kentucky and Tennessee there was very little even on unsprayed trees, and in Virginia the disease was not especially severe.

Table 20. Estimated losses from leafcurl as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
*10	Michigan	2.5	Ohio
8	New York	2	Arkansas, South Carolina, North Carolina
5	New Jersey, West Virginia		
4	Arizona	1.5	Delaware
3	Pennsylvania, Maryland, Kansas	1	Texas, Illinois

* No crop in worst affected district due to freeze.

Dates and counties of earliest reported appearance, 1924.

April 6	South Carolina	Oconee	May 13	New York	Ulster
April 15	Mississippi	George	May 22	Connecticut	New Haven
April 29	Virginia	Roanoke	May 22	Pennsylvania	Franklin
May 6	New Jersey	Cumberland	May 22	Indiana	Tipton
May 6	Delaware	Kent	June 5	Illinois	Calhoun
May 13	Ohio	Fairfield			

The relation of leafcurl to weather conditions seems to have been brought out particularly well during the past season. Guba reported that in New York, "Early spring rains were very favorable for a state-wide epidemic. There was a cool rainy period during and following the bursting of the buds." Cool wet weather just as peach buds were opening was reported from Pennsylvania, Delaware, West Virginia, South Carolina, Ohio, and Michigan. In Delaware unfavorable weather conditions prevented the timely application of the dormant spray in many orchards. On the other hand, McClintock reported that in Tennessee:

> "In marked contrast to last season, the peach trees, regardless of whether sprayed or not, are practically free from leafcurl this season. Our results here check with those of Professor Mix (Kansas; see Pl. Dis. Reporter 8: 8. June 15, 1924) relative to there being little or no rain at the time when infection was expected to occur."

In general, there seems to have been no difficulty in controlling the disease with the usual sprays, although Ludwig stated that in South Carolina it was present to some extent even in properly sprayed orchards. In both New York and New Jersey, where there was more leafcurl than usual, it was severe only where spraying was omitted or not properly done. Osmun reported that in Massachusetts leafcurl was very serious in many orchards that did not receive the dormant spray because of the probability of a light crop due to winter killing of the buds. The omission of the dormant application in Pennsylvania and West Virginia also permitted the disease to become severe. In the former state it was not important except where this spray had not been given. A number of states report that leafcurl was not important in commercial orchards, or others, where thorough spraying was done.

Maryland: Bordeaux 3-3-50 + 2% oil emulsion gave 95% control. Niagara soluble sulfur 4 pounds to 10 gallons water + 2% oil emulsion gave 50% control. Checks gave 95% defoliation and no fruit. (Temple & Jehle)

Kentucky: None of the oil sprays used were found to control it. (Magill)

Recent literature

Mix, A. J. Biological and cultural studies of Exoascus deformans. Phytopath. 14: 217-233. May 1924.

SCAB CAUSED BY CLADOSPORIUM CARPOPHILUM THUEM.

Peach scab was generally reported about as usual. West Virginia, South Carolina, New Jersey, and Delaware report more while Ohio, Illinois, Tennessee, Alabama, and New York report less. In general it was said not to be important except in unsprayed orchards.

Kentucky: It is being controlled nearly 100% by single spray with self boiled lime sulfur when the fruit is about 3/4 inch in diameter. (Valleau)

Tennessee: Not serious even on unsprayed trees. Evidently held in check by dry weather. (McClintock)

Florida: Scab was common wherever the host plant was found; attacking the young fruit always around the stem and top portions. (Weber)

Arkansas: Not important where orchards are well sprayed. In the vicinity of Rich Mountain several small well isolated clumps of peach trees were seen and in every case scab was abundant, indicating that the disease may have come in on nursery stock or else that it is easily spread for considerable distances. (V. H. Young)

Indiana: Not serious; only cankers noted. Carried on nursery stock. Found very serious in a young orchard in Gibson County, April 25. (Gardner)

Twig infection was reported from Delaware, South Carolina, Ohio, and Indiana.

Table 21. Estimated losses from scab as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
3	North Carolina, Kentucky, Arkansas, Texas	1	Michigan, Mississippi, New Jersey Alabama
2.5	Delaware		
2	Pennsylvania, Maryland, Virginia, West Virginia, Ohio, Georgia	.5	Connecticut

Dates and counties of earliest reported appearance, 1924.

March 21	Mississippi	Newton	June 20	New Jersey	Burlington
June 3	South Carolina	Chesterfield	August 21	Delaware	Kent
June 19	Virginia	Albemarle	August 28	Illinois	Jackson

BACTERIAL SPOT CAUSED BY BACTERIUM PRUNI EFS.

Bacterial spot appears to have been more abundant than usual and is reported more injurious in Michigan, Ohio, Illinois, Kentucky, Tennessee, Georgia, North Carolina, South Carolina, Virginia, Maryland, New Jersey, and Delaware. It was reported as less injurious than usual in New York and Indiana. Other states reporting it were Connecticut, Pennsylvania, West Virginia, Alabama, Mississippi, Louisiana, Texas, Arkansas, Missouri, and Kansas.

New Jersey: In one orchard in Atlantic County bacterial spot was severe on Carman and Elberta while on Belle and Hiley only a trace was found. All trees had received the regular spray applications. Severe on Mamie Ross, heavy leaf drop. (Martin)

Delaware: Most destructive disease of peach. More on light soils. (Adams)

Virginia: Caused defoliation and dropping but did not seriously affect yield. (Fromme)

Kentucky: July defoliation of trees in certain areas in orchards. (Magill)

Tennessee: Serious in some commercial orchards causing defoliation. Appears more serious on poorer soils on tops of hills. (McClintock)

North Carolina: Is prevalent and destructive this year on Hale and Elberta varieties. (Fant)

Mississippi: Causes heavy defoliation on some trees, sometimes resulting in death of trees. (Neal & Wallace)

Ohio: Very severe in northern part of the state, especially in orchards not in perfect growing condition. (H. C. Young)

Illinois: Worst this disease has ever been. Caused loss of 25% of Hales. In one large commercial orchard in southern Illinois the Hales were 95% marked and the selling value reduced 50%. (Anderson)

There is in Illinois a specimen bearing Burrill's notes and determination dated 1912. (Anderson & Tehon)

Michigan: Unusually severe in orchards where it is present. (Bennett)

Table 22. Estimated losses from bacterial spot as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
4	North Carolina	1	South Carolina, Georgia, Alabama, Arkansas
3	Illinois		
2	New Jersey, Delaware, Virginia	.5	Maryland

Michigan reports no loss because the crop was killed by a freeze in the affected district.

Dates and counties of earliest reported appearance, 1924.

May 6	South Carolina	Oconee	June 9	Pennsylvania	Mifflin
May 10	Mississippi	Harrison	June 12	New Jersey	Atlantic
May 23	Louisiana	Madison	June 25	New York	Wayne
May 28	Delaware	Sussex	June 27	Arizona	Cochise
June 4	Indiana	Knox	Aug. 5	Pennsylvania	Lawrence

Susceptibility of peach varieties to bacterial spot, 1924.

State and authority	Varieties affected
	Susceptible
New Jersey - Martin	Carman, Elberta, Mamie Ross
Delaware - Adams	Elberta, Belle of Georgia, Hale
Maryland - Temple & Jehle	Elberta
Illinois - Anderson	Hale, Elberta
	Resistant
New Jersey - Martin	Belle, Hiley
Illinois - Anderson	Jasper, Newton

There is evidently some difficulty in controlling the disease by the use of fertilizers. Anderson stated that in Illinois, "The outstanding feature of the bacterial spot situation was the failure to control the disease by applications of nitrate in many orchards;" while in Delaware, according to Adams, "Mineral fertilizers did not control, but only replaced the loss of foliage by new growth."

RUST CAUSED BY TRANZSCHELIA PUNCTATA (PERS.) ARTH.

Rust was reported from South Carolina, Georgia, Florida, Texas, Missouri, and California. Apparently in the first two states the disease was much less common than usual. According to J. C. Dunegan it was collected on the leaves of seedling peaches in the vicinity of Fort Valley, Georgia, as early as May, but had not been seen since then, although ordinarily it is abundant in that section. In South Carolina Ludwig stated, "Rust is commonly very prevalent on peach and wild cherry at Clemson College in the fall, but this season only a trace was found even after diligent search in the college orchard." On the other hand, Weber reported on October 13 that in Florida, "Rust is apparently no less severe at this time of the year than it has been in recent years. The infection is general and eventually results in the complete defoliation of the trees." In a nursery inspected by Fields at Santa Barbara, California, on September 23, rust infection was heaviest on a double-flowering peach tree about six or seven years old, but was also abundant on other peach trees about the same age.

J. C. Dunegan of the Office of Fruit Disease Investigations gives the following interesting report:

> "I have never collected stages 0 and I on Ranunculaceae in this district (Fort Valley, Georgia) although I have looked for them every spring. The hosts themselves are apparently very uncommon in the vicinity of Fort Valley.
>
> "Stage II has occurred in 1921, 1922, and 1923 very abundantly on all varieties of peaches. The first infections appear about the middle of August and toward the end of the season practically all the leaves are infected. A limited number of counts have revealed as many as 250 to 375 pustules on each leaf.
>
> "In 1924 stage II was collected from the leaves of a seedling peach on May 21. The infection was quite recent as many of the peridia were not ruptured. The spores were mature however, as they germinated readily in sterile tap water. This was the earliest date I ever collected this stage and I thought we could look for widespread infection and possibly some injury, due to its early appearance, but since that date no further collections have been made.
>
> "Stage III on peaches was not found until late in 1923, when a few pustules were observed among the uredinial sori. This stage is not very common on this host in this district.
>
> "Stages II and III were also collected on <u>Prunus angustifolia</u> in 1923. The telial collections were of especial interest as the sori occurred on both sides of the leaves (i. e. amphigenous). Dr. Arthur lists it as being only hypophyllous. Specimens submitted to Dr. Diehl of the Office of Pathological

Collections were determined as T. punctata but he stated they had no collections with this amphigenous character in their herbarium. Specimens of stage III which were not amphigenous were also collected from this host.

"Stage II was also collected on the leaves of Prunus serotina in the fall of 1923.

"I have in addition, specimens of stage II on peach leaves from Bowden, Griffin, and Woodbury, Georgia; and Uriah (near Atmore), Alabama."

BLIGHT CAUSED BY CORYNEUM BEIJERINCKII OUD.

Interesting reports of damage caused by peachblight were received from Ohio and Michigan in 1924. In Ohio it was said by H. C. Young to be quite serious on twigs and fruit in one or two orchards along Lake Erie. In Michigan, according to Bennett, the fruitspot, leafspot, and canker were important in two orchards in Mason County. In one of these orchards, one of the few in the county in which leafcurl was satisfactorily controlled, the owner estimated his loss at two-thirds of the crop. The shothole was abundant although defoliation was not serious. However, about 25% of the twigs were killed at the time the report was made (September 1), and it was thought that there would probably not be more than 20% of clean fruit.

In Idaho, according to Hungerford, blight is one of the most important peach diseases, especially in the northern part of the state. He stated that "Where San Jose scale is present the spray for that seems to control Coryneum blight." Colorado and Washington also reported the disease.

YELLOWS (CAUSE UNDETERMINED)

In 1924 yellows was reported as causing a loss of 2% in Maryland, and 1% in New Jersey and Virginia. It was said also to be of some importance in New York, Delaware, and West Virginia. Reports of inspections in New Jersey and Pennsylvania are given below.

Manns and Adams report (1) that attempts to communicate yellows and little peach through inoculations of healthy trees with infusions of leaves, limbs, and fruits from affected trees were unsuccessful. The results of two years' work on the transfer of pollen seemed to indicate that pollen from yellows-affected trees is functionless.

New Jersey: In a survey of a number of peach orchards in the east Vineland section in South Jersey, the infection of yellows and little peach ran from 1% to 40%. In most cases the orchards showing heavy infection were not properly tended. The Department of Agriculture inspected 4,352 trees in this area and marked 645 as being infected with yellows or little peach. (Dept. Pl. Path.)

Pennsylvania: 674.012 trees inspected and 0.89% affected with yellows. Highest percentage of yellows found in trees 8 to 9 years of age. (McCubbin)

Literature cited.

1. Manns, T. F., and J. F. Adams. (Report of) Department of plant pathology and soil bacteriology. Delaware Agr. Exp. Sta. Bul. 135: 35-46. 1924.

ROSETTE

Rosette was reported from Georgia and Florida. L. M. Hutchins of the Office of Fruit Disease Investigations furnishes the following report for Georgia

> "For the important peach producing districts of Georgia, annual losses of trees from peach rosette during recent years have been less than 0.1% of the total plantings, and may therefore be indicated by the word trace. Rosette is easily controlled by eradication. As a rule the diseased trees die during the same growing season that the characters of rosette appear, and thus natural eradication becomes an important factor in the control. In orchards where the disease is unusually severe, immediate removal of rosetted trees, followed up by similar eradications during the same and subsequent seasons, has proved very effective in control."

LITTLE PEACH

Little peach caused a loss estimated at 1% in New Jersey, and was reported also from New York, Pennsylvania, Delaware, and Michigan (See also under Yellows, New Jersey and Delaware).

SPRAY INJURY

Spray injury was reported from Connecticut, New Jersey, Delaware, West Virginia, Georgia, and Tennessee.

Connecticut: In one case used atomic sulfur and got injury but not with dry mix lime sulfur. (Clinton)

Pennsylvania: Fruit spur canker and fruitdrop, due probably to arsenicals, caused severe loss in Adams County. Bud cankers caused fruit to wither and drop. Many fruit bearing twigs killed, especially on inner branches, which will affect the 1925 crop seriously. Three year old orchards never sprayed show no sign of the trouble. Confined to orchards where arsenicals were used either as dust or spray. (Walton)

Delaware: Sulfur and arsenical sprays caused severe foliage injury. Leaves sensitive because of cool wet weather, first 6 to 8 leaves on new growth affected. Peach trees interplanted with apples where copper dust was used show severe leaf injury followed by defoliation. (Adams)

Tennessee: Little conspicuous injury, minor injury from Bordeaux where excess of lime was used. (Hesler)

Georgia: A large amount of injury from arsenate of lead in central par of state. (Hutchins)

In the following quotation Martin and Haenseler give some interesting data concerning spray injury in New Jersey.

> "Spray tests conducted the past year on three year old trees gave the following results:
>
> "1. 1-1/2 pounds of arsenate of lead to 50 gallons of water caused very severe leaf and twig injury.
>
> "2. The addition of 4 pounds of hydrated lime to 1-1/2 pounds of arsenate of lead in 50 gallons of water reduced the injury very slightly.
>
> "3. A combination of 1-1/2 pounds of powdered arsenate of lead and 8 pounds of sulfur to 50 gallons of water caused injury just as severe as lead arsenate alone.
>
> "4. In a dry mix containing 8 pounds of sulfur and 1-1/2 pounds of powdered lead arsenate the injury decreased as the amount of lime increased. Even with 6 pounds of hydrated lime, however, the injury was not entirely prevented.
>
> "5. Increasing the amount of lead arsenate in a standard dry mix (8 pounds of sulfur, 4 pounds of lime) from 1-1/2 to 2-1/2 pounds in 50 gallons of water materially increased the amount of injury.
>
> "6. A combination of self-boiled lime sulfur and lead arsenate used at the rate of 1-1/2 pounds to 50 gallons of mixture caused no injury to twigs or leaves.
>
> "This trouble has been particularly severe this year. In one orchard of 40 acres every leaf had fallen by July 1 and the new and 1 year old wood was severely cankered."

WEATHER INJURY

Winter and frost injury

Injury to trees was a very serious problem during the winter of 1923 and 1924. The greatest amount appears to have occurred in the eastern central states.

In Tennessee, according to McClintock, unusually cold weather following mild weather killed a number of trees in several orchards, mostly in the peach section about Harriman and Kingston. The same combination of weather in Illinois caused a loss of trees estimated by Anderson at 10%. In Kentucky Valleau reported that 3 to 8% of the young trees were killed. Young orchards also suffered severely in Alabama and Georgia. There was more injury to the trees than usual in Arkansas. H. C. Young estimated a loss of 3% due to injury to bark and twigs, which was serious throughout the northern part of Ohio.

A number of reports have been quoted previously (Pl. Dis. Reporter 8: 8, 25. 1924)

Lee M. Hutchins of the Office of Fruit Disease Investigations, U. S.

Department of Agriculture, gives the following valuable report on winter injury.

> "In the great southern peach district, lying south of Virginia and east of the Mississippi, except during periods when brownrot is unusually severe, the greatest average annual loss attributable to a specific pathological condition is generally due to the primary and secondary effects of winter injuries to the bark of the collars and trunks of the trees. Occasionally these tree destroying injuries mount to the extent of an actual catastrophe, the most serious recent occurrence having been in the winter of 1921-22, when probably one million peach trees were killed in this area. For the section indicated, the injury is most frequent along the Coastal Plain. The orchard site is important; injury is most severe in trees on the poorer soils and it is particularly prevalent on sandy hilltop sites. No variety is immune but varietal susceptibility is marked, particularly during periods when the injuries are less severe. Of the commonly grown sorts, Carman, Alexander, Red Bird, and Mayflower are among the most susceptible to winter injuries of this type, while Hiley and Elberta (both important commercial varieties) are more resistant though they too may suffer severely at times."

Injury to the fruit buds was severe in Indiana north of Gibson County and in Illinois north of Jackson County. Gardner stated that the crop north of Gibson County was ruined. A loss of 60% was reported by Bennett from Michigan, due to the killing of the buds by winter freezing and spring frosts. In Kansas freezing killed all of the crop in the northern part of the state and half of it in the southern, according to Stokdyk. A loss of 2 to 3% was reported by Orton from Pennsylvania, where frost caused a rather severe thinning in many orchards. Crawford reported that freezing of the blossoms caused a loss of 25% in New Mexico, chiefly in the Mesilla Valley. Attempts to prevent injury by smudging were not successful, due to high winds and low temperatures. Streets reported that in Arizona, "In the higher valleys in the northern counties where few trees are found the blossoms are frequently killed by frost."

Other forms of weather injury

Drought injury, and premature dropping of the fruit due to dry weather, were important in Texas, according to Taubenhaus. Clinton reported that drought injury in 1923, with subsequent winter injury, caused the death of a large number of twigs in some orchards in Connecticut. He stated also that imperfect pollination due to cool wet weather at blossoming time caused much fruit to drop later, but there was a fair set in most places.

OTHER DISEASES AND INJURIES

Armillaria mellea (Vahl) Quel., rootrot - Texas.

Bacterium tumefaciens EFS. & Town., crowngall - Very destructive in some orchards in South Carolina, according to Ludwig; reported by Hesler as killing 50 trees and injuring others in one orchard in Tennessee; serious in nursery stock in Mississippi and Indiana; also reported from Louisiana, Texas, and Arizona.

Peach - Miscellaneous

Botrytis sp. has been described as causing fruitrot on Elberta and Lovell peaches shipped from California. (3)

Cercosporella persicae Sacc., frosty mildew - Florida.

Chlorosis due to excess of lime - Texas.

Copper wire injury - In Delaware where copper wire was used for caging peach trees soluble copper caused complete defoliation (Adams).

Diplodia natalensis Ev., footrot - The cause of considerable trouble with the dying of nursery stock and young trees set in the groves in Florida. (Weber)

Glomerella cingulata (Ston.) Spauld. & Schrenk - Caused severe rotting of nearly mature fruit in one locality in Florida. (Weber)

Heterodera radicicola (Greef) Muell., rootknot - Destroyed a 25 acre orchard near Bennettsville, South Carolina, but such severe damage is uncommon, according to Ludwig; also reported on shipments of nursery stock in Mississippi, and from Florida and Texas.

Ozonium omnivorum Shear, rootrot - Texas, peach apparently highly resistant. (Taubenhaus)

Phoma persicae Sacc., canker - On nursery trees from Waynesboro, Virginia. (Fromme)

Rhizopus sp., fruitrot - Very serious on fruit, especially Hale, in transit and market, in Illinois. Over 50% of the rot reported on peaches originating in Illinois is due to this fungus, which was unusually serious this year, in the orchard as well as on harvested fruit, on account of the large number of cracked peaches and split seeds (Anderson (1)). Also reported from Washington.

Rootrots - In Arkansas numerous specimens sent in from orchards on new land particularly show rootrot. (Dept. Pl. Path.)

Sphaerotheca pannosa (Wallr.) Lév., powdery mildew - Connecticut, New York, Pennsylvania, Virginia, Texas.

Valsa leucostoma (Pers.) Fr., dieback - Pennsylvania (at State College on neglected trees injured by borers - Orton), Illinois.

Recent literature

1. Anderson, H. W. Rhizopus rot of peaches. Phytopath. 15: 122-124. Feb. 1925.

2. Haenseler, C. M. A new peach wilt disease. (Verticillium sp.) Ann. Rept. New Jersey Agr. Exp. Sta. 43 (1921/22): 568. 1924.

3. Lindegren, C. C., and Dean H. Rose. Two hitherto unreported diseases of stone fruits. Jour. Agr. Res. 28: 603-605. May 10, 1924.

4. Smith, C. O. The study of resistance to crown gall in Prunus. (Abstract) Phytopath. 14: 120. 1924.

PLUM AND PRUNE

BROWNROT CAUSED BY SCLEROTINIA CINEREA (BON.) SCHROET.

Brownrot is by far the most injurious disease of plum and prune. It was very generally reported from all sections except the Pacific Northwest, and was mentioned specifically as the most important plum disease in Wisconsin, Minnesota, Kansas, and Arkansas. New Jersey, Delaware, Ohio, Illinois, Wisconsin, and Iowa reported more damage than usual, while Louisiana, Minnesota, and the group of states including West Virginia, Kentucky, and Tennessee reported less. The disease was very serious in Iowa, causing total loss of the crop in some sections, especially the southeast part, according to Porter. H. C. Young reported that in Ohio, "Thorough spraying was necessary to control it this year," and in Illinois, Anderson stated that brownrot was serious even in many sprayed orchards. In most of the states reporting no more or less than usual, the disease was still of considerable importance, at least locally.

Table 23. Estimated losses from brownrot as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
25	Iowa	4	Kentucky
20	Alabama	3	Minnesota, West Virginia, Kansas
15	Michigan, New Jersey		
11	Ohio	2	South Dakota, Vermont, Connecticut, Georgia, Mississippi
10	Wisconsin		
7.5	Arkansas		
7	Maryland	1.5	Pennsylvania
5.5	Illinois	1	New York, Delaware, North Dakota, Texas
5	Nebraska		

Blossom blight was reported from Alabama, Michigan, Minnesota, and Wisconsin. Twigblight was said to be severe in many home orchards in Illinois, and was reported also from Ohio, Wisconsin, and Minnesota. In Florida the fungus caused a dieback of the young twigs of _Prunus umbellata_ and attacked the leaves and fruit also.

Mature apothecia of the fungus were found on April 7 at State College, Pennsylvania; April 29 at University Farm, Minnesota; May 5 at Madison, Wisconsin; and May 12 in Michigan and in Houston County, Minnesota.

Wet weather during May and June is believed by Anderson to be responsible for the severity of the disease in Illinois. Weather conditions in Michigan and Ohio were said to be favorable for brownrot as far as moisture was concerned, but the temperature was too low for its greatest development. Dry weather was mentioned as a factor in reducing the amount in West Virginia and Tennessee.

The following quotations give comments of collaborators on varietal susceptibility and on control. It will be noted that Minnesota and North Dakota both report sand cherry (_Prunus besseyi_) hybrids as attacked.

Wisconsin: Orchards sprayed with lime-sulfur had little loss. Put on one extra spray as fruit started ripening. (Vaughan)

Minnesota: Sand cherry hybrids very susceptible. Susceptibility varies with variety in Japanese and American plums. (Sect. Pl. Path.)

North Dakota: "Sapa" (P. besseyi X P. salicina) and "Hansen" found attacked, and "Compass cherries" (P. besseyi X P. hortulana mineri). (Weniger)

Kansas: Good control when sprays were properly applied. (Stokdyk)

BLACK KNOT CAUSED BY PLOWRIGHTIA MORBOSA (SCHW.) SACC.

Black knot was reported from twenty-four states.

Kentucky: It was more prevalent than usual on Damson plums. Also found on Green Gage and Lombard. (Valleau)

Illinois: More specimens sent in this season than in all previous seasons combined. While I have not seen the disease in the field I am certain from the reports that it must be unusually severe this year. (Anderson)

North Dakota: Found on Prunus americana, P. besseyi, P. virginiana, and P. pennsylvanica. (Weniger)

LEAFSPOT CAUSED BY COCCOMYCES PRUNOPHORAE HIG.

Leafspot was reported from New York, Delaware, Pennsylvania, Florida, Alabama, Arkansas, Ohio, Illinois, Michigan, Wisconsin, Minnesota, Kansas, and Montana. New York and Michigan each reported a loss of 1%. Vaughan stated that in Wisconsin it was worse on European than on Japanese plums. Coccomyces sp. on Wildgoose plum (Prunus munsoniana) was reported from Arkansas.

POCKETS CAUSED BY EXOASCUS PRUNI FCKL. AND E. COMMUNIS SADEB.

Plum pockets was reported from New York, West Virginia, Florida, Texas, Ohio, Michigan, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Kansas, and Colorado. There was more than usual in Minnesota and Kansas, and less in New York, Iowa, and North Dakota. Specimens of E. pruni were sent in from New York and Wisconsin.

Florida: Exoascus communis was very serious on both fruit and leaves of wild plums (Prunus umbellata). The fruit was almost 100% infected, also a large number of small twigs were attacked. (Weber)

Minnesota: Serious in some local areas; varieties from the Prunus niger group more seriously damaged. (Sect. Pl. Path.)

North Dakota: Wild plums, choke cherries, and cultivated hybrids of these as grown in state, all equally susceptible. (Weniger)

LEAFCURL CAUSED BY EXOASCUS MIRABILIS ATK.

Anderson and Tehon of Illinois report leafcurl common on hortulana plums in McDonough County. This is the first record for western Illinois. It was also reported from Georgia on Prunus angustifolia.

BACTERIAL SPOT CAUSED BY BACTERIUM PRUNI EFS.

Bacterial spot was reported as more injurious than usual in Michigan, where it caused a loss of 1%, and in Delaware, and Illinois. Other states reporting the disease are New York, Pennsylvania, Tennessee, Florida(on Prunus umbellata), Alabama, Mississippi, Louisiana, Texas, Ohio, and Indiana.

Delaware: Shoot infection more progressive than on peach; on neglected trees killed back to first year wood. (Adams)

Florida: Bacterial spot was sent to the laboratory attacking half grown fruit of Prunus umbellata forming large brown spots; not common. (Weber)

Illinois: The Burbank less diseased than others. (Anderson & Tehon)

Tennessee: Reported as more serious on higher soils of low fertility. (McClintock)

WEATHER INJURY

Frost injury

Stokdyk stated that frost killed the plum crop in some parts of Kansas, while other sections were free from it. A loss of 10%, due to freezing of the blossoms, was reported from New Mexico. Prunes in the southwestern portion of Idaho, and in the Walla Walla section of Washington, were injured by spring frost which reduced the crop. In some orchards in the latter section heating resulted in a good average crop. Frost injury was reported also from West Virginia, Michigan, Minnesota, and South Dakota.

Drought injury

Hungerford reported leafroll and fruitdrop, probably due to lack of moisture, as very important in Idaho.

The following interesting quotation is from the Division Letter of the Fruit and Vegetable Division of the Bureau of Agricultural Economics (5: 433-434. Sept. 19, 1924),

Plum - Weather injury; Other diseases

"Drouth was the principal factor in reducing the grade of fresh Italian prune shipments from points in western Washington and Oregon this summer. It caused four practically distinct types of injury:

"First, - gum spot, beneath which was found a crescent scar 1/4 to 3/8 inch long. This type of injury was most common.

"Second, - shriveling of the prune 1/4 to 1/3 of its length from the stem end, with browning and blackening of the underlying flesh as a result of oxidation. According to Dr. Zeller, of the Oregon Experiment Station, this is an excellent demonstration of the manner in which the leaves draw water from the fruit in case of shortage, removing it from the tissue near the stem end first. This type of injury, though not so common as the gum spot, was the most serious from the standpoint of injury to the individual fruit, prunes so affected being practically worthless as fresh fruit.

"Third, - shriveling on the cheek of the prune, with brown lines of injured tissue extending through the flesh beneath. This was a less serious form of injury than the stem end shriveling.

"Fourth, - browning of the cells lining the pit cavity. This type of injury carried no exterior manifestation and apparently did not injure the eating quality of the fresh fruit, but it did make buyers fearful of the carrying quality of crops so affected.

"As with other fruits in other regions, soil types, topography, and orchard practices were important factors in drouth injury. Some orchards would show mostly one type of injury, some another, and many were practically free from any form of injury.

"It is interesting to note that men associated with the prune drying industry were not so concerned over the various forms of drouth injury as were those interested in fresh prune shipments. One of the former remarked that one good rain before the start of picking for drying would flush the injured tissue, so that practically none of it would be noted in the dried product."

OTHER DISEASES AND INJURIES

Bacillus amylovorus (Burr.) Trev., fireblight - Ohio, South Dakota.

Cladosporium carpophilum Thuem., scab - New York, Pennsylvania, Delaware, Minnesota.

Chlorosis due to excess of lime - Texas.

Diplodia pruni Fckl., gummosis - Serious in Florida on Prunus umbellata in the vicinity of Gainesville and also at De-Funiak Springs, where it killed trees several years old. (Weber)

Fruitdrop - Idaho (see drought injury), Washington.

Ozonium omnivorum Shear, rootrot - Caused a loss of 3% in Arizona. (Streets)

Podosphaera oxyacanthae (Fr.) D By., powdery mildew - Florida, causing a definite twigblight on Prunus umbellata, apparently much more virulent than is usually the case for this fungus, younger parts attacked, becoming swollen and deformed and gradually killed. (Weber)

Roughbark (nonpar.) - Washington
Septobasidium retiforme (Berk. & Curt.) Pat., canker - Alabama.
Silver leaf (undet.) - Washington, diagnosis based on foliage symptoms only. (Dept. Pl. Path.)
Tranzschelia punctata (Pers.) Arth., rust - Alabama, Texas.
Valsa leucostoma (Pers.) Fr., dieback - New York, Texas.
Yellows (undet.) - Delaware.

Recent literature

Arnaud, Gabriel. Sur deux champignons parasites des pruniers deperissants. (Two fungi connected with dieback on plum trees). Rev. Path. Veg. et Entom. Agr. 10: 346-350. Oct.-Dec. 1923.
Valsa leucostoma (Pers.) Fr., and *Eutypella prunastri* (Pers.) Sacc. (Valsa prunastri (Pers.) Fr.)

Brooks, Charles, and D. F. Fisher. Prune and cherry brown-rot investigations in the Pacific Northwest. U. S. Dept. Agr. Bul. 1252: 1-21. 1924.

Fisher, D. F., and Charles Brooks. Control of brown rot of prunes and cherries in the Pacific Northwest. U. S. Dept. Agr. Farmers' Bul. 1410: 1-12. 1924.

Young, Paul A. Red plum curl (caused by Exoascus mirabilis Atk.) Phytopath. 14: 126. 1924.

CHERRY

BROWNROT CAUSED BY SCLEROTINIA CINEREA (BON.) SCHROET.

Brownrot was reported as more injurious than usual in Pennsylvania, Virginia, Ohio, Illinois, Michigan, and Iowa.

Connecticut: Reported on sweet cherry, sour cherry (English Marello), and on Chinese cherry (*Prunus tomentosa*) which is a new host in this state. (Clinton)

New York: On sweet and sour cherries. Blossom, leaf, and twigblight in some sections. (Guba)

New Jersey: In several instances very little rot was observed on trees sprayed with dry mix. On unsprayed trees 75% of the fruit rotted. (Martin)

Pennsylvania: Much more than usual; prevalent everywhere throughout state. Early wet weather must have resulted in sepal infection which later became source of conidial infection of fruit. Both sweet and sour cherries suffered heavy losses. First noticed June 12, in Philadelphia County. (Orton)

West Virginia: Dry season, little rot, heavy crop. (Sherwood)

Kentucky: Very little fruitrot on trees; some after picking. (Valleau)

Florida: Caused dieback of young twigs of *Prunus virginiana.* (Weber)

Arkansas: Sweet cherries as a whole much more susceptible. Certain varieties like Royal Anne very susceptible; unsprayed trees showing almost complete loss. (Dept. Pl. Path.)

Ohio: Most serious on sweet cherries and where sour cherries were harvested late. (H. C. Young)

Illinois: Very important in northern part of state. Notes on commercial orchards examined actually indicate 16% diseased fruit. (Anderson Tehon)

Wisconsin: Found attacking green fruit of sour cherry. (Vaughan)

Table 24. Estimated losses from brownrot as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
20	Pennsylvania	3	Ohio
10	New Jersey	2	New York
5	Illinois, Michigan, Iowa	1	Wisconsin, Kansas, New Mexico
4	Connecticut, Georgia	.5	Delaware
3.5	Arkansas		

LEAFSPOT CAUSED BY COCCOMYCES HIEMALIS HIG.

Cherry leafspot was quite generally reported as unusually severe. This was the case in New York, New Jersey, Delaware, Pennsylvania, Virginia, Kentucky, Ohio, Indiana, Illinois, Wisconsin, and Iowa. Some collaborators stated that the disease became more severe after the fruit was picked.

New York: Infection severe where petal fall and shuck fall applications were not applied. (Guba)

Pennsylvania: Usually important in unsprayed orchards, except in Adams County. General in state, but stated by Walton to be especially severe in Adams County. Apparently more important this year on sour cherries if number of reports is indicative. (Orton)

Delaware: Sour cherry completely defoliated July 10; neglected trees generally defoliated. (Adams)

Kentucky: Defoliation in July. (Valleau)

Wisconsin: Little developed until after harvest. (Vaughan)

Cherry - Leafspot

Table 25. Estimated losses from leafspot as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
9	Ohio	3	Kansas
5	New Jersey, Michigan, Iowa, Nebraska	2	New York
4.5	Arkansas	1.5	Pennsylvania, Illinois
4	Kentucky	.5	Delaware

Dates and counties of earliest reported appearance, 1924.

May	Tennessee	Maury	June 12	New Jersey	
May 6	Delaware	New Castle	June 19	Ohio	Montgomery
May 28	Pennsylvania	Delaware	June 21	Virginia	Henrico
June 5	New York	Dutchess	July 9	Indiana	Orange
June 10	Illinois	Jackson			

Control

New Jersey: Unsprayed trees in Burlington County completely defoliated. In adjoining orchard of 2500 trees sprayed with dry mix lime sulfur only 25% defoliation. In other orchards sprayed with dry mix lime sulfur trees were heavily defoliated. (Martin)

Pennsylvania: Spraying did not check it effectively in Adams County except when very thoroughly done according to R. C. Walton. (Orton)

Delaware: Spraying gives practical control. (Adams)

Tennessee: Well controlled in commercial orchards. (McClintock)

Wisconsin: Thorough control by spraying. Lime-sulfur more particular to use than Bordeaux; latter usually gives best control. (Vaughan)

Keitt and Jones (2), report that at Sturgeon Bay, Wisconsin:

> "Although ascospore discharge of the cherry leaf spot fungus began by May 14 and discharges occurred frequently thereafter, no disease was observed until June 25. Studies showed that this infection was occasioned by ascospores discharged June 15. Although numerous moist periods occurred in early spring, infection by the cherry fungus was delayed until higher temperatures prevailed, little injury occurring even on unsprayed trees before harvest. Later, however, unsprayed trees were severely infected."

These studies indicate that in this section it is unnecessary to apply the preblossom spray formerly considered essential in the control of this disease (1). Such data is of great value in determining the proper times for spray applications.

FROST INJURY

Wisconsin: Ten percent injury on Early Richmond, practically no injury on Montmorency which fruited very heavily so that the total crop was more than ever before. (Vaughan)

Ohio: Some orchards suffered severely. (H. C. Young)

Illinois: Sweet cherries in the Conninsville district showed about 60% fruit buds killed. (Anderson & Tehon)

New Mexico: Fifteen percent freezing of blossoms. (Crawford)

Washington: Crop is sharply reduced in quantity in eastern and central Washington because of spring frosts. The weakening and killing of trees in a number of cases is also noted. (Dana)

Frost injury was also reported from Michigan, Kansas, and Idaho.

OTHER DISEASES AND INJURIES

Alternaria sp., fruitrot - Reported by Lindegren and Rose (3) on sweet and sour cherries from Michigan, Idaho, and Washington, at the Chicago market.

Armillaria mellea (Vahl) Quel., rootrot - Washington; Michigan "In one orchard of 3500 trees ten years old, there was a loss of 50 trees in one portion near a woodlot. Replanted trees 5 years old also killed in some cases. Reports like this of loss of trees here and there in settings on newly cleared land come in each year." (Coons)

Bacterium cerasi F. L. Griffin, bacterial gummosis - Montana, Washington

Bacterium pruni EFS., bacterial spot - New York

Bacterium tumefaciens EFS. & Town., crowngall - Washington

Cladosporium carpophilum Thuem., scab - Iowa, Washington.

Coryneum beijerinckii Oud., blight - Washington

Exoascus cerasi (Fckl.) Sadeb., witches' broom - Washington

Glassy fruit (nonpar.) - Washington

Gummosis (nonpar.) - Washington

Leaf crinkle (cause unknown, probably soil deficiency) - Noted in several orchards in Lewiston region of Idaho. Leaves have somewhat the appearance of mosaic-infected plants (Hungerford).

Phomopsis padina (Sacc.) Died., twigblight and limb canker - Pennsylvani on sour cherry.

Podosphaera oxyacanthae (Fr.) D By., powdery mildew - Vermont, New York, Tennessee, Iowa, Colorado; on *Prunus virginiana* in Pennsylvania; on *P. demissa*, Washington.

Plowrightia morbosa (Schw.) Sacc., black knot - Connecticut on choke cherry and wild cherry, New York, Delaware, Pennsylvania, West

Virginia, Tennessee, Michigan, Wisconsin on wild cherries only, North Dakota (see plum), and Idaho.

Rhizopus nigricans Ehr., fruitrot - Caused some injury in Washington. (Dana)

Tranzschelia punctata (Pers.) Arth., rust - South Carolina, on wild cherry; Missouri, on *Prunus serotina*.

Recent literature (see also under peach and plum)

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2. Keitt, G. W., and L. K. Jones. Further studies of the seasonal development and control of apple scab and cherry leaf spot. (Abstract) Phytopath. 15: 57-58. Jan. 1925.

3. Lindegren and Rose, see peach.

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APRICOT

Bacillus amylovorus (Burr.) Trev., fireblight - Texas.

Bacterium pruni EFS. bacterial spot - Texas.

Bacterium tumefaciens EFS. & Town., crowngall - Caused a loss of 2% in Arizona (Streets).

Cladosporium carpophilum Thuem., scab - Caused a loss of 1% in Texas. (Taubenhaus)

Coryneum beijerinckii Oud., blight - Most important disease of apricots in Idaho. (Hungerford)

Cylindrosporium padi Karst., leafspot - Texas.

Fusicoccum sp., canker - Common on neglected trees in pasture in Monroe County, New York. (Guba)

Sclerotinia cinerea (Bon.) Schroet., brownrot - Connecticut.

Recent literature

Faës, Henry, and M. Staehelin. La maladie des abricotiers dans le Valais. Compt. Rend. Acad. Agr. France 10: 427-428. April 1924.

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Stromatinia (sclerotinia) laxa, thought by some to be only a specialized form of Sclerotinia cinerea.

Foex, E., L. Guyot, and A. Paillot. Quelques precisions sur le Monilia de l'abricotier. Pomol. Franc. p. 111-115, June 1924.

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(Monochaetia rosenwaldia Khazanoff)

DISEASES OF SMALL FRUITS

GRAPE

BLACKROT CAUSED BY GUIGNARDIA BIDWELLII (ELL.) VIALA & RAVAZ

Blackrot was reported as causing more loss than in 1923 in Michigan, Indiana, Ohio, Kentucky, Alabama, New Jersey, and Delaware, while in Pennsylvania, West Virginia, Tennessee, and Illinois it was said to be less severe.

Delaware: Spraying young shoots four to six inches too late for control. Starting with shoots one inch long gave thorough control. (Adams)

Florida: Blackrot was the most widespread grape disease. The fungus was more destructive to the fruit than any other part of the plant but was common on leaves and stems. It was very severe on the leaves of Muscadine (Vitis rotundifolia), which were decidedly more spotted than those of other varieties. (Weber)

Table 26. Estimated losses from blackrot as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
30	Kentucky	5	West Virginia, Ohio Alabama, Mississippi
25	South Carolina	2.5	Arkansas
10	Maryland	1	Illinois, Wisconsin, Nebraska, New Mexico
9	North Carolina	.5	Connecticut
7.5	Georgia		
6.5	Texas		
6.	Delaware		

Dates and counties of earliest reported appearance, 1924.

May 5	Georgia	Thomas	July 12	Tennessee	Hamilton
May 28	Delaware	Kent	July 24	New York	Dutchess
June 5	South Carolina	Chesterfield	July 28	New Jersey	Middlesex
July 3	Illinois	Madison	July 28	Connecticut	Middlesex
July 7	Indiana	Greene	Aug. 2	Pennsylvania	Perry

Recent literature

Rhoads, A. S. Grape diseases, with special reference to black rot and anthracnose. Quart. Bul. Florida State Plant Board 8: 102-112. July 1924.

DOWNY MILDEW CAUSED BY PLASMOPARA VITICOLA (BERK. & CURT.) BERL. & DETONI

Downy mildew was reported as more prevalent than usual in Ohio, Illinois, Michigan, Wisconsin, Iowa, New Jersey, and Delaware. In most of these states, however, it was not important on sprayed vines. Other states reporting it are Connecticut, New York, Maryland, West Virginia, Florida, Kentucky, South Carolina Alabama, Texas, Arkansas, Indiana, Minnesota, Missouri, and Kansas.

Arkansas: It was noted especially on red grapes. (Dept. Pl. Path.)

Illinois: Downy mildew was serious this year again but was not as bad as last year. Brightons seem to be especially susceptible to downy mildew in this state. Spraying with Bordeaux according to the regular schedule seems to have controlled the disease perfectly this year. (Anderson)

Michigan: In a few vineyards the loss due to fruit attack will run as high as 10%; leaf spotting is common. (Bennett)

Wisconsin: Major disease; caused leaves to drop. Good control with Bordeaux spray. (Vaughan)

Iowa: Serious on Moore Early. (Porter)

Estimated losses reported by collaborators were Iowa, 3%; Illinois, 2.5%; Maryland and Michigan, 2%; and Wisconsin, 1%.

Dates and counties of earliest reported appearance, 1924.

June 23	Pennsylvania	Center	Aug. 10	Wisconsin	Dane
July 10	New Jersey	Gloucester	Aug. 21	Connecticut	New Haven
July 17	New York	Wayne	Sept. 30	Delaware	New Castle

Recent literature

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POWDERY MILDEW CAUSED BY UNCINULA NECATOR (SCHW.) BURR.

Powdery mildew was reported from the following states: Connecticut, New Hampshire, New York, Pennsylvania, Delaware, West Virginia, Texas, Ohio, Illinois, Michigan, Wisconsin, Iowa, and Missouri. None of them report it as important.

Literature

De Castella, F., and C. C. Brittlebank. Oidium of the Vine. Uncinula spiralis (Berkeley & Cooke). Jour. Dept. Agr. Victoria 21: 673-685, 738-745. 1923; 22: 98-108. 1924.

Flossfeder, F. How to control powdery mildew. Calif. Grape Grow. 5 (6) 8-9, 14. June 6, 1924.

ANTHRACNOSE CAUSED BY GLOEOSPORIUM AMPELOPHAGUM (PASS.) SACC.

Anthracnose was reported from Maryland, South Carolina, Georgia, Florida, Alabama, Ohio, Indiana, Illinois, Michigan, Wisconsin, and Porto Rico.

Florida: Anthracnose was a very serious disease in the state wherever grapes were grown. It appears to do the most damage to the growing shoots and to the leaves. (Weber)

Literature: see blackrot

DEADARM CAUSED BY CRYPTOSPORELLA VITICOLA (D. REDDICK) SHEAR

Deadarm was reported from New York, Pennsylvania, South Carolina, Ohio, and Michigan.

New York: Common in Chautauqua grape belt and in the Hudson Valley. Dead arms very apparent in the middle of June; practically every vineyard in the Chautauqua grape belt has some dead arm. (Guba)

Ohio: In scattering vineyards found many cases of new infection. (Wilcox)

Michigan: It is present in the majority of vineyards; usually not more than 1% to 2% of plants affected, but in some cases 10% to 20% of vines are diseased. (Bennett)

Literature

Hiura, M. On the dead-arm disease of grape vine in the vicinity of Sapporo. Jour. Soc. Agr. & For. Sapporo 15: 417 (i.e. 435) - 450. June 1924.
Japanese with English resume.

WEATHER INJURY

Winter injury

Severe winter injury to the vines was reported from Minnesota and Illinois. In Minnesota, according to the Section of Plant Pathology, "Winter injury is the most important factor in grape growing. Grapes in general are not hardy in this state. Some hardy varieties such as Beta were badly damaged in some places last year. The estimated reduction in yield is 15%." In Illinois a loss of about 50% was reported by Anderson.

Dr. A. C. Vogele, of the University of Illinois, has sent the following report concerning injury to grapes at the Urbana Station during the winter of 1923 and 1924.

> "We had two periods of extremely low temperature, one in December and one in January. The weather of January 1924 was extremely cold, the temperature going to 18 degrees below zero on the fifth. This was the minimum temperature recorded at the University Weather Bureau. However, this cold snap was of long duration and the records show that it was below zero on January 6, 17, 18, 20, 21, 22, and 26. This long siege of sub-zero temperature with a minimum of 18 degrees below caused considerable injury to certain varieties of grapes in our vineyard at Urbana. Agawam, Lindley, Salem, and Barry were very seriously injured and produced very little fruit, that is, only a few scattered bunches. It is not uncommon to find the buds at the base and toward the middle of the canes dead, so that the only living shoots were to be found at the seventh, eighth, ninth, or tenth node. In other cases there was no localization of the injury, also in many other cases the buds made a vegetative growth but the flower parts were killed.
>
> "The variety that was most seriously injured of all was Herbemont. Of ten vines of this variety six were killed back to the ground. The most of them made growth from adventitious buds from the crown of the vine. Carman, which was growing beside Herbemont, was not injured and produced three-fourths of a crop. Brighton and Niagara were also seriously injured, but the injury in this case was the killing of the flower parts and not of the buds themselves. All of these vines with the exception of Herbemont made a very vigorous vegetative growth this year. A second

group of varieties which were slightly less seriously injured were Gaertner, Empire State, Lady Washington, Clinton, Bacchus, Norton, and Berckmans. The varieties in this group produced only a few pounds of grapes, and the injury here was again due to the killing of the flower parts in the buds, so that we get a large number of fruitless canes. The third group included Isabella, Eaton, King, Champion, Campbell Early, Ives, Goff, Ulster, August Giant, Iowa, Goethe. Winter injury was quite noticeable and reduced the yield to about one-third or one-half crop.

"It is interesting to note that of the newer varieties, Caco, Hubbard, and Regal stood up very well under these conditions of low temperatures and produced a very good crop for the season. Concord, Moore Early, Lutie, Worden, Delaware, and Diamond were the least affected by the minimum temperature of 18 degrees below zero.

"About the beginning of January 1925 the temperature went down for one night to 20 degrees, but the cold spell was not of as long duration as last January, which might make some difference in the winter injury for this season. Undoubtedly, however, the injury for two consecutive years will have a very detrimental effect on the varieties in the first two lists mentioned above."

Frost injury

Frost injury caused losses estimated at 2% in New Mexico, and 1% in southern Georgia, and was reported also from West Virginia, Illinois, and Kansas. In Illinois, however, more loss was caused by successive rains during the blossoming period than by frost, according to Anderson and Tehon. In Arizona frost on April 17 killed back the new shoots, but others started promptly. A loss of 2% was estimated by Streets. Frost in early fall was of considerable importance in Ohio and Michigan.

Michigan: Later maturing varieties frosted before harvest. Most damage in the northern part of the southern half of the state; 10% loss. (Bennett)

Ohio: Early varieties safe; Concord immature except on islands; Catawbas very immature; 5% loss. (Wilcox)

OTHER DISEASES

Armillaria mellea (Vahl) Quel. - Rootrot, Arkansas.

Bacterium tumefaciens EFS. & Town. - Crawford reported a loss of 1% from New Mexico, where crowngall appears to be most severe in vineyards where the crowns have been injured by cultivation. Also reported from Washington.

Chlorosis - Texas. Due to excess of lime. May be controlled by the use of iron sulfate incorporated in the soil (Taubenhaus). Illinois, associated with rootworm injury.

Hardberry (nonpar.) - Washington.

Leaf wrinkle, cause unknown - Seen on four trellises of Concords at

Wasco, Kane County, Illinois, July 25. (Tehon & Anderson)

? *Leptothyrium pomi* (Mont. & Fr.) Sacc. - Flyspeck, resembling that caused by this fungus on apple, found at one place in Adams County, Pennsylvania. (Kirby)

Ozonium omnivorum Shear - Rootrot, Texas.

Rhytisma vitis Schw. - Tarspot, New York.

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Viala, Pierre. Le court-noué. Compt. Rend. Acad. Agr. France 10: 135-138. Feb. 6, 1924.

STRAWBERRY

LEAFSPOT CAUSED BY MYCOSPHAERELLA FRAGARIAE (TUL.) LIND.

Leafspot was reported from practically all sections of the country.

South Carolina: Common throughout state; is causing a defoliation in some fields but did not appear until picking time. No control measures are practical in this state in connection with this trouble; 5% loss. (Moore)

Alabama: Probably due to wet spring, many fields seriously affected, vines dying in some instances. (Miles)

Illinois: Unusually severe this year on account of the exceptionally wet weather in June. (Anderson)

South Dakota: Probably caused from 5% to 10% damage to the crop in some of the larger fields of the southeastern part of the state. As in previous years reported, its severity varies greatly with the variety grown. (Petry)

LEAFSCORCH CAUSED BY DIPLOCARPON EARLIANA (ELL. & EV.) WOLF

Leafscorch was reported from Indiana, Illinois, Wisconsin, and Louisiana. Gardner reported that in a field of three varieties in Indiana, this disease was severe on Gibson and absent on Dunlap and Doctor Burrill. In Illinois it was serious in some beds in Pulaski County. It was especially serious on Klondike and was not found on Aroma in the same field according to Anderson.

Wolf (8) states that this disease is the most serious trouble of strawberries in North Carolina. Regarding losses due to it in that state, he says:

> "Losses ranging from those which were inappreciable to 50% of the crop with an average of about 20%, were sustained in Columbus County in 1922 according to estimates furnished by about 200 growers..... This is regarded as representative of conditions over the entire area devoted to the culture of strawberries within the state."

According to Wolf (l. c.) it occurs in the United States in Louisiana, Delaware, New Jersey, Connecticut, Illinois, Indiana, West Virginia, New York, Maryland, Tennessee, Kentucky, Florida, Wisconsin, and Montana; in Ontario, Canada; and in Germany, France, Italy, Siberia, and Portugal. Of the two important commercial varieties in North Carolina, Klondike is very susceptible, and Missionary moderately susceptible, while of other varieties noted, Excelsior is very susceptible, Lady Thompson moderately so, and Aroma, Brandywine, and Gandy seem to be entirely free. According to data furnished Wolf by L. K. Jones, the varieties in the plantings at the University of Wisconsin may be classified as follows:

Very susceptible - Big Wonder, Charles First, Glen Mary, Peerless, Sample, Superb.

Moderately susceptible - Gibson, Black Beauty.
Slightly susceptible - Magic Gem, Paul Jones, Stevens, Uncle Jim, Sionilli.
Free - Senator Dunlap, Aroma, Brandywine, Kellog's Premier, Progressive, Wolf, Big Late, Bun Special, Doctor Burrill, Joe, Kellog's Prize, Merrick, Warfield.

Attempts which were made to inoculate species of Potentilla with this fungus were uniformly unsuccessful, and the following list of synonyms given by Wolf does not include names first applied to the organism occurring on that genus:

Leptothyrium fragariae Lib.
Gloeosporium fragariae Mont.
Ascochyta fragariae Sacc.
Ascochyta colorata Pk.
Marsonia fragariae Sacc.
Peziza earliana Ell. & Ev.
Mollisia earliana (Ell. & Ev.) Sacc.

FRUITROTS DUE TO VARIOUS FUNGI

Rose (6) reports that one of the most destructive diseases in the southern Mississippi Valley is leather rot caused by a fungus apparently identical with Phytophthora cactorum (Leb.& Cohn) Schroet. It has been found in Mississippi, Louisiana, Arkansas, Missouri, Illinois, Kentucky, and Tennessee. The two varieties, Klondike and Aroma, which are of main commercial importance in these states, are also those on which the disease was most commonly seen in the field, the former being much more severely attacked. Gandy, Missionary, and Lady Thompson are said to be apparently resistant, but are not nearly so extensively used, Gandy being grown commercially only in southern Illinois, and Lady Thompson somewhat in Arkansas and Tennessee, while Missionary was seen in only one field in Arkansas. There is a conspicuous relation to rainfall, infection only occurring during wet weather and the disease reaching a maximum within three to four days after heavy rains. Mulching the beds seems to be an effective method of control. It has been tried with good success at Beebe, Arkansas. In the district around Hammond, Louisiana, there is very little leather rot, although it receives as much rain as any other area within these states. Practically all the strawberry fields in this section are mulched.

Dodge and Stevens (7) compare the rots caused by Rhizoctonia solani Kuehn (Rhizoctonia brownrot), Pezizella lythri (Desm.) Shear & Dodge (tan brown-rot), Botrytis sp. (Botrytis brownrot or gray mold rot), and Phytophthora cactorum (Leb. & Cohn) Schroet. (leather rot). The Rhizoctonia rot is very important in Florida. It is a much more constant source of loss than the Botrytis rot, which although it appears in destructive epidemics suddenly during or soon after brief rainy periods, is much less regularly present in the fields. Regarding the distribution of the first three rots the authors state that:

> "The Rhizoctonia rot is now known from central Florida, North Carolina and possibly from Tennessee . . . . Pezizella rot has been observed by the writers in Cuba, Louisiana, Florida, Arkansas, Virginia, Maryland, Wisconsin, and Alaska. Botrytis has been found to some extent as a fruit rot of strawberries in every strawberry region visited, though it varies greatly in

abundance. It is serious in Alaska and during many seasons in New England, and may become abundant in more southern regions during wet weather. . . . ."

During 1924 the gray mold rot caused by Botrytis sp. was reported by collaborators from Connecticut, New York, Louisiana, Arkansas, Ohio, Indiana, Illinois, and Washington. In Ohio, according to H. C. Young, it was quite general in some sections, causing losses as high as 25%. Anderson stated that in Illinois, "It caused 50% loss in many beds; worse than ever known, due to unusually wet weather in May and June. Many fruit clusters blighted to the crown of the plant."

Pezizella rot was reported from Louisiana.

Leak due to Rhizopus nigricans Ehr. was reported by Taubenhaus as being very prevalent in Texas due to wet weather during harvest, causing a loss of 20%. Rhizopus rot occurred also in Indiana and Iowa, according to reports.

ROOTROTS DUE TO VARIOUS CAUSES

Rootrots, mostly of unknown cause although Fusarium or Rhizoctonia were associated with them in some instances, were reported from a number of states. Blackrot was reported from New Jersey, Michigan, Colorado, and Washington. Rhizoctonia was associated with it in Michigan and Washington. Berkeley and Jackson (1) state that their observations indicate that on the Niagara Peninsula there are three types of blackrot, one of them possibly caused by soil bacteria. Rootrot occurred in Massachusetts, New York, New Jersey, Pennsylvania, Arkansas, Illinois, and Kansas. Some of the comments of collaborators follow:

New York: Rather prevalent in the state. Attempts to associate a pathogene with the disease have so far proved unsuccessful, loss .7%. (Guba)

Pennsylvania: Specimens of rootrot have come in from several localities notably Blair, Indiana, and Erie Counties. Cultures indicate that a Fusarium may be the cause in many instances. The variety Premier seems to be one of the most susceptible. (Thurston)

Florida: Wilt (Fusarium sp.) was found doing considerable damage at LaBelle. The organism attacked the roots and was detected by the discoloration in the lower portion of the main root. (Weber)

Illinois: Very serious in many sections of the state. (Anderson)

OTHER DISEASES AND INJURIES

Chlorosis - Idaho, Texas (due to excess of lime, Taubenhaus)

Dendrophoma obscurans (Ell. & Ev.) H. W. And. - Leafblight. Was reported for the first time from Minnesota, where it was locally important. (Sect. Pl. Path.)

Frost injury - Iowa, Washington.

Heterodera radicicola (Greef) Muell. - Rootknot, Washington.
Sphaerotheca humuli (DC.) Burr. - Powdery mildew, New York, New Jersey, Washington. Becoming severe in eastern Washington. (Dana)
Tylenchus dipsaci (Kuehn) Bast. - Stem nematode. On wild strawberries in the Pacific Northwest. (Godfrey and McKay (4).)
Yellows, cause unknown.- Rather common on Minnesota No. 4 and Dunlap in Minnesota, not so common on other varieties (Sect. Pl. Path.) In Colorado several specimens and reports were received of plants turning yellow and leaves dying at the edge. No organism was found to account for the trouble. (Learn)

Recent literature

1. Berkeley, G. H., and A. B. Jackson. Strawberry black root. (Abstract). Phytopath. 14: 348. July 1924.

2. Coons, G. H. Black root of strawberry. A discussion of the disease and suggestions to growers who contemplate starting new plantings. Michigan Agr. Exp. Sta. Quart. Bul. 7: 25-26. Aug. 1924.

3. Dodge, B. O., and Neil E. Stevens. The Rhizoctonia brown rot and other fruit rots of strawberries. Jour. Agr. Res. 28: 643-648. May 17, 1924.

4. Godfrey, G. H., and M. B. McKay. The stem nematode Tylenchus dipsaci on wild hosts in the Northwest. U. S. Dept. Agr. Bul. 1229: 1-10. 1924.

5. Klebahn, H. Fabraea fragariae, die Schlauchfruchtform der Marssonina fragariae. (Fabraea fragariae, the ascigerous state of Marssonina fragariae.) Ber. Deutsch. Bot. Gesellsch. 42: 191-197. 1924.

6. Rose, Dean H. Leather rot of strawberries. Jour. Agr. Res. 28: 357-376. April 26, 1924.

7. Stoddard, E. M., D. H. Rose, and N. E. Stevens. Spraying strawberries for the control of fruit rots. U. S. Dept. Agr. Circ. 309: 1-4. March 1924.

8. Wolf, F. A. Strawberry leaf scorch. Jour. Elisha Mitchell Sci. Soc. 39: 141-163. April 1924.

RASPBERRY

ANTHRACNOSE CAUSED BY PLECTODISCELLA VENETA (SPEG.) BURK.

Considerable injury due to anthracnose occurred during the 1924 season, no state reporting less damage than usual, while Vermont, New York, Maryland, Ohio, West Virginia, Michigan, and Illinois reported more.

New York: Considerable damage noted in Ontario and Yates Counties, especially on Plum Farmer. Occurred generally on raspberries in Wayne County but of no economic importance. Very prevalent on black raspberries, doing damage to the extent of 25% in Chautauqua County. (Guba)

Ohio: Spots so numerous at base of many laterals that they made almost no growth. (Wilcox)

Indiana: Limiting factor in black raspberry industry, a rather important one in Indiana. Worse in southern end of state. Bearing canes girdled and killed prematurely, also much pedicel and berry infection. Conclusive evidence obtained that the disease is introduced into new patches with the transplants. (Gardner)

Illinois: Most important disease this season. (Anderson)

Kansas: Important in many of the older patches. (Stokdyk)

Porto Rico: On Columbia raspberry. (Cook)

Table 27. Estimated losses from anthracnose as reported by collaborators, 1924.

Percentage loss	States reporting	Percentage loss	States reporting
25	Arkansas	5	New Jersey, Pennsylvania, Michigan
10	Indiana, Wisconsin		
8	Iowa	4	West Virginia
7	Maryland	3.5	Illinois
6	Kentucky	1	New York, North Dakota

Dates of earliest reported appearance, 1924.

April 23	New Jersey	Atlantic	June 11	Indiana	Montgomery
May 9	Ohio	Franklin	June 19	Minnesota	Hennepin
May 12	Mississippi	Lowndes	July 23	New York	Ontario
June 1	Illinois	Pike			

Varietal susceptibility and control

Colby of Illinois reports Quiller resistant (1). The variety Van Fleet developed by the United States Department of Agriculture was said to be free from the disease although other varieties growing nearby suffered injurious attacks (2).

Pennsylvania: Cumberland, Plum Farmer very susceptible, Gregg more resistant; Reds resistant. Bordeaux gave better results than lime-sulfur in Venango County. (Krout & Orton)

Indiana: Delayed dormant spray prevents the infection which later kills the canes. (Gardner)

Michigan: All black varieties very susceptible. (Bennett)

Wisconsin: Spray is important for control using either lime sulfur or Bordeaux. More on black than red raspberries. (Vaughan)

Minnesota: Especially common and severe on black caps. (Sect. Pl. Path.)

Stover gives some interesting data on control under Ohio conditions and states:

> "The first new lesions appearing on plants under observation near Columbus were found on May 9 when the new shoots were six to eight inches in height. Conidia were first observed in new lesions on May 19. Such lesions were very abundant on May 23, on unsprayed canes, thirty to sixty-five percent of the canes in different check plots being infected. Plants sprayed with either liquid or dry lime sulfur showed few lesions and only two to seven percent of the canes were affected. No injury to plants sprayed with lime sulfur have been apparent on this plantation, but some burning resulted from the use of Bordeaux mixture 3-6-50. In a plantation near Lucasville, Ohio, sprayed with dry lime sulfur, many leaves on the old canes are dead, and others have turned yellow. The new growth, however, is very healthy and the leaves on the fruiting branches are not injured. Unfortunately, no check was left in this plantation, and we cannot state definitely that this appearance is the result of spraying."

Recent literature

1. Colby, A. S. Control of anthracnose on black raspberries. Amer. Fruit Grow. Mag. 44(4): 44. Apr. 1924.

2. Darrow, George M. The Van Fleet raspberry; a new hybrid variety. U. S. Dept. Agr. Circ. 320: 1-15. Aug. 1924.

3. Jones, L. K. Anthracnose of cane fruits and its control on black raspberries in Wisconsin. Wisconsin Agr. Exp. Sta. Res. Bul. 59: 1-26. May 1924.

4. Rhoads, Arthur S. Anthracnose of blackberries and raspberries: its cause and control. Ozark Fruit Grower 9(1): 3-5. 1924.

CANEBLIGHT CAUSED BY LEPTOSPHAERIA CONIOTHYRIUM (FCKL.) SACC.

Caneblight was reported from Connecticut, New Jersey, Pennsylvania, Virginia, Ohio, Indiana, Illinois, Iowa, North Dakota, and Idaho. Losses reported were 10% in New Jersey, 2% in Pennsylvania, and one-half percent in Illinois. Kirby and Orton reported it as always important on blackcaps in Pennsylvania. At New Brunswick, New Jersey, severe infection was observed on the varieties Latham, Count, and June, and only slight infection on Donboro, according to the Department of Plant Pathology. Van Fleet is said to be resistant to this disease also (see anthracnose). Fromme reported that caneblight caused considerable loss on Cumberland in Roanoke County, Virginia. LaFrance was the variety affected in the only report of the disease in Connecticut.

BLUESTEM OR WILT CAUSED BY VERTICILLIUM ALBOATRUM REINKE & BERTH.

Bluestem was reported from New York,-where it caused a loss of 1%; Maryland, Ohio - on black raspberry; Minnesota - first report; and Washington-on red raspberry. Berkeley and Jackson (1) state that it is prevalent throughout the Niagara Peninsula on both red and black varieties, affecting three-fourths of the Cuthbert plantations.

> New York: Causes dwarfing and wilting of one and two year old canes. Common but local due to soil infestation (relation to other crops, particularly tomato and potato). Black varieties especially susceptible. Common on one variety of reds (Owasco). Believed to be one of the principal factors causing "running out" of black varieties in New York. (Rankin)

Literature cited

1. Berkeley, G. H. and A. B. Jackson. Blue stem of red and black raspberry. (Abstract). Phytopath. 14: 347-348. July 1924.

ORANGE RUST CAUSED BY GYMNOCONIA INTERSTITIALIS (SCHL.) LAGH. AND KUNKELIA NITENS (SCHW.) ARTH.

Orange rust reported as due to Gymnoconia interstitialis occurred in Connecticut, New York, New Jersey, Kentucky, Ohio, Minnesota, and Iowa. In Pennsylvania, according to Orton, orange rust was found only on blackcaps. It was also reported from three localities in Virginia, on blackcaps and a white variety.

> New York: Orange rust in black varieties is very common this year in Ontario, Yates, and Schuyler Counties where blackcaps are an important crop. It is the most important loss-factor in this crop for this area. Very little effort made at control. (Rankin)

Recent literature

Bessey, E. A. Notes on the orange rusts of Rubus. Papers Michigan

Acad. Sci. 3: 61-66. 1924.

Dodge, B. O. Uninucleated aecidiospores in Caeoma nitens, and associated phenomena. Jour. Agr. Res. 28: 1045-1058. June 7, 1924.

CROWNGALL CAUSED BY BACTERIUM TUMEFACIENS EFS. & TOWN.

Crowngall was reported from New York, New Jersey, Pennsylvania, Delaware, West Virginia, Tennessee, Ohio, Illinois, Michigan, Wisconsin, Iowa, Missouri, Kansas, New Mexico, and Washington. In most cases it was said to be of considerable importance, at least locally. Losses estimated by collaborators were Michigan 10%, Iowa 6%, Kansas 4%, New York, Illinois, New Mexico, and Washington each 1%.

New York: Serious infection local in state. Two patches of seriously infected Columbians noted in Wayne County. (Gula)

Pennsylvania: Heavy losses on introduced plants. Not serious except on plants shipped into state from outside nurseries. Bad cases from Michigan. All varieties appear susceptible. (Krout & Kirby)

Tennessee: Serious, of increasing importance. Most common on St. Regis red raspberry, possibly because this is a more commonly planted variety. (McClintock)

Ohio: Especially general on red varieties. (Wilcox)

Illinois: It is prevalent in all raspberry plantations and in some soils the organism seems to be so abundant as to render raspberry growing impracticable. (Anderson)

Michigan: Most important raspberry disease. Cuthbert and Columbians severely injured. (Bennett)

LEAFCURL, MOSAIC, AND STREAK

In some states leafcurl and mosaic are not distinguished. It is believed that further effort should be made along this line.

Leafcurl

Leafcurl was reported from Connecticut, New York, New Jersey, Pennsylvania, Maryland, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, and North Dakota. Losses estimated were: New Jersey 10%, Michigan 1%, Illinois 0.75%.

It is interesting to note that Melchers reported that neither leafcurl nor mosaic was found in Kansas in 1924, although careful inspection was made of large commercial plantations of all varieties in the southern part, and there have been many shipments of plants into the state from sections where these diseases do occur.

New York: Very uncommon. Occasionally found on Cuthbert, never in any great amount. Once collected on Syracuse, a red variety. (Rankin)

New Jersey: Severe on Idaho at New Brunswick. (Dept. Pl. Path.)

Pennsylvania: Chiefly on reds and purples, none on blackcaps. (Krout)

Ohio: Not common on blackcaps but in a few fields, does great damage. Severe on red varieties Cuthbert and Marlboro. Not on King, Herbert, or Ranere. (Wilcox)

Indiana: Rather common in black raspberries, our main commercial crop, and is considered a serious menace to the industry. (Gardner)

Illinois: Leafcurl is especially prevalent on certain varieties of red raspberry; it has caused more trouble in the northern section of the state than elsewhere. (Anderson)

Wisconsin: Fifty-one nurseries report leafcurl and 63 nurseries report yellows. Serious on Cuthbert and Marlboro; these varieties not as much raised as formerly. (Vaughan)

Minnesota: Probably a small percentage in 90% of the fields. (Sect. Pl. Path.)

Mosaic

Mosaic was reported in 1924 from about the same area as leafcurl, and in addition from South Dakota, Colorado, Idaho, and Washington. Losses estimated as due to mosaic were Minnesota 15%, New Jersey and Michigan 10%, Iowa 8%, and Wisconsin 5%.

Rankin has given the following list of varieties found to be susceptible to mosaic in New York:

Red raspberries - Brighton, June Ontario, Brilliant, Kevitt Hybrid, Owasco, Cayuga, King, Perfection, Count, Latham, Redpath, Cuthbert, Louboro, Red Rose, Donboro, Lyerle, Ruby, Eaton (Idaho), Marlative, Segrist, Empire, Marlboro, Seneca, Eureka, Marldon, St. Regis (Ranere), Golden Queen, Miller, Surprise, Goliath, Minnetonka, Superlative, Herbert, Newman.

Purple raspberries - Abundance, Columbian, Haymaker, Royal Purple, Shafer. (From New York State Col. Agr. Depts. Plant Path. & Ent. Weekly News Letter 1924: 25-27. May 5, 1924)

Connecticut: Nursery inspection for this disease taken up for first time this year. Cuthbert worst infected variety. Found also on St. Regis, Herbert, and suspicious symptoms on King and Latham. (Clinton & Hunt)

New York: Everywhere but most serious in the Hudson Valley. In Wayne County many plantings of Columbians ruined by mosaic by July. (Guba)

Very common but not an injurious disease. Many black and purple varieties - Columbian (purple) very susceptible. Similar conditions in some red varieties. Certain growing conditions seem to cause this type of mottling also. (Rankin)

New Jersey: Severe on St. Regis, Ontario, Count, June, and Cuthbert. Slight infection on Seneca, La France, Erskine, Park, and Donboro. (Martin)

Pennsylvania: Most important disease of raspberries; everywhere in state. Chiefly on blackcaps; less commonly on purple canes. In rogued fields the disease was reduced to usually less than 1%. (Krout & Kirby)

Ohio: Severe on King, Marlboro; not on Cuthbert or Herbert. On blackcaps, spreading rapidly especially in southern sections of the state. (Wilcox)

Indiana: Noted mainly in red raspberries. These are not grown on a commercial scale. Noted also in the Honey Sweet variety of the black raspberry. (Gardner)

Michigan: Low temperatures brought on marked symptoms. (Bennett)

Wisconsin: Noted some beneficial effects from roguing in 1923. Latham resistant as compared to Marlboro. Much confusion between mosaic, mildew and red spider. (Vaughan)

Minnesota: Latham in general shows a very high percentage of mosaic, but one strain showed a small amount. Sunbeam is the only variety generally grown that shows a very low percentage of disease. (Sect. Pl. Path.)

Streak (Eastern bluestem)

Streak was reported from New York, Pennsylvania, Ohio, and Illinois. Anderson states that in Illinois it is primarily a disease of blackcaps, and was especially prevalent in the Bloomington-Peoria district. In New York and Pennsylvania also it occurred on black varieties. Pennsylvania reported a loss of one-half percent.

Literature

Berkeley, G. H. Raspberry mosaic and leaf curl. Canadian Hort. 47: 183. August 1924.

Frank, A. Facts regarding the mosaic disease of raspberry and loganberry in western Washington. Western Washington Sta. Bimo. Bul. 12: 48-51. 1924.

Rankin, W. H. Raspberry mosaic and blue stem. New York Agr. Exp. Sta. Circ. 75: March 1924.

Zeller, S. M. Mosaic and other systemic diseases of Brambles in Oregon. Oregon Agr. Exp. Sta. Circ. 49: 15 pp. 1923.

OTHER DISEASES AND INJURIES

Botrytis sp. - In a few fields in Ohio 25% of the fruit was affected (Wilcox). Also reported from New York and Washington.

Cercospora rubi Sacc. - Blotch, Florida.

Cuscuta sp. - Dodder, Wisconsin.

Frost injury - Caused losses of 10% in Ohio, where it was severe in undrained situations (Wilcox), 5% in Iowa, 3% in Minnesota, and 2% in South Dakota. Also reported from Michigan, Wisconsin, Arkansas, Idaho, and Washington.

Gloeosporium sp. (not G. venetum) - Collected by Anna E. Jenkins on Van Fleet raspberry at Bell Station, Maryland. On stem.

Mycosphaerella rubi E. W. Roark (Septoria rubi West.) - Leafspot was reported from New York, New Jersey, South Carolina, Indiana, Illinois, Iowa, and Porto Rico. Losses reported were 3% in Iowa and 1% in Illinois. Most severe on red raspberries, causing serious defoliation in Indiana, according to Gardner.

Septoria rubi pallida Ell. & Helw. was reported on black raspberry from Pennsylvania. "Identified by Dr. L. O. Overholts. Spores too small for S. rubi" (Kirby).

Mycosphaerella rubina (Pk.) Jacz. - Spurblight, Maine (first report), Connecticut, Pennsylvania, Minnesota, North Dakota, Washington. In Minnesota it was quite important, causing a loss of 1.5%, and South Dakota reported 1% loss. Guba stated that serious damage due to this fungus in one planting in Otsego County, New York, was attributed to lack of pruning and cultivation.

Phragmidium imitans Arth. - Leafrust, Washington.

Pucciniastrum americanum (Farl.) Arth. - In New York this rust was unusually conspicuous by its absence this year. Last year (1923) it was very common at Geneva, causing complete defoliation in many varieties and seedlings. (Rankin)

Sphaerotheca humuli (DC.) Burr. - Powdery mildew, Connecticut (first report, conidia only), New York, Illinois, Minnesota.

Undetermined powdery mildew, probably the same as that reported from Minnesota by Leach and Seal (Phytopath. 14: 61. Jan. 1924), was very important in certain red varieties in New York. Latham and Owasco are the most susceptible varieties, other reds less so but often with 20% infection. Some in black varieties. Causes dwarfed tip of new canes, stops growth in length. Appeared in July and caused greatest damage during August, on new canes about 4 feet high. (Rankin)

The same trouble has been found in Maryland on raspberries, but that it is caused by powdery mildew is questioned and remains to be proved. (Shear & Dodge)

Literature

Anon. Raspberry diseases. Ann. Rep. Dept. Conserv. Indiana 5: 34-37. 1924.

Anderson, H. W. Raspberry troubles. Amer. Fruit Grow. Mag. 44(7): 4, 9, 11. July 1924.

Darrow, G. M. Some problems of raspberry growers. Rept. Mass. Fruit Assoc. 30: 147-153. 1924.

Rankin, W. H. Raspberry diseases. Proc. New York State Hort. Soc. 69: 139-145. 1924.

BLACKBERRY

ORANGE RUST CAUSED BY GYMNOCONIA INTERSTITIALIS (SCHL.) LAGH. AND KUNKELIA NITENS (SCHW.) ARTH.

Orange rust reported as Gymnoconia interstitialis occurred in Connecticut, on wild species, New York, New Jersey, Delaware, Florida, Mississippi, Texas, Illinois, Wisconsin, and Minnesota. Anderson and Tehon stated that it was extremely important locally in Illinois, and estimated a loss of one-half percent for the state. A specimen of *Tuberculina persicini* (Ditm.) Sacc., parasitic on the aecia of the rust, was received from New Jersey.

Kunkelia nitens was reported from Maine; Connecticut, on wild vines of *Rubus allegheniensis*; Pennsylvania, where it was said to be widespread but not generally serious; Virginia, South Carolina and Arkansas on wild blackberry; Indiana as serious locally; Kansas, and St. Maries, Idaho. B. O. Dodge, of the Office of Fruit Disease Investigations, Bureau of Plant Industry, who determined specimens of *Kunkelia nitens* from Maine, stated that they were the first authentic ones as proved by spore germination, from that state.

South Carolina: On wild blackberry. Unimportant, as there are too many such vines. Reduction in yield 20%. (Ludwig)

Arkansas: Very severe on wild canes, reduction in yield from 5 to 10%. All over state. Short-cycled form only one noted in germination tests. (Dept. Pl. Path.)

Orange rust, undetermined, but probably the short-cycled form, was reported from Georgia as locally severe, but generally of slight importance, causing a reduction in yield of 2%.

Reports from West Virginia, Michigan, Ohio, and Iowa did not distinguish between the two species. Porter stated that rust was very important in Iowa, and estimated a reduction in yield of 5%. In both West Virginia and Michigan it was reported to be of considerable importance. Losses estimated in both states were 2%. In Ohio according to Wilcox, it was not serious in Eldorado, the principal variety grown, but heavy infection of rogues and mixtures occurred.

ANTHRACNOSE CAUSED BY PLECTODISCELLA VENETA (SPEG.) BURK.

Anthracnose was reported from New York, Pennsylvania, Delaware, West Virginia, Arkansas, Ohio, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Kansas, and Idaho. Losses estimated were: Iowa 3%, Michigan 2%, New York and Illinois each 1%.

New York: Very important locally. More than the usual amount this year. Very severe in many plantings in Yates County. Very prevalent in Chautauqua County with an average of 25% of canes affected in most plantings. Present in all plantings and considerable damage noted in Ontario County. General but of no economic importance in Wayne County. (Guba)

Pennsylvania: Never very important on blackberry and its allies. (Orton)

Illinois: Anthracnose was unusually serious in the early part of the season on blackberry leaves, causing spotting and crinkling due to the abundance of lesions on the veins. Otherwise the disease was about as usual. (Anderson)

Wisconsin: Of minor importance; controlled by spraying with either lime-sulfur or Bordeaux. (Vaughan)

OTHER DISEASES

Armillaria mellea (Vahl) Quél. - Rootrot, Washington.
Bacterium tumefaciens EFS. & Town. - Crowngall, Washington, Texas.
Cercospora sp. - Leafspot, Georgia.
Fusisporium rubi Wint. - Double blossom, Louisiana
Kuehneola uredinis (Lk.) Arth. - Yellow rust, reported on wild plants and once on cultivated bushes in Connecticut; on wild blackberries in South Carolina.
Leafcurl (undet.) - Only found once in localized area on wild bushes in Center County, Pennsylvania. Has appearance of leafcurl on raspberry. (Orton & Krout)
? Leptothyrium pomi (Mont. & Fr.) Sacc. - Flyspeck resembling this, common on wild bushes at York Springs, Adams County, Pennsylvania. (Kirby)
Mosaic (undet.) - Pennsylvania, "Not important. Trace to 10% found in three localities. One percent found in 200 Eldorado plants in Franklin County; common on wild bushes in Adams County." (Orton & Kirby). Also reported as of slight importance in trucking districts in Iowa. (Porter)

Mycosphaerella rubi E. W. Roark (*Septoria rubi* West.) - Leafspot, New Jersey, Tennessee, Florida, Texas, Indiana, Iowa, Missouri.

Sphaerotheca humuli (DC.) Burr. - Powdery mildew, Pennsylvania, Indiana, Gardner reported from the latter state "In a newly planted plot of a number of varieties on the University Horticultural Farm, Mr. E. Stair found a number of plants badly mildewed. Unfortunately, the fungus was not critically examined. This is the first record for Indiana."

Verticillium alboatrum Reinke & Berth. - Canker and wilt was local and seemed to do some damage in Minnesota. The fungus was reported as *Verticillium* sp. This is the first report for the state.

Recent literature (see raspberry)

DEWBERRY

ANTHRACNOSE CAUSED BY PLECTODISCELLA VENETA (SPEG.) BURK.

Anthracnose was reported by Fant as causing heavy losses, estimated at 25%, to dewberries in North Carolina. Moore stated that in South Carolina it was severe on all dewberry fields, causing numbers of plants to die and reducing the yield considerably. No preventive measures had been practiced prior to 1924. In Delaware it was very prevalent on the Lucretia variety, according to Adams. The disease was also reported on dewberry from Indiana.

ORANGE RUST CAUSED BY GYMNOCONIA INTERSTITIALIS (SCHL.) LAGH. AND KUNKELIA NITENS (SCHW.) ARTH.

Gymnoconia interstitialis was reported from New York, Pennsylvania, and Tennessee. In Pennsylvania, according to Kirby and Orton, *Kunkelia nitens* is common on wild dewberries throughout the state. Dewberry appears to be the most susceptible host. McClintock of Tennessee reported that, "Orange rust was observed only on some wild dewberries. It did not develop on Early Harvest blackberries in a field adjoining the wild dewberries."

The Lucretia dewberry is highly resistant. (Dodge)

OTHER DISEASES

Kuehneola uredinis (Lk.) Arth. - Yellow rust, Florida.

? *Leptothyrium pomi* (Mont. & Fr.) Sacc. - Sooty blotch resembling that due to this fungus reported from Pennsylvania.

Mycosphaerella rubi E. W. Roark (*Septoria rubi* West.) - Leafspot was reported from Pennsylvania, Tennessee, and Indiana.

Peronospora potentillae D By. - Downy mildew caused by this fungus was reported from Connecticut on wild dewberry. This is the first report received by the Survey.

Peronospora rubi Rabh. - Downy mildew, reported from Florida on wild plants, completely covering the growing tips and younger leaves of new shoots. (Weber). This is the first report to the Survey on this host.

Sphaerotheca humuli (DC.) Burr. - Powdery mildew, Pennsylvania.

LOGANBERRY

The following diseases and injuries of loganberry were reported from Washington: Mosaic, Mycosphaerella rubina (Pk.) Jacz. (spurblight, first report) an undetermined basal rot of the canes, frost and winter injury.

Recent literature

Zeller, S. M. Mosaic disease of the loganberry. (Abstract) Phytopath. 14: 119. 1924.

WINEBERRY

Mosaic (undet.) was reported on wineberry (Rubus phoenicolasius) from Pennsylvania by Orton, who states that this species is apparently quite susceptible.

CURRANT

Leafspot caused by Mycosphaerella grossulariae (Fr.) Lind. caused a loss of 5% in Iowa, according to Porter, and was said to be important locally in New York. It was reported also from Indiana, Illinois, and Minnesota.

Leafspot, Septoria aurea destruens Ell. & Ev. (Mycosphaerella aurea (Ell. & Ev.) R. E. Stone), was said to be severe locally at Ames, Iowa, by B. N. Uppal.

Anthracnose, Pseudopeziza ribis Kleb., was reported from Connecticut, New Jersey, New York, Ohio, and Indiana. In New Jersey it caused a loss of 10%, according to Martin, who stated that in the southern part of the state many plantings were completely defoliated before the crop was harvested. The disease was important in Ohio and Indiana also.

Caneblight due to Botryosphaeria ribis Gross. & Dug. was reported from Ohio only. Stevens and Jenkins, in a recently published article (6), state that this fungus has been found and proved to be parasitic on rose and horsechestnut. They report that the disease is now known to occur in Massachusetts, Connecticut, New York, Ohio, Pennsylvania, New Jersey, Maryland, and Virginia.

Leafspot, Cercospora angulata Wint., caused a loss of 7% in Iowa according to Porter, and was reported as of slight importance in Indiana.

Rootrot, Fomes ribis (Schum.) Fr., was observed about the crown of a few plants at the Geneva Experiment Station, New York, but was causing no injury. (Guba)

Sooty mold, Fumago vagans Pers. A specimen of this fungus on red currant was received from Washington.

Canker, Nectria distissima Tul. New York, Minnesota.

Physalospora cydoniae Arn. (P. malorum (Berk.) Shear) was found to be fruiting, producing the perfect stage, on dead currant canes. (5).

Rust, Puccinia grossulariae (Schum.) Lagh. New York, Minnesota, North Dakota.

Recent literature

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2. Lees, A. H. Progress report on big bud and reversion of black currants. Jour. Bath. & West. & South. Co. Soc. Agr. V, 18: 195-198. 1924.
   (In Ann. Rept. Nat. Fruit & Cider Inst., 1923)

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4. Shear, C. L., Neil E. Stevens, and Marguerite S. Wilcox. Botryosphaeria and Physalospora on currant and apple. Jour. Agr. Res. 28: 589-598. May 10, 1924.

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7. Vasil'evskii, N. I. Zur Biologie Septoria ribis Desm. auf Ribes nigrum. Bolezni Rast. 13: 12-21. 1924.
   Russian with German resumé.

GOOSEBERRY

Dieback, Botrytis sp., is reported from Washington. (1).

Leptosphaeria coniothyrium (Fckl.) Sacc. A specimen of the Coniothyrium stage was received from Indiana, where it was said not to be particularly serious. This is the first report on this host from Indiana.

Leafspot, Mycosphaerella grossulariae (Fr.) Lind., was reported from New York, Indiana, and Illinois. Gardner stated that it was very serious in Indiana, much more so on gooseberry than on currant. According to Tehon, it was more abundant in Illinois in 1924, whereas in the preceding year it was not prevalent in the southern tip.

Anthracnose, Pseudopeziza ribis Kleb., was reported as important in New Jersey, Delaware, Indiana, and Illinois. Martin estimated a loss of 5% in New Jersey, and stated that many plants were completely defoliated. Adams reported that in Delaware "Heavy infection caused early defoliation." The disease was very serious in Indiana and caused premature defoliation, according to Gardner. Tehon stated that anthracnose was locally serious in Illinois and reported a loss of 0.75%.

Rust, Puccinia grossulariae (Schum.) Lagh., was reported from New York, Pennsylvania, Wisconsin, Iowa, and North Dakota. In most cases it was not important, but Guba reported that in one planting in Ulster County, New York, there was a loss of 30% or more, due to rust infection of the foliage, young shoots, and fruits, and Porter reported a loss of 2% for Iowa.

Powdery mildew due to Sphaerotheca mors-uvae (Schw.) Berk. & Curt. was reported from New York, Minnesota, and Washington, Guba stated that in New York,

> "Mildew was reported only from the Hudson Valley. In Ulster County it was controlled with a single application of copper spray or dust or sulfur spray or dust. On June 28 check rows in the demonstration showed nearly 100% foliage infection."

Recent literature

1. Heald, F. D., and B. F. Dana. Notes on plant diseases in Washington - 1. Botrytis diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924.

2. Maarschalk, H. Control of American gooseberry mildew by alcaline Bergundy mixture. Rept. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 119-120. 1923.

MULBERRY

Bacterial spot, Bacterium mori (Boyer & C. R. Lambert) emend. EFS. - Indiana, caused angular black leaf lesions and dieback of twigs (Dietz).

Blotch, Cercospora moricola Cke., caused complete defoliation of several trees at Fort Pierce, Florida (Weber).

Rootrot, Ozonium omnivorum Shear, was prevalent in the black lands of Texas, where it caused a loss of 2%. (Taubenhaus)

Phyllosticta moricola Ell. & Ev., Missouri (specimen received, determined by E. A. Seigler and W. W. Diehl)

Popcorn disease, Sclerotinia carunculoides E. A. Seigler & A. E. Jenkins - During the year specimens were received by the Office of Pathological Collections from Texas, Georgia, and Louisiana. The disease had not been reported previously from the latter state. (Jenkins)

CRANBERRY

Red leafspot, caused by Exobasidium vaccinii (Fckl.) Wor. C. G. Malde stated that this disease was more serious than ever before in one locality in Wisconsin, and permits for the sale of the plants were refused. In Pacific County, Washington, it was the most important fungous disease of the host, attacking the berries and young wood as well as the leaves, according to the Department of Plant Pathology.

False blossom (undet.) was reported as less important than usual in Wisconsin. Surprising improvement was noticed in individual fields, according to Malde.

The following diseases and injuries were reported from Pacific County, Washington: (*= first report from this state **= first report from any state to the Survey):

*Acanthorhyncus vaccinii Shear, causing fruitrot.
Bordeaux injury causing deforming of blossoms and poor set of fruit.
**Botrytis sp. causing blossom rot (may be but weakly parasitic). Stevens (7) reports this disease as common in Washington and Oregon.
Botrytis sp. causing fruitrot (5).
*Ceuthospora lunata Shear, blackrot.
*Exobasidium oxycocci Rostr., roseblcom.
Fusicoccum putrefaciens Shear, endrot.
Penicillium sp., fruitrot.
**Phomopsis sp., storage rot.
Sclerotinia oxycocci Wor., hardrot (cotton ball fungus), causing tip-blight and field rot.
Sporonema oxycocci Shear, fruitrot in storage.

Recent literature

1. Beckwith, Charles S. Investigations of cranberry problems. Ann. Rept. New Jersey Agr. Exp. Sta. 43(1921-22): 449-465. 1924.

2. —————— Report of the cranberry substation. Proc. Amer. Cranberry Grow. Assoc. 54: 18-21. 1924.

3. —————— Cranberry disease work in New Jersey. Proc. Amer. Cranberry Grow. Assoc. 55: 11. 1925.

4. Franklin, H. J. False blossom In his State bog report for 1922 and 1923. Ann. Rept. Cape Cod Cranberry Grow. Assoc. 1923-24: 7-8. 1924.

5. Heald, F. D., and B. F. Dana. Notes on plant diseases in Washington - 1. Botrytis diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924.

6. Stevens, Neil E. Notes on cranberry fungi in Massachusetts. Phytopath. 14: 101-107. 1924.

7. —————— Notes on blueberry and cranberry diseases. Proc. Amer. Cranberry Grow. Assoc. 55: 7, 10. 1925.

BLUEBERRY AND HUCKLEBERRY

Rust caused by Pucciniastrum myrtilli (Schum.) Arth. was found on huckleberry at Caldwell, Chester County, Pennsylvania. The alternate stage was found on Tsuga canadensis at the same place. (Orton)

Dodder, Cuscuta sp. - Pennsylvania, on low blueberry; the first report of dodder on this host received by the Survey.

Exobasidium vaccini (Fckl.) Wor. - Galls caused by this fungus were collected in Florida on Gaylussacia frondosa and G. baccata (Weber).

Dryrot due to Sclerotinia vaccinii-corymbosi J. M. Reade was found in one patch of blueberries in Elkhart County, Indiana. This is the first report of this disease to the Survey. Specimens were received and the determination verified by Shear.

Stevens (1) makes the following statement concerning the distribution and importance of Sclerotinia rot of blueberries:

> "The most destructive disease of blueberries, so far observed, is the Sclerotinia rot. This rot is readily distinguished by the fact that the fungus completely fills the cavity of the berry with the result that the berry becomes hard and dry - true mummy. Sclerotinia rot is found to some extent on many species of wild blueberries in the New England States. For some reason not fully understood it has been very destructive on the experimental blueberry plantation at East Wareham, Massachusetts. In 1921 the loss from this disease was variously estimated at from one-fourth to one-third the crop. In 1922-1923 practically the entire crop was killed by Sclerotinia. This year conditions were much more favorable and the loss amounted to only about one-tenth of the crop. Miss White and Mr. Hutton informed me that this disease proved serious at Whitesbog (New Jersey) during 1921 and have suggested that the unusual infection was associated with unusual weather conditions.
>
> "This disease furnishes another example of the close relation between blueberry and cranberry disease, for Sclerotinia rot, caused by a species very close to, if not identical with, the one on blueberries is a very common rot on cranberries in Washington and Oregon."

Other diseases mentioned by Stevens are:

Botrytis sp., causing blossom blight, observed on one or two varieties at Whitesbog, New Jersey, in all cases on bushes which seemed to have had insufficient drainage.

Calyptospora sp., witches' broom rust, on high-bush and low-bush blueberries and mountain cranberry. As far as known this disease does not occur south of Massachusetts.

Phomopsis sp. causing twigblight, very closely related to if not identical with the fungus commonly causing rot of cranberries after picking, has proved serious in the experimental planting at East Wareham, Massachusetts, and a few cases were found at Toms River and at Whitesbog, New Jersey. The bushes looked as though they were winter killed, but isolation and inoculation proved the causal relation of the Phomopsis.

Recent literature

1. Stevens, Neil E. Notes on blueberry and cranberry diseases. Proc. Amer. Cranberry Grow. Assoc. 55: 7, 10. 1925.

DINGLEBERRY

Tarspot, *Rhytisma vaccinii* Fr. Generally abundant wherever found on dingleberry (*Vaccinium stamineum*) in Pennsylvania. (Orton)

DISEASES OF SUB-TROPICAL FRUITS

Prepared by H. R. Fulton

CITRUS FRUITS

MELANOSE CAUSED BY PHOMOPSIS CITRI FAWC.

Florida: Young foliage and fruit in some groves were badly affected in the spring. The disease is worse in groves where there is considerable deadwood in the trees. It has been demonstrated that spraying with 3-3-50 Bordeaux mixture plus 1% oil soon after the petals have dropped controls this disease. (Burger)

Prevalence much less than the average, but of major importance. First noted infections were in January. The greatest injury was produced during wet periods in March and June, April and May being too dry for general infection. Grapefruit is more susceptible than orange. Spraying with Bordeaux-oil in April satisfactorily protected the young fruit. (Winston)

Alabama: More prevalent than usual but unimportant. (Miles)
More than usual, but of minor importance. (Winston)

Mississippi: Prevalence about the same as usual; unimportant; first noted in May. (Neal)

Louisiana: Present, but not important. (Edgerton)

Texas: Occasionally observed in Cameron and Hidalgo Counties, but not in sufficient amount to justify special control measures. (Winston)

Arizona: None reported. (Streets)

Porto Rico: Common, but not serious. (Cook)

STEMEND ROT CAUSED BY PHOMOPSIS CITRI FAWC. AND DIPLODIA NATALENSIS EV.

Florida: Causes more loss than any other disease. Usually shows up during transportation during the fall months. (Burger)

Affects oranges and grapefruit about equally. More prevalent than usual throughout the state. Spraying for melanose control and the use of a borax bath in the packing house generally satisfactory. (Winston)

Mississippi: Slightly more than usual; important locally; first report in October. (Neal)

Louisiana: Not reported, probably present. (Edgerton)

Arizona: None reported. (Streets)

California: Considerable Diplodia stemend rot in lemons in southern California. *Phomopsis californica* Fawcett caused some rot of mature lemons in storage in southern California during the summer; more than the preceding year. (Fawcett)

Porto Rico: Diplodia stemend rot was common. (Cook)

SCAB CAUSED BY SPHACELOMA FAWCETTI A. E. JENKINS (formerly erroneously attributed to CLADOSPORIUM CITRI (PRO TEM) MASSEE)

Florida: Was very prevalent in all sections in the spring on the new growth; caused many grapefruits to be classed as culls. (Burger)

More prevalent than usual. First infection noted in January. Greatest injury during cool rainy weather in early spring and again during summer rains. Very few growers sprayed for control because of low prices for grapefruit. (Winston)

Alabama: Less than usual. (Miles)

Less than usual on satsuma oranges; mostly leaf infection; freezes killed most of the bearing wood, and very little fruit set; consequently little or no spraying for scab control. (Winston)

Mississippi: Less than usual but becoming important in many satsuma groves. Present in about 75% of the groves, causing a reduction in yield of about 1%. The season was unusually dry, and this was unfavorable for scab development. (Neal)

Louisiana: Considerable on satsuma orange. (Edgerton)

Texas: Of major importance on rough lemon and sour orange nursery stock in Cameron and Hidalgo Counties. No treatment given. Occurred in minor degree on bearing grapefruit, not serious enough to justify special control measures. (Winston)

Arizona: None reported. (Streets)

Porto Rico: Very severe. (Cook)

Literature

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2. Doidge, E. M. and E. J. Butler. The cause of citrus scab. Trans. Brit. Mycol. Soc. 10: 119-121. Sept. 1924.
   Describe fungus as *Sporotrichum citri* Butler

3. Jenkins, Anna E. The citrus scab fungus. Phytopath. 15: 99-104. Feb. 1925.

4. Peltier, G. L. and W. J. Frederich. Relation of environmental factors to citrus scab caused by Cladosporium citri Massee. Jour. Agr. Res. 28: 2410254. April 19, 1924.

CITRUS CANKER CAUSED BY BACTERIUM CITRI (HASSE) JEHLE

Florida: No cases found during 1924. (Report of Department of Citrus Canker Eradication, Florida State Plant Board for December 31, 1924)

Alabama: Reported once; trees destroyed. (Miles)

Mississippi: No cases found. (Neal)

Louisiana: Usual amount in southern part of the state. First reported infection in June. (Edgerton)

Probably effectively eradicated east of the Mississippi Rive where commercial plantings are found. In the south central and southwestern parishes infection ranges from light to very heavy, mostly in yard trees. (W. E. Anderson)

Texas: No record. (Taubenhaus)

Literature:

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2. ——— Citrus canker eradication (South Africa). Union South Afric Dept. Agr. Jour. 8: 85. 1924.

MISCELLANEOUS DISEASES, PARASITES KNOWN OR SUSPECTED

Blast and Blackpit caused by Bacterium citrarefaciens H. A. Lee was reported by Fawcett as being unimportant in California. The blackpit effect on fr was more prevalent on lemons than oranges. The blast of leaves and twigs affected oranges in the northern citrus region of the state. Infection occurred from January to April.

Brownrot caused by Pythiacystis citrophthora E. H. Smith & R. E. Smith was less prevalent than usual in California because of deficiency in winter and spring rains. Lemons are most susceptible, oranges and grapefruit less so. Control is secured by spraying the ground and lower branches with Bordeaux and by washing the fruit in hot (115° to 120°F) water. (Fawcett)

Cottony rot caused by Sclerotinia sclerotiorum (Lib.) Mass. was less prevalent than usual in California; lemons and occasionally oranges were injured in winter and spring. (Fawcett)

Damping-off caused by Rhizoctonia sp. did considerable damage in many nursery seedbeds in Florida. (Burger)

Felty fungus girdle caused by Septobasidium pedicillatum (Schw.) Pat. was reported by Burger from all portions of Florida.

Flyspeck caused by Leptothyrium pomi (Mont. & Fr.) Sacc. was reported by Burger from the East Coast of Florida where it did no damage but disfigured the fruit.

Fungal leafspot attributed to Alternaria sp. was reported from Arizona. Leaves developed small red to salmon colored spots with chlorotic margins. When cultured in the laboratory these gave an Alternaria, probably Alternaria citri. Removal of fallen leaves, fruits, and dead wood, followed by a thorough spraying with a good fungicide and practiced for several seasons should control the disease. (J. G. Brown).

Greymold rot caused by Botrytis cinera Pers. was not of great importance in California. Mature fruit of lemons and oranges were affected in winter and spring. (Fawcett)

Gummosis caused by Diplodia sp. resulted in death of bark on trunk or limbs of lemon, orange, and other citrus in California. (Fawcett)

Gummosis caused by Botrytis cinerea Pers. was rather slight in California. It occurred on the older trees in the spring, mainly in the coast regions. Lemons are most susceptible, followed by oranges and grapefruit. (Fawcett)

Gummosis and twigblight caused by Sclerotinia sclerotiorum (Lib.) Mass. occurred in California during winter and spring on trunks, large roots and twigs of lemon and orange. (Fawcett)

Gummosis caused by Pythiacystis citrophthora E. H. Smith & R. E. Smith was less prevalent than usual in California, but occurred in over 90% of the citrus plantings in the state and caused considerable damage in some. Gummosis and death of bark on trunk and large roots at the crown was produced on trees of all ages. Lemon, orange, grapefruit, rough lemon, sour orange, and other citrus forms were affected. There is much less in recent years on account of preventive methods being used or recommended. (Fawcett)

Algal disease caused by Cephaleuros virescens. Kunze was reported by Cook as occurring commonly on citrus in Porto Rico.

Rootrot caused by Armillaria mellea (Vahl) Quel. was of usual prevalence on all varieties of citrus in California, causing death of roots in certain localities especially where oaks or sycamores have been. (Fawcett)

Citrus Fruits - Miscellaneous

Scaly bark attributed to Cladosporium herbarum citricolum Fawc. was quite prevalent in Florida. In some sections the disease was very virulent while in some of the older sections it caused practically no commercial losses. (Burger)

Shellbark caused by Phomopsis californica Fawc. was of usual prevalence in California. It was found on lemon only and was important in some orchards, especially in southern California, causing death of the outer layers of bark. (Fawcett)

Shoestring fungus disease caused by a fungus similar in gross characters to Corticium stevensii (Noack) Burt. was slightly more prevalent than usual in Florida but of minor importance. It was confined to a few spots in the Everglades, and developed during the summer rainy season causing defoliation and death of twigs and surface discolorations of fruit. Grapefruit was more susceptible than orange. Bordeaux-oil applied in late spring checks the disease for a year. (Winston)

Sooty mold caused by Capnodium citricolum was common in Florida. (Fulton), and Porto Rico (Cook). A trace was reported from Texas (Taubenhaus).

Sour rot caused by Oospora citri-aurantii (Ferr.) Sacc. & Syd. was reported by Burger from two places in Florida on lemons. Fawcett reported a considerable amount on mature lemon and orange fruit in California during the summer.

MISCELLANEOUS DISEASES, CAUSE UNKNOWN OR NON-PARASITIC

Chlorosis (Frenching, Mottle leaf), cause undetermined, was reported from Florida by Burger and Winston; from Alabama and Texas by Winston; from Arizona by Streets, and from California by Fawcett. Burger attributes it in some cases to liming the soil. Winston reports it as most prevalent whereshell or limestone is found in quantity in the soil; that oranges are more susceptible than grapefruit; and that humus in the form of stable manure or cover crops corrects the trouble. Fawcett reports that organic nitrogenous fertilizers like stable manure appear to help in some soils.

Dieback (Exanthema, Fruit Ammoniation) was more prevalent than usual in Florida; oranges are more susceptible than grapefruit; Bordeaux sprayed on the trees in the spring, or bluestone applied to the soil usually corrects the trouble. (Winston)

Burger reported from Florida an unusual development of brown, gumming areas in the rind of young grapefruit which was regarded as a form of ammoniation; and the usual amount of typical dieback. Incipient stages of dieback in the form of multiple buds and practically defoliated twigs were reported by Winston from Texas. J. G. Brown reported similar symptoms from Arizona. Fawcett reports the disease as scattered here and there, but important in California.

Frost injury. The most disastrous freeze of many years occurred in January throughout the satsuma orange belt from northern Florida to Louisiana. Burger reports considerable damage to the satsuma industry in northwestern Florida. Miles reports that all citrus trees in Alabama were injured, varying in degree from slight to complete killing, with practically no fruit production for the season. Injury was least where correct cultural practices had been followed and trees had been kept free from diseases and insect pests. Winston reported satsuma orange trees in Alabama with 10% to 100% of the bearing wood killed and in many instances large limbs were killed back to the trunk or the trees were killed outright; trees that had borne no fruit or light crops the previous year and that had been kept free from scale insects the whole of the preceding season were injured least. Edgerton reported very severe injury in new satsuma plantings in southern Louisiana caused by temperatures of 12° to 16°F in January. Taubenhaus reported no observed frost injury in Texas, and Horne reported severe injury in late December on unpicked fruit in the Sacramento district of California. Streets reported a trace from Arizona.

Greasy spot (Black melanose), cause unknown, was reported by Burger as being common in Florida and by Cook as being abundant in Porto Rico.

Greenspot, caused by exuded oil preventing proper coloring up of green rind following mechanical injury. Burger reports much trouble during the early part of the shipping season in Florida.

Gummosis, (including Psorosis) caused undetermined, was reported by Burger as doing much damage in Florida. Winston reports the usual prevalence in Florida during spring and summer; painting twice a year with soda, lye, and bluestone mixture often is effective. Cook reported it as common but not destructive in Porto Rico. Fawcett reports that Psorosis is becoming slowly more important in California and is coextensive with orange orchards, affecting from 1% to 30% of the trees: the scraping method of treatment gives good results.

Lightning injury was reported by Burger as quite common in Florida.

Peteca, cause unknown, was about the same as usual on California lemons. (Fawcett)

Spray injury was reported by Burger as being due in Florida to oil and to lime sulphur sprays.

Wilt, cause unknown, was reported by Burger as being serious on the East Coast of Florida, and in some of the older groves in the northern part of the citrus belt.

Recent literature on various citrus diseases

Anon. Account of Shippers Meeting in California Citrograph. 10: 110. Feb. 1925.

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Carne, W. M. A new disease of citrus trees. Leaf blight is troublesome. Fruit World Australasia 25: 227-228. May 1924.

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Springer, J. R. Insects, pests and diseases in a nursery and their control. Florida Grow. 29(4): 7, 20-21. Jan. 26, 1924.

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Van Iderstine, R. The recent freeze and its results. Gulf Coast Grow. 1(10-11): 1-3. Dec. 1923-Jan.1924.

Weber, George F. Poria cocus developed on tuckahoe found attached to orange tree root. (Abstract) Phytopath. 14: 35. 1924.

Young, F. D. Frost protection by artificial mixing of air. California Citrogr. 9: 125, 132, 136, 138. Feb. 1924.

AVOCADO

Algal leafspot caused by Cephaleuros virescens Kunze was common but seldom serious on shaded leaves in Florida. (Weber)

Anthracnose caused by Colletotrichum gloeosporioides Penz. was destructive on young fruit and succulent new growth in Florida. (Weber) Cook reported fruitrot, caused by Gloeosporium sp. as common in Porto Rico.

Blotch caused by Cercospora sp. was reported as unimportant on nursery stock in Florida. (Weber)

Footrot caused by Diplodia sp. caused some loss in Florida in nursery stock and in new field plantings. (Weber)

Leafspot caused by Pestalozzia guepini Desm. var. vaccinii Shear was widespread and severe in Florida; the leaves were spotted and the edges curled. (Weber) A trace was reported from Texas by Taubenhaus.

Powdery mildew caused by Oidium sp. was quite prevalent in Florida during the rainy season. (Weber)

Scab caused by Sphaceloma fawcettii Jenkins (formerly erroneously attributed to Cladosporium citri (Massee) was widespread and sometimes caused serious defoliation in Florida (Weber). Winston reports more than the usual amount in Florida, beginning in February and affecting young fruit and tender leaves.

Recent literature

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Peattie, D. C. A new avocado disease. Florida Grow. 29(6): 7. Feb. 9, 1924.

Ryerson, Knowles. The recovery of the avocado tree after the 1922 freeze in California. Florida Grow. 29(9): 6-7. March 1, 1924.

BANANA

Anthracnose caused by Gloeosporium musarum Cke. & Mass. was widespread on the Cavendish banana in Florida attacking the leaves and the ripened fruit. (Weber). It was common in Porto Rico (Cook).

Bacterial disease caused by Bacterium musae (?) resulted in killing of the leaf tissue in black areas advancing from margins to the midrib of the Cavendish banana in Florida. (Weber)

Rootknot caused by Heterodera radicicola (Greef) Muell. caused a partial wilting of Cavendish banana plants in one locality in Florida. (Weber)

Wilt caused by Fusarium cubense EFS. was common in Porto Rico. (Cook)

Recent literature

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CHERIMOYA

Anthracnose attributed to Colletotrichum gloeosporioides Penz. was found attacking the fruit and causing a definite rot in one locality in Florida (Weber)

DATE

Leafspots, caused in one case by Exosporium palmivorum Sacc. and in the other by Alternaria sp. were reported from Florida. (Weber)

Rust caused by Graphiola phoenicis (Moug.) Poit. was reported from Porto Rico by Cook.

FIG

Anthracnose caused by Glomerella cingulata (Ston.) Spauld. & Schrenk was general but of minor importance in Georgia (Boyd) and in Mississippi (Neal and Wallace).

Cankers of four types were reported as follows: (1) caused by Diplodia sycina Mont. var. syconophila Sacc. was reported by Taubenhaus from Texas; (2 caused by *Macrophoma fici* Alm. & Cam. was reported by Taubenhaus from Texas; (3) caused by *Septobasidium pedicillatum* (Schw.) Pat. was rather general in Mississippi, but of moderate importance (Neal); (4) caused by *Tubercularia fici* Edg. affected over 20% of the trees in Georgia and reduced the yield about 10%; it was common in old plantings and sometimes completely killed the trees (Boyd); also reported near Norfolk, Princess Anne County, Virginia, (Fromme).

Leafblight caused by *Rhizoctonia microscleretia* Matz was very destructive on leaves, small twigs and young fruit in Florida. (Weber)

Leafspot caused by *Cercospora fici* Heald & Wolf, *C. bolleana* (Thuem.) Sacc., or *Cercospora* sp. was reported as unimportant in Georgia, Mississippi, and Texas.

Limb blight caused by *Corticium laetum* Karst. was of usual prevalence throughout southern Georgia causing slight loss in yield. (Boyd)

Rootknot caused by *Heterodera radicicola* (Greef) Muell. was prevalent in Texas but caused little loss. (Taubenhaus)

Rootrot caused by *Ozonium omnivorum* Shear was prevalent in the black lands of Texas. (Taubenhaus)

Rust caused by *Physopella fici* (Cast.) Arth. was reported by Weber as the most serious disease of figs in Florida. In Georgia Boyd reported premature defoliation generally too late in summer to cause appreciable loss. Taubenhaus reported it as unimportant in Texas.

Softrot attributed to *Aspergillus* sp. and *Rhizopus* sp. was general in Georgia reducing the yield 10%. (Boyd)

Soured fruit, cause undetermined, was quite prevalent in Texas. (Taubenhaus)

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Heald, F. D. and B. F. Dana. Notes on plant diseases in Washington. I. Botrytis diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924.

GUAVA

Fruitrot caused by *Glomerella psidii* (Del.) Sheldon was very severe in Porto Rico. (Cook)

LOQUAT

Anthracnose caused by *Colletotrichum* sp. was well distributed in Florida producing a sort of withertip on young shoots and fruit spurs. (Weber)

Leafspot caused by *Phyllosticta* sp. was reported as causing leaf shedding in one locality in Florida. (Weber)

MANGO

Anthracnose attributed to Colletotrichum gloeosporioides Penz. was wide spread and destructive in Florida, attacking fruit and young twigs causing both to drop off. (Weber). Cook reports a severe fruit rot and canker in Porto Rico attributed to Gloeosporium sp. G. O. Ocfemia reports the collection of Gloeosporium sp. in a mango nursery in the Philippines.

Internal fruitspot, cause unknown, was reported from one locality in Florida; the outer skin was intact, but slightly sunken in small areas; underneath the flesh was tougher and lighter colored than surrounding parts; later this area formed a sort of cyst being hollow in the center. (Weber)

Scab attributed to Cladosporium sp. was not plentiful in Florida but was severe in some places. (Weber)

PAPAYA

Fruitrot caused by Gloeosporium cingulata (Ston.) Spauld. & Schrenk was reported as serious in one locality in Porto Rico. (Nolla)

Leafspot caused by Pucciniopsis carica Earle was reported from one locality in Florida. (Weber)

PERSIMMON

Anthracnose caused by Gloeosporium diospyri Ell. & Ev. caused considerable twigblight and dying back of new growth in Florida. (Weber)

Crowngall caused by Bacterium tumefaciens EFS. & Town. resulted in the death of considerable nursery stock and newly set trees in Florida. (Weber)

Footrot caused by Diplodia sp. killed many trees especially in young plantings in Florida. (Weber)

Leafspot caused by Pestalozzia guepini Desm. was common in Florida. (Weber)

Leafspot caused by Cercospora sp. was of minor importance in Georgia. (Boyd)

Softrot caused by Rhizopus sp. caused much loss during wet weather in Texas; infection occurred on maturing fruit through wounds made by a large stink bug. (Taubenhaus)

Scab caused by Cladosporium sp. was reported from one locality in Florida. (Weber)

PINEAPPLE

Fruitrot caused by Thielaviopsis paradoxa (de Seynes) Hoehn. occasione heavy losses in shipping from Porto Rico. (Cook). G. O. Ocfemia reported from the Philippines a Thielaviopsis rot and a brownrot, the cause of which was not determined.

Wilt, cause unknown, gave considerable trouble in Florida. (Weber)

POMEGRANATE

Fruitrot caused by Gloeosporium sp. was reported from Porto Rico. (Nolla)

Rootknot caused by Heterodera radicicola (Greef) Muell. was reported from one locality in Mississippi. (Barker)

DISEASES OF NUTS

PECAN

SCAB CAUSED BY FUSICLADIUM EFFUSUM WINT.

Scab was reported from South Carolina, Georgia, Florida, Mississippi, and Texas. Losses estimated were 20% in South Carolina and 5% in Georgia.

Georgia: Less than last year; less rain during critical period. Delmas, Georgia, Alley, Schley, Pabst, Mobile, and Success most susceptible in the order named. Sanitary measures followed with four to six applications of Bordeaux mixture recommended. (Demaree)

Florida: Scab was prevalent wherever the host is grown and was severe on nuts, young twigs, and leaves. (Weber)

Mississippi: Less than usual or than last year, very dry this year. Confined largely to Delta and Coastal sections, although becoming general in prevalence. Pabst, Delmas, Schley, and Success are susceptible in the order named. Stuart, Van Deman, Frotscher, and Money Maker are resistant; controlled largely by Bordeaux spray. (Neal & Wallace)

Texas: Unimportant, due to dry weather(?). (Taubenhaus)

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Neal, D. C., O. M. Chance, R. P. Barnhart, and E. K. Bynum. Spraying experiments for pecan scab control in Mississippi in 1923. Mississippi Agr. Exp. Sta. Circ. 53: 1-4. July 1924.

BROWN LEAFSPOT CAUSED BY CERCOSPORA FUSCA (HEALD & WOLF) EMEND. F. V. RAND

Brown leafspot caused loss reported at 1% in Texas and one-half percent in Georgia, and was also reported from Mississippi.

> Georgia: Of minor importance except on trees lacking vigor. All varieties seem to be equally susceptible. Fertilization, cultivation, or any factor increasing vigor of trees tends to reduce disease. July and August spraying with any good fungicide will prevent infection. (Demaree)

OTHER DISEASES AND INJURIES

Bacterium tumefaciens EFS. & Town. - Crowngall was relatively unimportant in Mississippi. (Neal)

Blackpit (nonpar.) - Caused a loss of 2% in Georgia. Frotscher is possibly most susceptible; no difference noted in other varieties. No effective treatment known. (Demaree)

Cephalothecium roseum Cda. - Pinkrot following scab, South Carolina.

Glomerella cingulata (Ston.) Spauld. & Schrenk - Anthracnose was important locally in Mississippi; common on Stuart, Delmas, Pabst, and Van Deman (Neal & Wallace). Demaree reported it from Georgia.

Kernel spot (insect puncture) - South Carolina.

Microsphaera alni (Wallr.) Wint. - Powdery mildew, general, unimportant in South Carolina. (Ludwig)

Oidium sp. - Powdery mildew, Texas.

Ozonium omnivorum Shear - Traces. Pecan is apparently highly resistant to this rootrot. (Taubenhaus)

Phyllosticta caryae Pk. - Nursery blight caused a loss of 5% in Georgia. Individual seedlings show differences in susceptibility. Remedy: spray with 3-3-50 Bordeaux during April, May, and June. (Demaree) Also reported from Florida.

Rosette (undet.) - Caused a loss of 5% in Georgia. No varietal difference in susceptibility noted. Treatment: increase organic content of the soil, applications of stable manure are most effective. (Demaree) Also reported from Texas.

Winter injury - Death of young trees due to low temperatures during January, 1924, was reported from Georgia and Alabama. In Georgia trees under 8 years old were affected, especially those 3 and 4 years old. In Alabama the trees killed were from 1 to 5 years old, and those most severely attacked were especially thrifty and vigorous, growing late into the winter. Demaree stated that withholding fertilization and cultivation during the latter half of the season, and wrapping the trunks of the trees with cloth will help to prevent winter injury.

ENGLISH WALNUT

Canker caused by *Sphaeropsis* sp. was reported from Connecticut by Clinton.

COCONUT

BUDROT CAUSED BY PHYTOPHTHORA FABERI MAUB.

What seems to be the true budrot of coconut, at first attributed to *Bacillus coli* Esch. then to Pythium and later to Phytophthora has now been determined as occurring in Florida. In January of 1924 one of the assistant nursery inspectors of the Florida State Plant Board noted a diseased condition in a block of coconut palms near Miami and submitted specimens to the plant pathologist at Gainesville. After examination of these and numerous other samples *Phytophthora faberi* was isolated and further investigation with that organism is now in progress, conducted by J. L. Seal of the Florida Station. A general survey of coconut palms on the east coast of Florida is being conducted and up to the present time several hundred, including seedlings and young trees, have been destroyed on account of the disease. The prospects for preventing the spread of budrot and eventually stamping it out seem good.

Recently C. M. Tucker (1) reported that budrot has appeared in epidemic form on the west coast of Porto Rico. More than 800 cases have been recorded between Mayaguez and Rincon. Mr. Tucker thinks high precipitation during certain months of the year is an important factor in the development of epidemics. He has isolated *Phytophthora faberi* and succeeded in infecting mature palms with that organism. Eradication of diseased palms has been found efficacious in reducing the incidence of the disease in an experimental grove in Porto Rico.

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OTHER DISEASES AND INJURIES

Rootrot, *Thielaviopsis paradoxa* (De Seyn.) Hoehn., was said by Cook to be common in Porto Rico. In Florida it was found to be the cause of the killing of a large number of seedlings soon after sprouting. It was not common but was serious where it occurred. (Weber)

The following diseases were reported by Weber from Florida. None of them have been reported to the Survey previously.

Alternaria sp., leafspot.

Colletotrichum sp. caused considerable spotting of the leaves and often a deep rotting of the leaf petioles, causing them to break down. Common.

Cytospora palmarum Cke. observed on leaves and petioles; not important.

Diplodia epicocos Cke. was found commonly, causing the leaf petioles to become weak and break down, often a serious condition.

Fusarium sp., dry rot, was noticed on many specimens sent in to the laboratory. The fungus was almost invariably present on all killed parts, often secondary.

Gloeosporium nanoti Prill. & Del., anthracnose, causing numerous small spots on the leaves.

Pestalozzia palmarum Cke., leafspot, almost as well distributed as the host plant, but damage very small.

Ramularia sp., causing leafspot, not important.

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Supplement 40

Diseases of Cereal and Forage Crops
In the United States in 1924

May 10, 1925

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

DISEASES OF CEREAL AND FORAGE CROPS

IN THE UNITED STATES IN 1924

Prepared by L. E. Melchers, Plant Pathologist, Kansas Agricultural
Experiment Station and Collaborator, Plant Disease Survey.

Plant Disease Reporter
Supplement 40

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CONTENTS

INTRODUCTION

A summary of the cereal and forage crop diseases which have been reported in the United States in 1924 is herewith included. The general scheme which has been followed in other reports has for the most part been used in this one. The information on the occurrence, prevalence, and importance of these diseases has been obtained from the records submitted by the several collaborating states, the Office of Cereal Investigations, and the Plant Disease Survey records. In addition to this an attempt has been made to cite all important literature published in 1924 bearing on the cereal and forage crop diseases.

This report has been made as concise as possible. It is realized that in some cases more extended discussions and conclusions might have been desirable, but the limitations of space and time made this impossible.

There were no important epidemics of cereal or forage crop diseases in the United States in 1924. The cereal rusts were conspicuous by their absence. While wheat bunt was not a very important factor in all the wheat growing states, it was serious in a few states such as Kansas, Washington, and Idaho. Apparently the flag smut situation has not increased in seriousness in the United States the past year. This holds also for take all and the nematode disease of wheat. The importance of corn diseases which are collectively causing a large annual loss in the corn belt is being recognized more fully each year. Several new alfalfa diseases which are not fully understood are appearing in several states. Undoubtedly it will be found that several root diseases are responsible for some of the reduced acreage in alfalfa growing states.

Several new cereal and forage crop diseases have been reported for the first time in the United States. Some of these are new to science.

A number of States have reported diseases for the first time as occurring within their boundaries.

The accuracy of this report depends for the most part on the accuracy of the data supplied by the collaborators. There is, of course, no method of determining absolutely the actual loss caused by these plant diseases, and in general the estimated percentages of loss are only approximate. However, as one studies the data which have been contributed by collaborators for the last few years, he is struck by the general agreement in the estimates which have been made. One cannot help but realize, if one has had occasion to consult the records in the Plant Disease Survey, that it is the only complete available source of information on losses caused by plant diseases in the United States.

In working over the annual reports of the various collaborators, great differences were noted in the accuracy, completeness, and general conclusions reached. There seems to be considerable opportunity for improvement on the part of some individuals. If the plant disease survey work is taken seriously, the value of the records will be increased. Each year they are becoming more valuable. It should be the moral duty of the collaborator to try to improve his reports each year, for only in this way will this Survey improve. If the various reports from the collaborators are more carefully worked out, the annual reports will become accurate, complete, and satisfactory.

NEW DISEASES

(See following text for details)

The following are some of the organisms found in 1924 for the first time to be the cause of cereal and forage crop diseases in the United States.

Corn

Helminthosporium sp. (leafspot), Florida, Philippine Islands.
Helminthosporium sp. (stalk canker) Georgia.

Rice

Ophiobolus sp., Arkansas.

Alfalfa

Macrosporium sarcinaeforme Cav., Illinois.

Milo

Sphacelotheca sp., Kansas, Texas, New Mexico.

Clover

Ascochyta imperfecta Pk., Illinois.
Bacterium trifoliorum Jones, Williamson, Wolf, & McCul. Reported from several states.

Soybean

Septoria glycines (?), Delaware.
Rhizoctonia solani Kuehn, Indiana.

Velvet Bean

Bacterium vignae Gardner & Kendrick, Indiana.

Red Top

Helminthosporium sp., District of Columbia.

DISEASES FOUND IN NEW LOCALITIES

(See text for details)

Note: This is only a partial list of some of the more important diseases and is not to be considered complete; neither does the list include the organisms occurring on miscellaneous grasses.

Spelt

Colletotrichum graminicolum (Ces.) Wils., (C. cereale Manns. & Taub.), Illinois.
Gibberella saubinetii (Mont.) Sacc., Illinois.

Wheat

Bacterium atrofaciens McCul., Pennsylvania.
Tylenchus tritici (Stein.) Bast., South Carolina, Arizona.

Rye

Helminthosporium sativum Pam., King, & Bak. (leafspot), Pennsylvania.
Septoria secalis Prill. & Delacr., Indiana.
Urocystis occulta (Wallr.) Rabh., Idaho.

Barley

Bacterium translucens Jones, Johnson, & Reddy, Texas.
Claviceps purpurea (Fr.) Tul., Illinois.

Oats

Scolecotrichum graminis Fckl., Illinois.

Corn

Sphacelotheca reiliana (Kuehn) McAlp., New York, Idaho.

Rice

Sclerotium oryzae Cat. (stemrot), Arkansas.

Flax

Phlyctaena linicola Speg., South Dakota.

Alfalfa

Macrosporium sarcinaeforme Cav., Illinois.
Pleosphaerulina briosiana Poll., Illinois.
Tylenchus dipsaci (Kuehn) Bast., several new counties in Colorado, New Mexico, Wyoming, etc.

Sweet Clover

Peronospora trifoliorum D By., Wisconsin.

Cowpea

Phyllosticta phaseolina Sacc., Illinois.

Soybean

Bacterium glycineum Coerper, Mississippi.

Mosaic - Quebec. First report from this section.
Peronospora sojae Wolf, Delaware and Kentucky.
Sclerotium rolfsii Sacc., Mississippi.
Septoria glycines (?), Delaware.

Timothy
Heterosporium phlei Greg., Pennsylvania.

DISEASES OF CEREAL CROPS

WHEAT

BUNT CAUSED BY TILLETIA LAEVIS KUEHN AND T. TRITICI (BJERK.) WINT.

Bunt in the United States in 1924 seems to have been about as prevalent as in 1923. Several states report less, while others report somewhat more. Table 28 shows the percentage loss by states. Kansas, Arkansas, and Michigan report considerably more bunt in 1924. In the Northwest, where bunt is always most severe, Washington reports 2% less than in 1923. Idaho reports the same, namely, 8%. In Kansas there was a marked increase, the loss in 1923 being only a trace, while in 1924 it was 8%. Conservative figures estimated by Melchers indicate "that over $6,000,000 damage occurred." Illinois reports 2.3% and North Carolina 1% in 1924 which is only about one-third as much as occurred in 1923.

In the Northwest, bunt is always a serious problem on account of soil contamination, but the unexpected epidemics in the Middle West are not so easily understood. A glance at the estimates of loss due to this disease in the United States for the last five or six years shows plainly that the bunt problem has become more serious. Even in the Northwest the percentage of loss continues to increase steadily, according to the estimates made. In Kansas the loss the past year is the greatest that has ever been reported, the most ever recorded previously being 5% in 1920.

Table 28. Estimated percentage loss from bunt, 1924.

Percent loss	States
8	Idaho, Kansas
6	Washington
3-4	Arkansas, Michigan
2-2.3	Iowa, Illinois
1-1.5	California, New Mexico, North Dakota, South Dakota, Indiana, Ohio, Virginia, Goergia, North Carolina
.5	Texas, Nebraska, Utah, Pennsylvania
Less than .5	Delaware
trace	Kentucky, West Virginia, New York
0	Connecticut

Wheat - Bunt

Reports by collaborators:

Pennsylvania: About $.10 per bushel dockage occurred on smutted wheat. Of 114 fields surveyed bunt is the most menacing of wheat diseases when the losses and dockage are taken into consideration. Over 25% of the fields surveyed, which were planted with seed produced in this state, were infected with stinking smut, and it is safe to say that 20% of these fields had sufficient smut to be docked when the grain was sown. (Kirby)

Kansas: From $.02 to $.35 dockage occurred on a large amount of wheat in Kansas. (Melchers)

Ohio: Bunt is serious this year in southern and southwestern Ohio. Counts have been made showing as high as 50% infection. Where copper carbonate dust treatments have been properly made, excellent control is obtained. (Thomas)

Illinois: Infection general throughout the state. The losses, however, are much less than in 1923. The dockage alone in 1924 amounted to $80,506. It varied from a minimum of $.02 to a maximum of $.15 a bushel, or an average of $.05-1/2. (Tehon)

Colorado: Bunt not as prevalent in spring as in winter wheat. (Learn)

Montana: Damage slight, although infection quite general. This is the first smut in grain I have run across in Lake or Flathead Counties in 1924. Average loss due to bunt of spring wheat less than 1%. Fall planted wheat damage 5 to 10% in some counties. It would appear that infection (fall) came largely from spores in the soil. (Jennison)

Idaho: Bunt is again very serious this year. Infection in treated fields runs from 5 to 50%. Several smut explosions have been reported. (Hungerford)

Washington: The harvest of wheat has already begun in this state, and at first the farmers expected not over 60% of a crop but after harvest operations have revealed at least a 75% crop. Smut, however, is the worst. Some experimental plots conducted by the Department of Farm Crops and Department of Plant Pathology averaged about 35% smut. Last Saturday field counts were made around Pullman and the percentages of smut ranged from 30 up to 65%. One interesting experiment might be called to your attention. Mr. H. H. Curtis last year, under the direction of Dr. Heald replowed some of his summer fallow and then planted wheat. We find that there is less than 8% smut on the wheat on plowed summer fallow, while fields right next to it on unplowed fallow had 35% smut. It is just another illustration that if farmers want to go to the trouble they could control a large amount of the wheat smut. (Dana)

Losses from field fires have been severe in the Walla Walla section of Washington during the past year. A large number of these fires have been thought to be directly traceable to smut.

Weather relations:

It is well known that comparatively low temperatures and considerable moisture are most favorable for infection by bunt. Undoubtedly such conditions prevailed in those states where considerable bunt occurred in 1924. This was the case in Kansas during the sowing season. Weniger reports unusually cool weather at seeding time in North Dakota. In Idaho weather conditions in the fall of 1923 were favorable for soil infestation, according to Hungerford.

Varietal resistance:

Colorado: Marquis is susceptible, also Defiance, among the spring varieties, while Kanred and Turkey Red are susceptible among the winter wheats. (Learn)

Minnesota: Only a trace found in Marquis wheat, none in Durham but considerable in Kota and Prelude. (Div. Pl. Path.)

North Dakota: Kota and Prelude most susceptible, Marquis slightly susceptible and Durham is very lightly attacked. (Weniger)

Gaines (1) discusses the testing of more than 500 selections and varieties of wheat on resistance to bunt during the past ten years. He finds that while complete susceptibility prevails in most varieties, resistance is very marked in some. One cross of an immune variety with a susceptible one has produced a wheat of sufficient merit for commercial production. Resistance in wheat to bunt seems to be recessive

Control measures:

Copper carbonate dusting seems to be unquestionably the most practical, economic, and satisfactory method for controlling bunt, and is rapidly replacing all others in sections where the disease is serious. Several states have carried out experimental work for several years before finally recommending this treatment. California, Washington, Oregon, Kansas, Minnesota, Michigan, Pennsylvania, Iowa, and Ohio seem to have adopted copper carbonate dusting as their standard method of bunt control, and Idaho and Indiana are employing it rather extensively in conjunction with other treatments. Undoubtedly, other states are beginning to use this treatment, but no further reports are available.

In the past year several Stations have published results of experiments concerning the use of copper carbonate dusting for bunt control. Some of these publications are listed under literature "not cited."

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LOOSE SMUT CAUSED BY USTILAGO TRITICI (PERS.) JENS.

The figures given in table 29 do not indicate that loose smut was any more prevalent in the United States than has been reported for the last five years, in fact it is evident that in some states the average loss has been greater during the last two or three years.

Table 29. Percentages of loss from loose smut of wheat and maximum percentages found in any one field as reported by collaborators, 1924.

Percent loss	State	Maximum percent infection	State
5	Arkansas, Indiana, New Mexico	50	Arkansas
		25	Pennsylvania, Ohio, Iowa
3	Virginia, Maryland		
2	West Virginia, Iowa, Idaho	20	New York, Minnesota, Nebraska
1.5	New Jersey, Pennsylvania Ohio, North Dakota	15	Illinois
		14	Utah
1	New York, South Carolina, Texas, Utah, Alabama	11	Kansas
		10	Indiana, North Dakota
		5	New Jersey
.5	Delaware, Illinois, Minnesota, Kansas	2	Delaware
		1	Montana
t	Wisconsin, South Dakota, Montana, Colorado	t	Wisconsin

Comments by collaborators:

Pennsylvania: Loose smut on spelt is the first that has been observed. The average amount of loose smut found in each county is as follows: (Kirby)

No. fields	County	Percent loose smut
2	Lebanon	3
2	Berks	3
12	Cumberland	1.99
21	Blair	1.19
8	Chester	.94
27	Lancaster	1.25
14	Delaware	2.46
9	Lycoming	1.88

Virginia: Loose smut is especially prevalent in the eastern parts where wheats of the Fulcaster type are grown. (Fromme)

Arkansas: Very common and destructive. (Young)

Ohio: Appears very abundant this spring. The few counts I have made so far, however, show only 5 to 8% of the heads affected. R. A. Robbins, however, reports 8 to 10% in counties northwest of Columbus. The county agent in Pike County reports having counted 25% loose smut in one field. (Stover)

Illinois: Loose smut rarely seen in fields of spring wheat. (Young)

Nebraska: Much more prevalent than previous reports. Some fields showing 15 to 20% of heads infected. Practically all fields show some, averaging from trace to 5%. More prevalent than bunt, probably due to favorable weather conditions. (Goss)

Kansas: Generally present to the extent of one-fourth of 1% in hard wheats. Seldom does it attain higher percentages. In soft wheats of eastern Kansas percentages vary from a trace up to 15%. (Melchers)

New Mexico: Loose smut on wheat appears to be more common this year also. (Crawford)

Idaho: Important in spring wheat under irrigation. (Hungerford)

Varietal resistance:

Pennsylvania: In the examination of a large number of fields of Forward wheat, no loose smut was found. Apparently it is highly resistant.' Forward and Leap are resistant and Pennsylvania 44 and Red Rock are susceptible. (Kirby)

New Jersey: Red Wave showed 3%, Fultz 2%, Dawsons Golden Chaff 5%, Forward 1%, and Red Rock 1%. (Dept. Pl. Path.)

Illinois: In one instance a 35 acre field of Michikoff had from 10 to 15% of the heads smutted. (Tehon)

Minnesota: Prelude and Kota susceptible. (Dept. Pl. Path.)

North Dakota: In many fields of Kota, infection of 5 to 10% has been found. Marquis wheat shows more than last year and Monad about the same as last year. (Weniger)

Control measures:

In general it may be said that any method that attempts to treat all the seed wheat for large areas for the control of loose smut of wheat is impracticable. The only feasible method in regions where loose smut is serious, is one involving a seed plot for increase purposes. In Indiana, which has been a pioneer in advising the modified hot water treatment on a large scale, it has been shown that a seed plot is practically necessary, at least where a considerable quantity of smut free seed is desired.

It is believed that all Experiment Stations, growers of pure seed wheat, or any organization that supplies farmers with seed, should see that it is free from loose smut. For example, the Kansas Station treated all its wheat for loose smut in 1924. No Experiment Station can afford to send out seed that is not free from controllable diseases.

Gregory (1) reports a method which is being used to some extent by farmers in Indiana.

Tapke (4) has made a study on the effect of the modified hot water treatment on wheat. He shows that the physical condition of the seed is a very important factor. This treatment will reduce the germination of seed wheat to zero or nearly zero when the seed coats are broken over the embryo. Increasing the duration of the presoaking period increases the amount of injury from the 10-minute treatment rapidly when the seed coats are broken and relatively slowly when the seed coats are unbroken. Even when the presoak period is not used the 10-minute treatment causes severe injury when the seed coats are broken. Neill (2) has made some recent studies on this subject in which he states:

> "Presoaking in itself does not appear to injure the vitality of the seed, but renders it more sensitive to the action of the higher temperatures in the subsequent dip. There is a slight advantage in a presoak temperature of 84° over a temperature of 63° for five to six hours when germination is commenced on the day following the treatment. With a presoak of five to six hours at 63° the total germination is unaffected by a subsequent dip of ten minutes up to 127°, or five minutes up to 129°. A reduction of 3 to 4 percent takes place in each case by a further rise of 2° and a rapid reduction with a still further rise. The germination speed is in all cases lowered in direct proportion to increase in both time and temperature of dip. Drying quickly, following treatment in an air current of 95° to 100° has no injurious effect on germination, nor when treated seeds are thus dried is there any loss of vitality after storage up to one month."

Rodenhiser and Stakman (3) report successful results in the control of the loose smuts of wheat and barley by the use of Uspulun, Semesan, and Germisan.

Virginia: Good results with hot water treatment applied on farm. Dipping grain enclosed in sacks and barrels. (Fromme)

Indiana: Severe loose smut infection in northern Indiana where it is not generally serious. Fields planted with seed treated in 1922 but not in 1923 were not free from smut. (Gardner)

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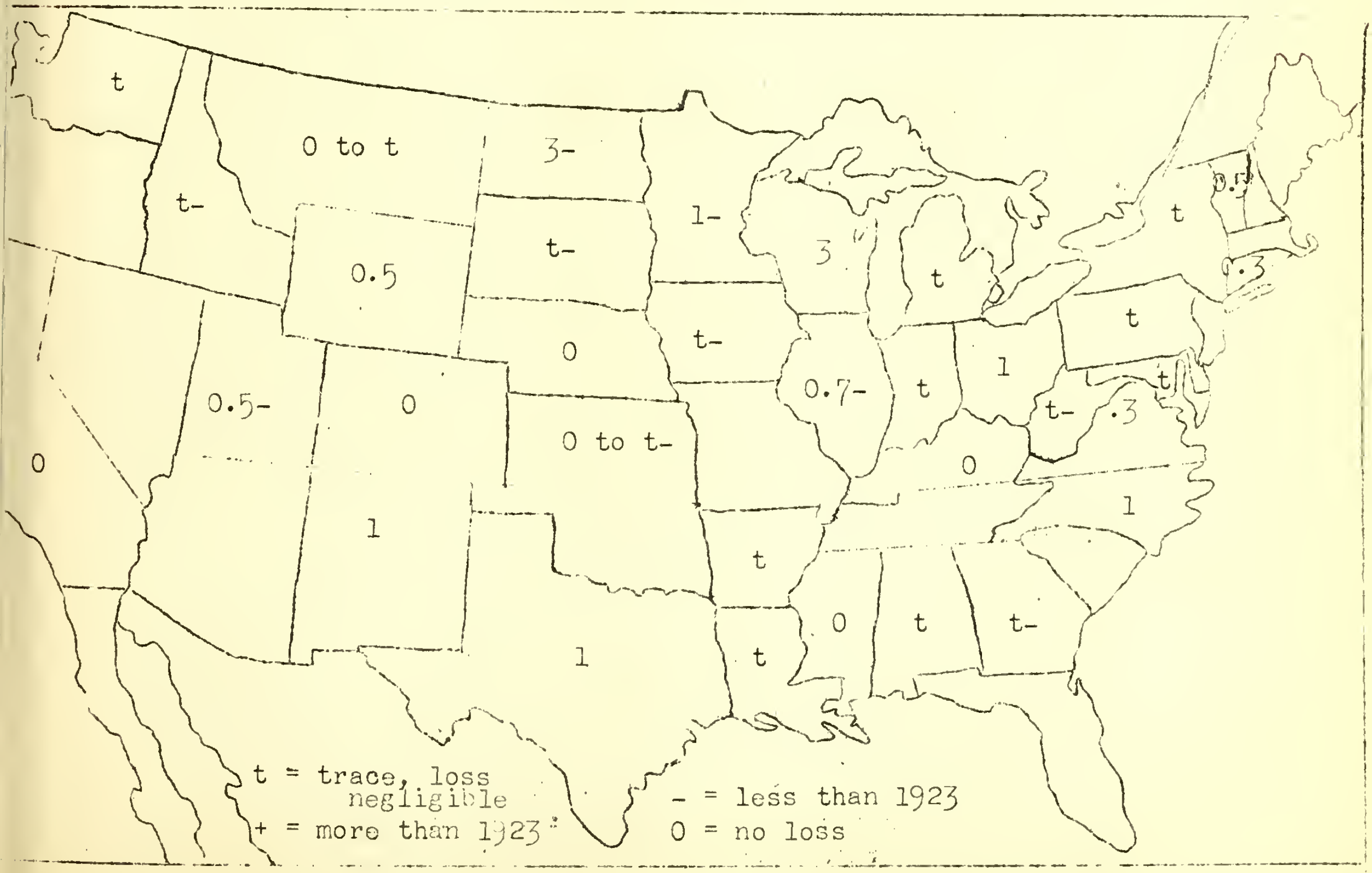
STEM RUST CAUSED BY PUCCINIA GRAMINIS PERS.

Stem rust of wheat in the United States in 1924 caused very little loss. It was not to be compared in this respect with the season of 1919, 1920, or 1923.

North Dakota and Wisconsin, according to reports, had the greatest losses, 3% in each case. Minnesota, North Carolina, New Mexico, Texas, and Ohio, states widely scattered, reported 1%. Virginia and Connecticut each reported 0.3% damage, while 0.5% loss was estimated for Utah, Wyoming, and Vermont. Most of the reports indicate that stem rust was a negligible factor. In the Hard Winter Wheat Belt, Oklahoma did not make a report, but it is believed that no damage occurred in this state. Most damage occurred in the Hard Red Spring Wheat Belt as shown by the map. In all probability a conservative estimate of the total loss caused by stem rust in the United States in 1924 would be less than one-half percent.



1. Percentage losses and prevalence as compared with 1923 of stemrust of wheat, 1924.

Weather relations:

The season of 1924 was rather unusual in many respects, in that it was backward and cool during May, June, and parts of July. Collaborators' reports indicate that the small amount of stem rust on wheat was due to extremely cool weather at some of the critical stages when infection ordinarily would have occurred. In numerous cases cited, as in West Virginia, there was an abundance of moisture but the temperatures were below normal. Minnesota likewise reported an unusually cool spring as did also Kansas and Nebraska and the corn belt states in general. Iowa reported an extremely cool and unusually dry spring, a combination which in itself would not favor rust development. In South Dakota it was unusually dry when the first signs of rust appeared. Undoubtedly, these unusual environmental conditions in states where stem rust ordinarily is severe were important factors in holding it in check in 1924.

Factors affecting the relative severity:

The following quotation is from a report by E. B. Lambert "Report of progress in epidemiology of stem rust of cereals, 1924." Cereal Courier 17: 37-46. Jan. 31, 1925.

> "In Oklahoma, Kansas, Missouri, southern Illinois, and Nebraska, no appreciable loss resulted from stem rust. Infection was first observed in these states during the second and third weeks in June. In this region barberries rusted in May but conditions were unfavorable for abundant infection. The significance of barberry infection in Kansas and Missouri could not be determined, since only a few rural barberry plantings were available for study.
>
> "The rust was first found in Colorado, South Dakota, Iowa, Minnesota, and North Dakota during the last week in June and the first week in July. It was found at Grand Forks, North Dakota, on July 13, and on the Canadian border a few days later. A center of heavy infection developed around Yankton, South Dakota, where the initial infection seemed to have occurred about June 15. Seven barberry plantings were located in this region, but the amount of inoculum spreading from these barberries did not seem abundant enough to account for all of the heavy initial infection. It may, possibly, have been due to a combination of spores blown in from the South and East and spores from local infected barberries. Another center of severe infection existed at harvest time in central North Dakota. Initial infection occurred throughout this region during the second week in July. The heaviest early infection centered around Jamestown and Courteney and extended northwest through the Kenmare region and northeast through the Devils Lake region. Several barberry plantings which were infected were located near Courteney. These were located after the epidemic had become widespread, and therefore it was impossible to determine how much they had contributed to the production of the epidemic. The inoculum which caused the intial infection in this region may have come from several sources, - local barberries, wind-blown urediniospores from northern Kansas

Nebraska, and the Yankton area, or aeciospores from Ohio or possibly as far east as West Virginia, Pennsylvania and New York may have contributed.

"In the eastern portion of the barberry eradication area, with the exception of southernIllinois and southern Indiana, stem rust did not appear on grains or grasses until July. Barberries were heavily infected throughout southeastern Minnesota, Wisconsin, northern Illinois, northern Indiana, Ohio, and Michigan. In this region local epidemics were easily traceable to barberries. In Swift County, Minnesota, stem rust on oats was traced seven miles to infected barberries. In Indiana, during the latter part of June, rust apparently spread twenty-five miles northeast from infected barberries in the area of escapes at Ambia. Stem rust infection was extremely severe on oats near the escaped barberry area at Trempeleau, Wisconsin. During the latter part of July, oats were heavily rusted for eighty miles northwest of this area. In Michigan an area of rusted wheat was found in Gratiot County on July 8. At this time the area comprised less than two acres adjacent to infected barberries. On July 22, the rust had spread to all of the wheat fields in four section. Numerous other examples were noted. Mr. Reddy reported conditions in Michigan as follows:

> 'This has been a wonderful season in Michigan because all rust outbreaks can be directly associated with barberry plantings. We say it is wonderful, because the influence of barberry is so obvious that Michigan farmers having rust are enthusiastic for the eradication of barberries after making a limited number of field observations. It has never been so easy to correlate the rust and the barberries.' "

Statements of collaborators:

Pennsylvania: Stem rust on wheat was first found on July 7 in Chester County. Thereafter the rust was present in every county surveyed. However, only in Cumberland County could the rust be considered of any importance. In that county infected barberries were reported to have spread so much rust to several neighboring wheat fields as to almost totally destroy the grain. It was also observed that fields growing several miles from the barberries had more rust than others in the state. (Kirby)

North Dakota: The season has been very backward and although much wheat was sown fully a month earlier than usual, cold and dry spring wheat weather checked germination and early development very greatly. Wheat is about a week later in development than usual at this time of the year. In Cass County wheat headed generally during the first week in July. In the northeastern and southwesternsections of the state it headed during the second week in July. Stem rust was observed on spring wheat in the Uniform Rust Nursery at Fargo for the first time on July 8, although it had been looked for previously. The amount of infection was very light, about one pustule per rod row. Infection has not spread very much since first observed. Fields of wheat are generally very sparsely infected. (Weniger)

<u>South Dakota</u>: There is a general sprinkling of black stem rust all over South Dakota. A general area of 5 to 10% infection in Spink and Brown Counties may do a little damage but we do not look for more than a very slight loss. There is a small area of about 30% infection in southeastern South Dakota but it will probably do little damage as the wheat is being cut. (Evans)

<u>Nebraska</u>: Stem rust was about two weeks later than usual in making its appearance from overwintering spores in the south. On account of dry weather conditions in April, barberries failed to rust generally. The few light infections which did occur early developed very slowly and could be traced only with difficulty to cereals. The numerous rains during June brought out new infections on the barberries which of course were too late to do any damage to the wheat. In the spring wheat section of the state the weather conditions have been very dry and the rust which is present is developing very slowly and I am sure there will be little if any damage to the spring wheat. (Thiel)

<u>Colorado</u>: In Colorado there was a general infection especially in the spring wheat where the crop was late. The late spring wheat on the dry land in eastern Colorado showed a general epidemic of stem rust ranging from 25 to 30% severity. Most of the spring wheat in the spring wheat area had advanced far enough to escape any serious damage by the rust. (Learn)

An interesting list of the first dates of stem rust infection at Fargo for various years follows. (Weniger)

1919 - June 6
1920 - June 22
1921 - June 13
1922 - June 26
1923 - June 29
1924 - July 8

A general summary of the stem rust situation in South Dakota, Minnesota and North Dakota is given by Messrs. Humphrey, Stakman, and others. (Cereal Courier 16: 173. July 31)

"Dr. H. B. Humphrey, Pathologist in Charge of Cereal Disease Investigations, writes from Doland, South Dakota, on July 26 that with a party consisting of Dr. E. C. Stakman, Donald G. Fletcher, Mr. Hynes, an Australian graduate student at the University of Minnesota, L. W. Melander, and E. B. Lambert, he made an automobile trip from Minneapolis to Fargo, North Dakota, arriving there July 23. Every few miles grain fields were examined and but little stem rust was found. The members of the party made individual notes in different parts of each field and then compared notes. Briefly, the following points were agreed upon: (1) the initial inoculum must have been very meager and therefore but thinly scattered and at widely spaced intervals; (2) the initial infections were few to a given area and apparently dated back to about June 20 to 25; (3) with the exception of about four days of hot, humid weather the growing period for cereals throughout the area visited had been cool and relatively dry; (4) during the few days of rust-favoring weather secondary infection became manifest in scattered uredinia; (5) by the time this secondary infection appeared practically every field of Marquis wheat inspected was in either the soft dough or hard dough stage and really out of danger; (6) barberries, where found, were unmistakably responsible for tributary local infection of grains and grasses; (7) throughout most of the territory visited the barberry field men had found only comparatively few barberries and these were but lightly infected; (8) the greater part of the initial infections may possibly have originated from spores carried in from other states, not necessarily from the South, and precipitated in June by showers during low-pressure periods. This initial inoculum may have come from states as far away as Wisconsin or even from Michigan, Illinois and Ohio."

Varietal resistance:

Several papers bearing on the problem of resistance of wheat to stem rust have been published in the past year.

Hurd (1) has made a detailed study of the relationship of acidity with reference to stem rust resistance in wheat varieties. It is claimed that varietal resistance to stem rust is not related at any stage of development to titratable acid or H-ion concentration. High acidity of the juice does not tend to hinder attacks of the stem rust organism nor does low acidity predispose the plant to the disease.

The relation of the morphological characters of wheat to resistance is discussed by Hursh (2). In addition to fundamental protoplasmic resistance, wheat varieties are said to possess other means of defense against stem rust. The number of leaf hairs and the size and number of stomata are not considered important in influencing the entrance of germ tubes, but the stomatal movements may have some effect in preventing the penetration of the fungus. The rust mycelium is almost entirely limited to certain tissues in the host. Those varieties which have a great deal of sclerenchyma are less likely to be injured by rust due to the mechanical limitation to the spread of the mycelium.

In a paper giving the results of experiments covering a period of eight years on the effect of fertilizers on the stem rust of wheat, Stakman and Aamodt (3) state the degree of physiological susceptibility of susceptible and resistant varieties is not changed directly by the use of different fertilizers, although the morphologic resistance may be changed slightly. While there appears to be only a slight direct effect of fertilizers on the development of stem rust there is sometimes an intense indirect effect. The authors recommend the avoidance of excessive nitrogenous fertilizers and the use of phosphates and potassium fertilizers on soils which need them.

Stoa (4), discussing "The early harvest of rusted Marquis Wheat," states that the proper stage for harvesting rusted wheat appears to be the same as for a normal harvest, which is directly contrary to the usual recommendation.

The progress of barberry eradication in 1924 has been summarized by F. E. Kempton and Lynn D. Hutton (Cereal Courier 17: 13-36. Jan. 31, 1925).

> "During the calendar year 1924 approximately 124 counties were covered in the original survey, approximately 60 counties were surveyed a second time, and the equivalent of 203 counties was covered in resurvey. Original bushes numbering 295,814 were found on 5,250 properties, and 388,632 bushes were destroyed on 6,335 properties. These totals include 4,841 bushes found on 695 properties in second survey. In resurvey, 21,852 sprouting bushes were found and 21,850 were eradicated. Seedlings numbering 847,771 were found in the original survey, second survey and resurvey.
>
> "Summary of results for seven years. In the seven years of the campaign, from April 1, 1918, to December 31, 1924, the equivalent of approximately 796 counties has been covered in the original farm-to-farm survey. The original survey of practically all cities in the entire 13 states has been completed. Of the counties already covered by the original survey, approximately 111 have been surveyed a second time. In continuing the resurvey it has been necessary to revisit the properties in approximately all counties covered by the original survey to June 30, 1923. Original bushes numbering 6,358,343 have been located on 68,465 properties. Of these, 5,813,192 bushes have been destroyed on 67,510 properties. On resurvey, 273,619 sprouting bushes were destroyed from 10,902 properties. In all surveys, 4,607, 142 seedlings were found and 4,548,956 were destroyed. The numbers include 10,106 bushes and 9,579 seedlings found and 10,086 bushes and 9,579 seedlings destroyed on second survey. This makes a grand total of 11,239,104 bushes, sprouting bushes and seedlings found and 10,634,741 bushes, sprouting bushes and seedlings destroyed in all surveys in the entire campaign."

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LEAF RUST CAUSED BY PUCCINIA TRITICINA ERIKSS.

As in the case of stem rust in the United States in 1924, leaf rust was inconspicuous and caused little damage. It was perhaps less prevalent than in any year since 1918, when it was very common in all states growing wheat. A report of the occurrence of leaf rust for 1924 by states is shown in Table 30. The highest percentage reported was 5% in Georgia, followed by 3% in North Carolina and Alabama, and 2.4% in Illinois. New York, Pennsylvania, South Carolina, Wisconsin, and Utah reported 1%. Michigan and Vermont, each, reported 0.5%, while Connecticut reported 0.25%. Mississippi and California reported no loss, while such other states as sent in reports indicated only a trace of injury. A further examination of the 1924 reports show that in every case there was "much less" or "less" leaf rust than in 1923, with the exception of Ohio which reported more.

It is interesting to note that in those regions where leaf rust was general, infection was too late to be of any importance. In Table 30 a summary has been made, using as a basis the reports sent in by various states over a period of years from 1918 to 1924, inclusive. The various sections of the United States in which wheat is a major crop are included in this table. The maximum and minimum amounts of rust reported by any state for the various areas are given, together with the average. Attention should be called to the fact that the records for 1918 are undoubtedly low for the entire country. At that time most pathologists regarded damage due to leaf rust of wheat as virtually negligible. A review of the reports on conditions in 1918 shows plainly that considerable damage occurred in various states, but most pathologists were probably too conservative in their estimates of loss. The years 1918, 1919, 1921, and 1922 were unquestionably years when considerable injury resulted and the estimates bear this out, with the exception of those recorded for 1918. The infection in 1924 was extremely light for the country as a whole and only in a very few cases was there an appreciable injury.

Comments by collaborators:

Tennessee: On June 5 I stopped at Knoxville and found no leaf rust in the wheat plots there, the varieties being past flowering at that time. Professor Essary tells me that this is the first year since he has been there in which there has been so little leaf rust of wheat. (Mains, Indiana)

Georgia: About May 6 I made a trip into Georgia stopping at Experiment and Tifton. At Tifton quite a fair amount of rust was found, one variety showing about 100 percent rusting. Most varieties, however, were only moderately rusted upon the lower leaves. At Tifton the wheat was in the milk stage. At Experiment, Georgia, the early varieties were just beginning to flower and there was only a small amount of rust on the lower leaves. On June 5, I returned to Experiment, Georgia, and found quite a fair amount of rust in the variety nursery, enough so that we are able to obtain data as to varietal susceptibility. The leaf rust, however, was not widespread and even in the Agronomy nursery there, many of the hybrids showed but little rust. (Mains, Indiana)

Indiana: Leaf rust is the least in 1924 that has occurred in six years. Fall wheat badly infected on October 31, especially near volunteer wheat. (Mains)

Minnesota: Light to moderate infections were reported throughout the wheat growing region. There was a marked variation in the amount of rust in neighboring fields, some were almost free from rust, others contained a moderate infection. (Sect. Pl. Path.)

Kansas: The least amount of leaf rust that has occurred in ten years. Practically none was to be found in the hard winter wheat area of the state. Only a very slight infection was found in the eastern soft wheat district, the infection being confined to the lowermost foliage. (Melchers)

Table 30. Summary of percentages of loss from leaf rust of wheat, 1918-1924.

Region	*1918	1919	1920	1921	1922	1923	1924
1. New England States	0 to t (Av. t)?	.5 to 5 (Av. 1)	0 to t (Av. t)	0 to t (Av. t)	0 to t (Av. t)	0 to 1 (Av. t)	.25 to .5 (Av. .2)
2. Atlantic States (Virginia northward)	0 to t (Av. t)?	1 to 3 (Av. 1.6)	0 to t (Av. t)	t to 6 (Av. 2)	t to 4 (Av. 3)	.2 to 2 (Av. 1)	t to 1 (Av. .5
3. Ohio Valley States	0 to t (Av. t)?	1 to 3 (Av. 1.7)	t to 1 (Av. .3)	t to 7 (Av. 2.7)	5 to 18 (Av. 11)	1 to 4 (Av. 2)	t to t (Av. t)
4. Great Lake States	0 to t (Av. t)?	1 (Av. 1)	0 to t (Av. t)	0 to t (Av. t)	.5 to 2 (Av. 1.1)	t to t (Av. t)	t to 1 (Av. .5)
5. Great Plains States	0 to t (Av. t)?	.1 to 4 (Av. 1.5)	t to 1.5 (Av. .3)	t to 10 (Av. 2)	t to 5 (Av. .5)	1 to 1 (Av. 1)	t to t (Av. t)
6. Cotton Belt States	0 to t (Av. t)?	4 to 8) (Av. 5.3)	t to 4 (Av. 2)	t to 20 (Av. 7)	1 to 15 (Av. 6)	1 to 5 (Av. 3)	to to 5 (Av. .7)

States included in region:

1 = Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island.
2 = Virginia, New Jersey, Pennsylvania, Delaware, Maryland, New York.
3 = Ohio, Indiana, Kentucky, West Virginia.
4 = Michigan, Wisconsin, Minnesota.
5 = North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, Montana, Wyoming, Colorado, New Mexico.
6 = North Carolina, South Carolina, Georgia, Alabama, Tennessee, Mississippi, Louisiana, Oklahoma, Arkansas, Texas.

*See text (p. 125) for explanation.

Wheat - Leaf rust

Weather relations:

There undoubtedly was considerable fall infection in various states, but this seemed to have been killed out in some instances. This naturally held early spring infection in check to a considerable extent. Decidedly low temperatures occurred in January in several states and probably operated in eliminating sources of infection, while the late spring seemed unfavorable to the spread of leaf rust from such as may have survived. It is interesting to note that many states had more rainfall than usual in the spring months accompanied by a lower average temperature, while other states had less than usual with lower temperatures. These opposite conditions as regards rainfall did not seem to change the leaf rust situation. Where infection was found early in the season it was noted that the rust developed much more slowly than generally is the case. Undoubtedly the temperature relationships were the most important factors involved.

Arkansas: Unusually wet and cool weather in early spring hindered the development of leaf rust. (Dept. Pl. Path.)

North Dakota: Too cool for early development. Even the most susceptible varieties were little affected. (Weniger)

Kansas: Extremely dry weather during April and May is probably responsible for the non-occurrence of leaf rust. This is is the first year since 1917 that this condition has existed. For the first time I have had great difficulty producing an artificial epidemic in my leaf rust nursery here at Manhattan. (Johnston)

Pennsylvania: The warm winter with its alternate thawing and freezing seemed to more completely kill out leaf rust than ever before observed. The examination of many wheat fields in March and April showed no signs of this rust. (Kirby)

Leaf rust on Aegilops cylindrica:

This grass was found by C. O. Johnston in Kansas the past season to be causing considerable alarm on account of its occurrence in wheat fields in the southern part of the hard winter wheat belt. He reports it susceptible to *Puccinia triticina* Erikss. and states that "Natural hybrids of *Aegilops cylindrica* X wheat were found to be extremely susceptible to *Puccinia triticina* Erikss."

Varietal resistance:

The report from Colorado indicates that there are strains of leaf rust in that state different from those in neighboring states.

Illinois: As usual, Turkey wheats are much less severely rusted than the soft wheats. So far as could be observed, there was no appreciable difference in the amount of infection on the soft wheats such as Fultz, Fulcaster, Red Cross, Columbia etc. (Tehon)

Texas: A uniform but not extremely heavy epidemic of leaf rust was found at Denton, Texas. A slightly heavier infection occurred at Temple, Texas. At both of these stations a number of pure lines of Mediterranean showed marked resistance to leaf rust. (Johnston, Kansas)

Colorado: Marquis moderately susceptible. Kanred and Turkey Red susceptible. (Learn)

FUSARIUM BLIGHT (SCAB) CAUSED BY GIBBERELLA SAUBINETII (MONT.) SACC.

Wheat scab is confined generally to the section of the country east of the Great Plains area, being most prevalent in the corn belt. Records indicate that scab was about as prevalent in 1924 as in 1923, being perhaps an average year for this disease and certainly not to be compared with the season of 1919, which was an outstanding one for damage caused by wheat scab.

Table 31. Estimated percentage reduction in yield of wheat due to Fusarium blight (scab) 1924.

Percent	States
5	Pennsylvania, Iowa, Tennessee
2	Delaware, Illinois, Ohio
1.5	Maryland
1	Virginia, North Carolina, Michigan, Wisconsin, North Dakota, New Mexico
.5	New Jersey, Indiana, Kentucky
trace	New York, West Virginia, Texas, Kansas
no loss	South Dakota, Mississippi, Idaho, Washington

Table 32. Maximum percentages of scab infection noted by collaborators, 1924.

Percentage	State	Percentage	State
100	Illinois	10	Minnesota (durum wheat)
90	Maryland		
80	Pennsylvania	7	Virginia
77	Delaware	5	North Dakota
60	Ohio	2	Michigan
20	New Jersey, Iowa	trace	South Dakota, Kansas

Weather relations:

Pennsylvania: Considerable injury from scab. Wet weather at flowering time. (Kirby)

Wheat - Fusarium blight

Ohio: The unusually high precipitation of the early season, particularly when the wheat was heading out, presented conditions very favorable for the scab disease. (Thomas)

General statements by collaborators:

New Jersey: General over the state. Severe in Cumberland and Burlington Counties in fields of wheat following corn. (Martin & Haenseler)

Pennsylvania: Scab was much more severe in corn ground as for example in Lancaster County there was 72.8% scab when wheat followed corn and 8% when wheat followed other than cereal crops.

Scab this year appears to be more severe than for many years and the loss will likely run as high as 5 to 10%. The dates of occurrence, the amount of scab and the locations where scab has been observed in Pennsylvania are as follows: (Kirby)

Date observed	County	No. fields	% Scab
June 24	Lebanon	1	t
June 25	Berks	2	.5
June 26	Delaware	14	64.0
July 7	Chester	8	8.1
July 8-9	Lancaster	24	19.1
July 10	Cumberland	12	27.6
July 11-12	Blair	21	7.9
July 15	Center	6	30.0
July 16	Lycoming	9	26.1

Delaware: Exceptionally heavy infection. Appears more generally prevalent in the late maturing field of New Castle County. Farmers are generally complaining of poor development of heads. The development of straw is best secured for years. The following is a report on the prevalence of wheat scab in threshed wheat: (Adams)

1924

Total number samples (58) collected showed

New Castle County..........77%

Kent County.................47%

1923

Total number of samples (6) collected

New Castle County..........27%

Kent County.................33%

Sussex County...............--

Ohio: Very severe, in some cases running as high as 60% on corn ground wheat. The worst disease of wheat this year. (Hesler

Repeated observations indicate that wheat scab may be expected to be much more severe where wheat follows corn. (Thomas)

Illinois: Scab unusually bad this year. At Rochelle, one field had an average of 60% scab with most of 80% of the top heads destroyed. At Amboy, another field had an average of 40% of the heads scabby and most of 70% of the top heads destroyed. By top heads I mean those on the longest stalks. These two fields were Marquis wheat (?). Marquis fields have usually showed 5 to 10% or higher percent of scab. The blue stem or blue ribbon spring wheat, bearded, usually showed 1 to 5% and one case of 10% scab. (Young)

Michigan: Common in southern half of state. With certain varieties actual loss of 1 or 2% may occur. Peculiar blasting of entire plants, probably of this nature, has done considerable damage with some varieties.

Iowa: Common throughout Iowa causing moderate damage estimated at 5%. (Porter)

Recent literature:

Dickson, J. G., Sophia H. Eckerson and Karl P. Link. Studies on predisposition of wheat and corn to seedling blight caused by Gibberella saubinetii. (Abstract) Phytopath. 14: 34. 1924.

Hynes, H. J. On the occurrence in New South Wales of Gibberella saubinetii, the organism causing scab of wheat and other cereals. Jour. & Proc. Roy. Soc. New South Wales 57: 337-348. May 1924.

Johnson, A. G., H. H. McKinney and C. E. Leighty. The rosette disease of wheat and its control. U. S. Dept. Agr. Farm. Bul. 1414: 1-10. June 1924.

Koehler, B., J. G. Dickson and J. R. Holbert. Wheat scab and corn rootrot caused by Gibberella saubinetii in relation to crop successions. Jour. Agr. Res. 27: 861-880. Mar. 15, 1924.

Lundegordh, Henrik. Der Einfluss der Wasserstoffionenkonzentration in Gegenwart von Salzen auf das Wachstum von Gibberella saubinetii. Biochem. Zeitschr. 146: 564-572. Apr. 1924.

MacInnes, Jean and R. Fogelman. Wheat scab in Minnesota. Minnesota Agr. Exp. Sta. Tech. Bul. 18: 1923.

Russell, H. L. and F. B. Morrison. Studies on nature of disease resistance in cereals. (Data supplied by J. G. Dickson). In New facts in farm science. Wisconsin Agr. Exp. Sta. Bul. 362: 43-45. Mar. 1924.

Wineland, G. O. An ascigerous stage and synonomy for Fusarium moniliforme. Jour. Agr. Res. 28: 909-922. May 31, 1924.

ROSETTE (CAUSE UNDETERMINED)

No extensive reports for 1924 are available on this disease which seems to be restricted to Illinois and Indiana. The accompanying table compiled by McKinney and Dungan is of interest but does not give any indication of the extent of damage that rosette does when considering the entire wheat crop of these states. So far rosette would come in the class of minor wheat disease problems in this country.

Table 33. Distribution of the rosette disease in the United States (1919-1924)

State	County	Number of infested fields	Approximate acreage of infested fields
Illinois	Madison	27	670
	Mason	48	1310
	Sangamon	2	380
	Logan	1	20
	Cass	-	-
Indiana	La Porte	7	215
	Porter	6	120
	Tippecanoe	1	5

TAKE ALL CAUSED BY OPHIOBOLUS GRAMINIS SACC.

No new areas have been added during the past year to the list of states reporting take all of wheat. Table 34 gives the year when each state, in which Ophiobolus graminis is known to occur, first reported it.

Table 34. Years in which take all of wheat was reported authentically from various states.

Year	States
1919	Virginia, *Washington
1920	New York
1921	Indiana, Arkansas, Oregon
1922	Kansas
1923	California, Tennessee, Maryland (material collected in 1922), North Carolina

*Collected in 1919 but not determined until later.

An attempt has been made to ascertain the damage which this disease has caused in the states in which it has been reported during the several years of its occurrence. Table 35 shows the estimated percentage loss from this disease. It will be observed that New York is the only state which reports any appreciable loss. When these estimates are compared with those for losses caused by some of our footrot organisms such as Helminthosporium sativum, it would seem that the take all disease of wheat has up to the present caused no appreciable loss in the United States. While, of course, some doubt may exist at times as to the actual identity of the organism involved, these reports of the injuries caused by Ophiobolus seem to have been considered carefully.

Table 35. Estimated percentage loss from take all of wheat caused by Ophiobolus graminis from 1919-1924, according to reports of collaborators.

Year	Va.	Wash.	N. Y.	Md.	Ind.	Ark.	Ore.	Kans.	Calif.	Tenn.	N. C.
1919	P	P									
1920	0	0	P	t							
1921	0	0	.5	t	P	P	t				
1922	0	0	1.0	t	0	t	t	t			
1923	0	0	.08	t	0	P	t	P	t	P	
1924	0	0	t	t	0	P	t	P	t	P	.05

t = trace
P = Known to occur but no evidence that it caused any appreciable loss of the state wheat crop.

Control measures:

The Department of Agriculture of South Australia (1) recommends the following measures for the control of take all: Burn stubble early. Fallow early, and keep clean by cultivation, which also makes a better seedbed. Roll if seedbed is not well compacted. Use more superphosphates; consider taking grasslands out of the rotation in bad take all areas; use wheat-oats-bare fallow, or wheat-oats-oats-bare fallow. Sow early wheats if it is thought that the soil is still infested.

Bartlett (2) also states that crop rotation is successful in controlling the disease.

An article (3) dealing with the rate of spread of a footrot of wheat, the cause of which is not given but which resembles take all, has been published recently. Methods of seed bed preparation and their effect on the control of this footrot for the conditions prevailing in Kansas are discussed. It is shown that the date and depth of plowing have a marked influence on the survival of this disease.

Recent literature:

Cited:

1. Anon. "Take all" investigations. Jour. Dept. Agr. South Australia 27: 566-570. Jan. 15, 1924.
2. Bartlett, H. The control of take all and footrot in wheat. Agr. Gaz. New South Wales 35: 82. 1924.
3. Sewell, M. C., and L. E. Melchers. The effect of rotation and tillage on footrot of wheat in Kansas, 1920-1924. Jour. Amer. Soc. Agron. 16: 768-771. Dec. 1924.

Not cited:

Bellanger, Fernand. La maladie du pied des cereales. Terre Vaud. 16: 350-351. May 31, 1924.

Fraser, W. P. "Take all" of wheat in Western Canada. (Abstract Phytopath. 14: 347. July 1924. (Saskatchewan; peritheci with mature asci found.)

Putterill, V. A. Plant diseases in the western Cape province. Vrotpootjie or take all of wheat. Jour. Dept. Agr. South Africa 8: 602-612. June 1924.

Samuel, G. Take all investigations. Jour. Dept. Agr. South Australia 27: 1134-1147. July 1924.

Sevegrand, P. Le piétin des céreales. Vie. Agr. et Rur. 24: 341-342. May 31, 1924.

FOOTROT CAUSED BY HELMINTHOSPORIUM SATIVUM PAM., KING, & BAK.

Helminthosporium footrot has been reported as causing appreciable damage in several states. Undoubtedly as studies progress this organism will be found responsible for causing a definite footrot in not only the hard spring wheat area, but also in the soft and hard winter wheat regions.

This fungus has been shown to be capable of attacking all parts of the wheat plant, affecting the seedling stage in which the plants may be killed outright, or later stages in which older plants are killed with evident root or footrot symptoms. The common name Helminthosporium footrot is being used to distinguish this disease from other footrots.

Table 36. Estimated percentage reduction in yield of wheat due to Helminthosporium footrot, 1924.

Percentage	State
10	North Dakota
8	Minnesota (durum)
4	Minnesota (common wheat)
2	South Dakota, Kansas
.5	Pennsylvania
trace	New York

Comments by collaborators:

Utah: Footrot occurs in the state, however, it is not known at present to be due to Helminthosporium. (Richards)

South Dakota: Worst area along northern part of state. Some fields were 100% loss. My estimate, 2%, is probably too low. (Evans)

North Dakota: Epidemic. Ten percent reduction for the state. Very severe in durum, Marquis and Kota. (Weniger)

Minnesota: Eight percent reduction in yield in durum wheat. Four percent for common wheat. Durum varieties very susceptible. As high as 75% of plants killed in some fields (after heading). Disease most severe late in the season. (Sect. Pl. Path.)

Kansas: Helminthosporium injury occurs in many fields. It is more common than at first thought in the hard wheat area. Rotation and time and depth ofplowing seems to have an important bearing on its control. (Melchers)

Pennsylvania: Forward at least was more severely attacked than any other variety. (Orton & Kirby)

Recent literature:

Christensen, J. J. and E. C. Stakman. Foot and rootrots of wheat in 1924. (Abstract) Phytopath. 15: 15. 1925.

Henry, A. W. Rootrots of wheat. Minnesota Agr. Exp. Sta. Techn. Bul. 22: 1-71. Apr. 1924.

Hynes, H. J. Investigations by the late C. O. Hamblin into the Helminthosporium disease of wheat. Jour. & Proc. Roy. Soc. New South Wales 57: 160-172. May 1924.

McKinney, H. H. An undescribed imperfect fungus associated with wheat footrot in Oklahoma. (Abstract) Phytopath. 14: 34. 1924.

OTHER FOOTROT AND ROOTROT DISEASES OF WHEAT

There are undoubtedly several other organisms involved in the production of foot and rootrot diseases of wheat in the United States. The only records available of such reports for 1924 are the following statements by collaborators.

Minnesota: Fusarium sp. seems to be partially responsible for rootrot damages in spring wheat. Many fields of durum had 5 to 30% of the plants killed after heading. Durum most susceptible to footrot caused by Fusarium sp. Several Fusaria have been isolated from a large number of fields but Helminthosporium seems to predominate. (Sect. Pl. Path.)

Kansas: Species of Fusaria have been isolated very frequently. A fairly large percentage of Wojnowicia graminis has been isolated from plants in conjunction with Helminthosporium sativum. (Melchers)

Brittlebank and Adam (1) report the occurrence in Australia of a new disease resembling the true take all caused by Ophiobolus but due to a different organism to which they give the name Pleosphaeria semeniperda. The fungus has been found on wheat, oats, Avena fatua and Bromus sterilis. The conidial stage is believed to be identical with Podosporiella verticillata O'Gara, described as the cause of a seedling disease of wheat in Utah in 1915 (Phytopath. 5: 323. 1915)

Recent literature:

Cited:

1. Brittlebank, C. C., and D. B. Adam. A new disease of the Gramineae: Pleosphaeria semeniperda nov. sp. Trans. British Mycol. Soc. 10: 123-127. Sept. 1924.

Not cited:

Henry, A. W. Rootrots of wheat. Minnesota Agr. Exp. Sta. Techn. Bul. 22: 1-71. Apr. 1924.

ERGOT CAUSED BY CLAVICEPS PURPUREA (FR.) TUL.

Ergot of wheat occurs in various states, especially on durum wheat. Collaborators' reports for 1924 are as follows:

Ohio: One case of its occurrence reported. (Young)

Illinois: Ergot for the first time occurred in a five acre field in Carroll County. Only two sclerotia were found. (Tehon)

Michigan: Occasionally found. (Coons)

Minnesota: A trace occurred in Hennepin County. (Sect. Pl. Path.)

North Dakota: A trace occurred. Not sufficient moisture for development. Too cool at the period of infection at blossoming time. The last epidemic occurred in 1921, when many lots of ar durum contained 10% or more of sclerotia. (Weniger)

STRIPE RUST CAUSED BY PUCCINIA GLUMARUM (SCHM.) ERIKS. & HENN.

The only report of the occurrence of stripe rust in 1924 was from Idaho, where it was of no importance according to Hungerford.

Recent literature:

Akerman, A. Sommarens gulrostangrepp pa vetet (Attacks of yellow rust upon wheat during the summer) Sver. Utsädesför. Tidsskr. 33: 262-267. 1923.

Humphrey, H. B., C. W. Hungerford, and A. G. Johnson. Stripe rust (Puccinia glumarum) of cereals and grasses in the United States. Jour. Agr. Res. 29: 209-227. Sept. 1, 1924.

ANTHRACNOSE CAUSED BY COLLETOTRICHUM GRAMINCOLUM (CES.) WIL.

This disease seems to be confined to a section of the country east of the Great Plains area. It does not seem to be of any importance in the main winter wheat belt. Losses reported were 4% in Ohio, 3% in Pennsylvania, 2% in Iowa and a trace in New York and Wisconsin.

Illinois: There has been practically no anthracnose of wheat this season. It was found only once in very moderate amounts in one field in Knox County. (Tehon)

Indiana: Severe on lowlands in Jackson County. Observed growing on early fall sown wheat. (Mains)

POWDERY MILDEW CAUSED BY ERYSIPHE GRAMINIS DC.

Powdery mildew of wheat seems to have been most prevalent in the northeastern part of the United States in 1924. Those states reporting a trace were New York, New Jersey, Virginia, Illinois, Wisconsin, Maryland and Minnesota. Pennsylvania reported a 2% loss.

Pennsylvania: This disease was the most severe in many years, being present on nearly 100% of all plants observed about jointing time. It was first observed on April 17 at East Greenville, Montgomery County. Since then it has been observed everywhere in the state. By the time the wheat entered the dough stage little or no mildew could be found, however, it must have caused 2 to 5% loss in the state this year. (Kirby)

Illinois: This disease is occurring in the northeastern corner of the state. It is more abundant and more prevalent in Illinois this season than ever before. Hitherto it had been found only in Madison County but this season it has been found in Cass County where 20% of the plants in a 40 acre field of Turkey Red were infected, in DuPage County where 100% of the plants in one-sixth acre plots of Red Cross and Turkey 10-110 were diseased, and in Lake County where a slight infection was in a 20 acre field of Turkey Red. (Tehon)

Utah: Abundant in irrigated districts and occasionally destructive. (Richards)

New Jersey was the only state reporting on varietal reaction to powdery mildew. Prelude was severely attacked, Java was heavily infected and Red Bobs slightly, and on Marquis and Kota there was only a trace, according to the Department of Plant Pathology.

BLACKPOINT CAUSED BY HELMINTHOSPORIUM SATIVUM PAM., KING, & BAK.

The only state reporting this disease was North Dakota.

North Dakota: It caused a loss of 0.5%. It was less severe than usual. Most severe on Red Durum, Monad, and Kubanka. Weather conditions not as favorable for injury to heads and kernels as it was to earlier rootrot and bladeblotch by same organism. (Weniger)

GLUMEBLOTCH CAUSED BY SEPTORIA NODORUM BERK.

Glumeblotch is general but most prevalent in the South and the Ohio Valley States. The injury which this disease causes has varied from year to year. Some collaborators seem to question the importance of Septoria. The writer has seen instances when it was unquestionably responsible for a slight shriveling of the grain. It has been observed that an abundance of rainfall and moderately high temperatures are necessary at the time the wheat heads emerge from the "boot" if injury is to result.

In 1924 Pennsylvania and Arkansas reported losses of 1%, New York and Wisconsin each a trace, and Iowa and Kansas reported that it was present but caused no loss.

It is undoubtedly true that glumeblotch has been confused with the two bacterial diseases, blackchaff and basal glumerot, and that errors have been made in the reports in past years. It would be desirable to submit specimens to the Bureau of Plant Industry for careful examination when there is any doubt concerning the organism.

Pennsylvania: Blotch is only slightly more prevalent than in the past year or two. The disease was first observed on June 24 at Lebanon and during the remainder of the surveys it was observed than average of 8-15% of the spike lots were infected. Velvet Chaff most susceptible. (Kirby)

Virginia: Septoria is prevalent in the wheat. Roguing of the wheat varieties for chaff color has been impossible because of Septoria. The infected spikes appear to have ripened prematurely, the kernels being poorly developed. As the infection often amounts to five percent or more, it is expected that the quality as well as the quantity of the grain will be poor. (Cereal Courier 16: 139. July 10, 1924.)

Wisconsin: Glumeblotch is general over the state but of minor importance. (Vaughan)

BLACKCHAFF CAUSED BY BACTERIUM TRANSLUCENS UNDULOSUM S. J. & R.

For the most part, blackchaff occurred in recent years most extensively in the Mississippi Valley, Great Plains Area, Montana and Idaho. It has been most conspicuous in the Great Plains area and Mississippi Valley. It was not serious in 1924.

Blackchaff disease has been confused frequently by pathologists with the basal glumerot and glumeblotch diseases and there undoubtedly have been some errors in reports that have been submitted. Also, it might be mentioned that a variety of wheat known as Clark's Black Hull under certain environmental conditions produces a blackening of the glumes which has been confused with the bacterial blackchaff disease.

Minnesota: Very generally present. Kota and Ruby hybrids are very susceptible. Khapli, especially on peat lands, was found heavily infected on leaves, stems and glumes. (Dept. Pl. Path.)

North Dakota: More abundant on Kota and Marquis hybrids than either Kota or Marquis this year. Last year Kota very susceptible. (Weniger)

Nebraska: More prevalent than in previous years. All fields show considerable infection, from 1 to 25%. Particularly common where wheat had made a rank growth and where lodging occurred. Not causing any shrinking of the kernels. (Goss)

Kansas: The season of 1924 was not favorable for blackchaff infection and spread. In order to have an epidemic of this disease it is necessary to have an excessive amount of moisture almost continuously from the time the wheat heads emerge from the "boot" until the dough-stage is reached. Moderately high temperatures are favorable for the rapid spread and development since it has been observed that low temperatures (45 to 60° F) are very much less favorable. The environmental conditions at heading time are those which determine how much damage may occur. Even though there is heavy infection on the foliage, culms, and glumes little or no damage will result if bright, warm, dry weather prevails from the milk stage of the wheat kernel until harvest. (Melchers)

Iowa: General over state, but causing very little noticeable damage. (Porter)

SPECKLED LEAFBLOTCH CAUSED BY SEPTORIA TRITICI DESM.

Speckled leafblotch is general in its occurrence and has been found in past years to be widely distributed. If any one is prepared to state how much injury the wheat plant sustains when the foliage ceases to function, an approximation may be made of the damage caused by this Septoria. In several instances from one-fourth to one-half of the foliage has been dried up from an attack of speckled leafspot on wheat in Kansas. No attempt, however, has been made to interpret this in loss estimates.

The following states have reported a trace of loss in 1924: New York, Pennsylvania, South Carolina, Wisconsin and Idaho. Illinois reports .75%, Arkansas 2% and Alabama 1%.

Several other reports have been sent in of Septoria sp. on foliage from Connecticut, Idaho and Washington.

Comments by collaborators:

Illinois: Second only to wheat rust in conspicuousness. This disease has appeared in all parts of the state. In more than usual abundance on Fultz, Columbia, and a variety reported as "Orange." The resistance shown by Red Cross is more marked this season than usual. Turkey wheats have been uniformly highly infected. (Tehon)

Kansas: Practically no evidence of Septoria was noted the past year in direct contrast to other seasons. (Melchers)

WHEAT NEMATODE CAUSED BY TYLENCHUS TRITICI (STEIN.) BAST.

This disease up to 1924 had only been reported from Virginia, West Virginia, North Carolina, Georgia and California. Since 1922 it does not seem to have caused any appreciable damage in the states where it is known to occur. Only a few very slight infestations were reported in 1923 by the above states.

The most important development in the wheat nematode situation in 1924 was the discovery of the nematode disease occurring in Oconee County, South Carolina, which lies about midway between the Georgia and North Carolina infestations. The disease was found in four fields in the county where it affected the following percentages of plants in the various fields: 80%, 50 to 75%, 1.5%, and less than 1%. The disease has probably been prevalent in the county for several years.

Another interesting occurrence was that in Arizona where it was found for the first time. It was observed by W. H. Tisdale, April 26, at Sacaton in experimental plots in a single row of wheat introduced from India.

Recent literature:

Leukel, R. W. Investigations on the nematode disease of cereals caused by Tylenchus tritici. Jour. Agr. Res. 27: 925-956. Mar. 22, 1924.

FLAGSMUT CAUSED BY UROCYSTIS TRITICI KOERN.

Up to 1924 flagsmut of wheat has been reported from Illinois, Missouri, and Kansas. Complete accounts of the occurrence, spread of this disease, economic importance and additional information is to be found in the Plant Disease Bulletin sections on Diseases of Cereal and Forage Crops in the United States for 1921, 1922 and 1923.

Reports by collaborators:

Illinois: Flagsmut was found in one field in the eastern part of Washington County about thirty miles from the nearest known infestation. The maximum found in any field was 50%, this field being protected from the cold by timber. Attack light where wheat winterkilled. (P. A. Glenn)

Kansas: This disease occurred in Leavenworth County, northeastern Kansas the same as last year. Although the percentages in various fields were somewhat lower than in 1923, flagsmut was located in many new fields. The amount of smut varied from a trace to approximately 10%. It has been confined to Harvest Queen. (Melchers)

Recent literature:

Carne, W. M. Flagsmut of wheat (Urocystis tritici). Jour. Dept. Agr. Western Australian II, 1: 142-147. June 1924.

Griffiths, Marion A. Experiments with flagsmut of wheat and the causal fungus, Urocystis tritici Koke. Jour. Agr. Res. 27: 425-450. Feb. 16, 1924.

Noble, R. J. Studies on the parasitism of Urocystis tritici Koern., the organism causing flagsmut of wheat. Jour. Agr. Res. 27: 451-490. Feb. 16, 1924.

Shelton, J. P. Breeding wheats resistant to flagsmut. Agr. Gaz. New South Wales 35: 336-338. May 1924.

OTHER DISEASES AND INJURIES

Bacterium atrofaciens McC., basal glumerot, has been reported in past years from states between the Mississippi River and the Rocky Mountains, Michigan, New York. It has never occurred in amounts sufficient to cause appreciable damage. In 1924 this disease was found on several varieties in the University Farm plots at St. Paul, Minnesota, July 15 to 24, and Kirby reported that in Pennsylvania it was very common. "There was apparently from 1/2 to 2% of the heads infected in most of the fields in the following counties: Chester, Lancaster, Cumberland, Blair, Center, Lycoming, Clinton, and Erie."

Blast (cause unknown). Slight injury was reported from Arkansas. The disease was apparently associated with weather conditions. Some heads blight partially. The upper spikelets are often normal; the lower ones missing. In Illinois it was observed that the top half of heads failed to set grain, a condition only found in Carroll County, and not hitherto seen in the state.

Epicoccum (vulgare Corda)?, glume smudge, Pennsylvania.

Hormodendrum cladosporioides Sacc., sooty mold, Mackie of California says, "It reduced wheat yields adjacent to the coast, as usual. This disease is the limiting factor in wheat production in the lower Salinas Valley and northward. We found no varietal resistance although we have observed hundreds of varieties under attack. It does not attack barley and oats seriously."

Marasmius tritici P. A. Young (4) has been found in Illinois. Plants attacked are stunted and killed. Sporophores of the fungus occur on the basal internodes. This is the first report of this trouble.

Pythium debaryanum Hesse, seedling blight, Washington.

Sclerospora macrospora Sacc., downy mildew, was less abundant in Delaware than in 1923 and caused no damage. It occurred on Dietz Amber and Blue Stem varieties in the plots at the farm. (Adams)

Stripe (cause undetermined). In Pennsylvania a stripe disease, identical with that reported in previous years from New York, was found on Red Rock wheat, and caused a loss of 1%. This is the first time it has been found in the state. A stripe disease is also reported from Illinois by Tehon, as follows:

> In the wheat fields of southern Illinois, and to a lesser extent in northern Illinois, there has appeared this season an unusual and remarkable pathological condition among the plants which is the best described by the term "stripe." It is largely confined to soft, beardless varieties such as Fultz and Red Cross. Beginning near the top of the sheath, stripes of dead, yellowish-brown tissue run the length of the leaf, expanding near the tip

and causing the death of the tip for 2 or 3 cm. The stripes vary in width according as they involve the tissue adjacent to only a few, or to many, of the veins. At times the entire linear half of a leaf may be involved, but the stripes rarely appear to involve or cross over the strong middle vein. Running parallel to the diseased stripes is the normal, healty, green tissue. So definite are the tans and yellow-brownsof the diseased tissue that they form, beside the healthy tissue, a contrast equaled in brilliany only in the stripe disease of barley. The most careful microscopic examinations have failed to reveal the presence of any fungus, or other organism capable of causing the disease. It seems entirely probable that the condition of the leaves is due to the unusual climatological sequence of our spring.

"Following an excellent start under favorable conditions in April, the growth of the wheat was held in check through May by the coldest weather recorded for years, but during June which, while tremendously stimulating the growth of the crop,has imposed a decided strain on the adaptive powers of the plants, resulting in the death of tissues unable to secure sufficient water for evaporation during the hot days. "Stripe," first seen June 5 in Green County, has been found generally prevalent on wheat in Jersey, Calhoun, Green, Madison, Randolph, Monroe, St. Clair, White and Jackson Counties. Farther north, in Moultrie, Piatt, Kankakee and Will Counties, it is less prevalent."

Recent literature:

1. Foëx, E. Note sur Erysiphe graminis DC. Bul. Soc. Mycol. France 40: 166-176. Sept. 1924.
2. Newton, R. The nature and practical measurement of frost resistance in winter wheat. Res. Bul. Univ. Alberta Coll. Agr. 1: 1-53. July 1924.
3. Tehon, L. R. Marasmius on wheat. Mycologia 16: 132-133. 1924.
4. Young, P. A. A Marasmius parasitic on small grains in Illinois Phytopath. 15: 115-118. Feb. 1925.

RYE

STEM RUST CAUSED BY PUCCINIA GRAMINIS PERS.

Stem rust of rye was less widely distributed and caused less damage to the crop in 1924 than for several years. In 1921 there was considerable stem rust reported on rye. In 1922 and 1923 there was considerably less than in 1921. It is evident that stem rust was of even less importance in 1924 than in the last two years and, as with the stem rusts of other cereals, was an insignificant factor in lowering the yield.

Rye - Stem rust

Table 37. Percentages of loss from stem rust of rye, 1924, as reported by collaborators.

Percentage	States
1	Michigan, Ohio, South Dakota
.25	Connecticut
t	New York, Pennsylvania, Maryland, Illinois, Arkansas, Wisconsin, Minnesota, North Dakota, Alabama, Iowa, Idaho, Washington

States where stem rust of rye occurred but where no estimate on loss was made were: Connecticut, Pennsylvania, Texas, Arkansas, Indiana, Iowa, Idaho, Nebraska, Colorado, Wyoming, and Montana.

Dry and moderately cool conditions prevailed in Kansas, Nebraska and Iowa which probably held stem rust in check. Vaughan reported that in Wisconsin it was too cold for rust to get started.

LEAF RUST CAUSED BY PUCCINIA DISPERSA ERIKS.

Leaf rust was somewhat more common and apparently more destructive the past year than in 1923, judging from the estimates submitted by collaborators.

Table 38. Estimated percentage loss from leaf rust of rye, 1924, as reported by collaborators.

Estimated percent loss	States
3	Ohio
2	New Jersey
1.5	Connecticut
1	New York, Georgia, Maryland
.5	Pennsylvania, Illinois
t	Delaware, Virginia, Michigan, Wisconsin, Iowa, Arkansas, Kansas, Louisiana, Mississippi, Kentucky
0	North Dakota, South Dakota, Idaho, Washington, Oregon

<u>New Jersey</u>: General over state. Severe in South Jersey. (Dept. Pl. Path.)

<u>Pennsylvania</u>: General where rye was grown. (Kirby)

<u>Georgia</u>: Throughout southern counties. (Boyd)

Arkansas: Cold winter and spring reduced the percentage very materially. (Dept. Pl. Path.)

Minnesota: Overwintered in mycelial stage. Reported April 30 on old leaves. First observed on new leaves May 17. The distribution of leaf rust of rye very irregular. Some fields were found to be almost free, others were fairly heavily infected. (Sect. Pl. Path.)

Wisconsin: Reduced tillering in fall. (Vaughan)

Indiana: Prevalent only just previous to maturity. (Mains)

Recent literature:

Mains, E. B. Rye resistant to leaf rust, stem rust, and powdery mildew. (Abstract) Phytopath. 15: 58-59. Jan. 1925.

Mains, E. B., and H. S. Jackson. Aecial stages of the leaf rusts of rye, Puccinia dispersa Eriks. and Henn., and of barley, P. anomala Rostr., in the United States. Jour. Agr. Res. 28: 1119-1126. June 14, 1924.

ERGOT CAUSED BY CLAVICEPS PURPUREA (FR.) TUL.

This disease did not occur in serious amounts in the states where rye is a major crop. It was very much less common in North Dakota than reported in other years.

Table 39. Losses due to ergot of rye, as estimated by collaborators, 1924.

Percentage	States
5	Ohio
4	Iowa
2	Michigan, South Dakota
1	Illinois
.5	North Dakota, Kentucky
t	New York, New Jersey, Virginia, Wisconsin, Utah, Idaho
0	Pennsylvania, Kansas, Mississippi, Washington, California

Statements by collaborators:

Iowa: General in northern Iowa. Severe in many fields. (Porter)

North Dakota: Last epidemic of ergot in 1921. This year it was not abundant. Common on volunteer rye. (Weniger)

South Dakota: Ergot was very common this year, some fields bad; others with only small amounts. (Evans)

Recent literature:

Weniger, Wanda. Ergot and its control. North Dakota Agr. Exp. Sta. Bul. 176: 1-23. 1924.

ANTHRACNOSE CAUSED BY COLLETOTRICHUM GRAMINICOLUM (CES.) WILS.

Anthracnose has been reported generally east of the 100th meridian. In 1924, according to reports, it was somewhat more destructive than in 1923, and strikingly more so than during the past several years. Two states, Mississippi and Alabama, report a loss of 10%. In Alabama as much as 80% infection occurred in a field.

Table 40. Summary of the percentage of loss from anthracnose 1924.

Percentage	States
10	Mississippi, Alabama
5	Pennsylvania
1.5	Wisconsin
1	New York
.5	Indiana, Illinois
t	New Jersey

Statements by collaborators:

Illinois: There has been a single instance of anthracnose on rye reported. About 90% of the plants in a 5 acre field in Knox County were diseased, but the injury appears to have been very slight. (Tehon)

Mississippi: As much as 85% of the plants attacked. Kills stalks at crown. Head and leaf blight. (Barker)

POWDERY MILDEW CAUSED BY ERYSIPHE GRAMINIS DC.

There appeared to be somewhat less powdery mildew on rye than in 1923. The following states reported its occurrence: Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Indiana, Illinois, Wisconsin, and Iowa. The only state reporting an appreciable injury was Pennsylvania, where 0.5% loss occurred.

Recent literature:

Mains, E. B. Rye resistant to leaf rust, stem rust, and powdery mildew. (Abstract) Phytopath. 15: 58-59. Jan. 1925.

SCAB CAUSED BY GIBBERELLA SAUBINETII (MONT.) SACC.

Very slight amounts of scab occurred on rye in 1924. The only noteworthy case was in Wisconsin where Vaughan reports: "2% loss; considerable in shocks." Slight amounts were observed in some fields in New York, Pennsylvania, Illinois, Iowa, and North Dakota.

STEM SMUT CAUSED BY UROCYSTIS OCCULTA (WALLR.) RAB.

Prior to 1924, stem smut had been reported only east of the 100th meridian. In 1924, however, Hungerford reported it as occurring for the first time in Idaho. In general the losses were slight or very small in the states where it occurred. The largest estimated loss, 0.5%, was reported from Pennsylvania. Illinois reported .24%. Traces were reported from New York, Wisconsin, Minnesota, Iowa, and North Dakota.

Pennsylvania: About 20% infection was observed in untreated plots. (Kirby)

Illinois: Unusually abundant. There have been several cases of severe damage some running as high as 15 and 20%. It appears to be more abundant in the northern half of the state. (Tehon)

Minnesota: First report June 3 from Carver County. Quite generally present throughout the rye growing region but considerably less severe than last year. (Sect. Pl. Path.)

North Dakota: From a trace to one percent has been found in plats at Fargo. The disease has not been common with us in past years. The amount indicated is more than observed for the past five years at Fargo. (Weniger)

Idaho: Found for the first time near Sandpoint. (Hungerford)

LOOSE SMUT CAUSED BY USTILAGO TRITICI (PERS.) ROSTR.

Loose smut was not reported in 1924. Up to the present this smut has been reported from the following states: New York, Virginia, Tennessee, Indiana, Illinois, Missouri, Oklahoma, Minnesota, North Dakota, and Kentucky

OTHER DISEASES

Bacterium translucens secalis Reddy, Godkin, & Johnson (2) was described as causing a bacterial blight of rye. The new variety was found in 1921 at Bloomington, Illinois. Subsequent experimentation has shown that it affects rye only, whereas B. translucens attacks only barley, and B. translucens undulosum occurs on wheat, barley, rye, and spelt. In 1924 Mains reported that B. translucens secalis was noted at La Fayette, Indiana, by A. G. Johnson.

Helminthosporium sativum Pam., King, & Bak., causing leafspot, was reported from North Dakota, Delaware, New York, and Pennsylvania.

Marasmius tritici P. A. Young was reported for the first time from Illinois. According to Tehon this fungus attacks the lower internodes killing the plants.

Rhynchosporium secalis (Oud.) Davis, causing leafblight, was prevalent on the lower leaves in Wisconsin. (Vaughan)

Septoria secalis Prill. & Delacr., leafblotch, was reported from Indiana and Illinois.

Recent literature:

1. De Jaczewski, A. Sur le développement menacant du Tilletia secalis Kühn en Russie pendant les dernieres annèes. (On the threatening spread of Tilletia secalis Kuhn in Russia during recent years. Rept. Intern. Conf. Phytopath. & Econ. Entom., Holland 1923: 267-272. 1923.
2. Reddy, C. S., James Godkin, and A. G. Johnson. Bacterial blight of rye. Jour. Agr. Res. 28: 1039-1040. June 7, 1924.

BARLEY

STEM RUST CAUSED BY PUCCINIA GRAMINIS PERS.

This disease was about as prevalent as the stem rust of rye and generally speaking the estimated loss was nearly the same.

Table 41. Percentage losses from stem rust of barley, as estimated by collaborators, 1924.

Percentage loss	States
2	South Dakota
1	New York, Missouri, North Dakota, Texas, Iowa
.5	Ohio, Wisconsin
.25	Connecticut
t	Pennsylvania, Virginia, Michigan, New Mexico, Washington, Utah, Idaho
0	Kentucky, California, Nebraska, Colorado, Wyoming, Montana

Wisconsin: Found only on late-sown barley. In that case practically ruined. (Vaughan)

Illinois: Barley and fox-tail rusted on June 10th and on June 15th in Kane County near the town of Huntley. The rust originated, apparently, from a number of barberry shrubs around the barley field. On June 15th the rust was very light on the barley but was spreading heavily among the fox-tail. (Tehon)

New York: Ontario County. Where severe the plants did not ripen uniformly. (Chupp)

LEAF RUST CAUSED BY PUCCINIA ANOMALA ROSTR.

The leaf rust of barley was present over a considerable area of the United States, but it was of little importance. New York, Pennsylvania, Kentucky, Tennessee, Ohio, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Nebraska and Colorado reported traces.

Judging from the records since 1918, leaf rust of barley has never been serious in the United States as a whole during any single season. Occasionally one state has reported heavy infection during past years, as in the case of Arizona in 1920 when the disease was said to have caused considerably injury. California has reported damage at times. Occasionall a section of a state had considerable leaf rust, but no estimate of loss has ever been more than a trace. It would be interesting to know whether conditions will ever rise to produce an epidemic in the United States. Mains reported as follows:

> "A heavy development of the leaf rust of barley was observed at Knoxville, Tennessee, where a number of varieties showed 100% infection. That leaf rust of barley should develop to such an extent while only a little development of the leaf rust of wheat occurred is interesting."

Illinois: Six-row barley varieties were lightly infected. Odenbrucker showed the heaviest infection. (Tehon)

Wisconsin: Barley rust appeared before wheat or oat rust on the Experiment Station Farm but was not serious. (Valleau)

Recent literature:

Beck, O. Ein Infektionsversuch mit Puccinia simplex. Ann. Mycol. 22: 291-292. Nov. 1924.

STRIPE RUST CAUSED BY PUCCINIA GLUMARUM (SCHM.) ERIKS. & HENN.

Idaho: This disease was noted only on barley in the rust nursery. This is the first infection noted on barley in Idaho since 1915. (Hungerford)

COVERED SMUT CAUSED BY USTILAGO HORDEI (PERS.) KELL. & SW.

In general, records indicate that covered smut was somewhat more common than in 1922 or 1923. In 1921, however, covered smut was widespread and destructive on account of the very high percentage occurring in scattered regions in several states.

Table 42. Percentage losses from covered smut of barley in 1924, as estimated by collaborators.

Percentage loss	States
5	Virginia, Kentucky
3	Iowa, Alabama
2	Kansas
1.5	Idaho, Pennsylvania
1	Delaware, New York, Georgia, North Dakota, Washington
.5	Vermont, Connecticut, Texas, California
t	Utah, Indiana, Illinois, Michigan, Wisconsin, South Dakota, Colorado

Wisconsin: Wet season retarded seedling infection. (Vaughan)

Virginia: Covered smut found in all fields. Seems to be increasing and is now fully as prevalent as loose smut. Perfectly controlled with hot water and commercial control with formaldehyde in experimental plots. (Fromme)

Controlled at Arlington Farm with Semesan, Corona 620, Germisan, Chlorophol and Uspulun. (Tisdale)

California: Meager analysis show that the commonest and heaviest attack occurs in soil with Ph values about 5.7. Early sown barley is attacked most severely. (Mackie)

Recent literature:

Faris, J. A. Factors influencing infection of Hordeum sativum by Ustilago hordei. Amer. Jour. Bot. 11: 189-213. 1924.

Godkin, James. Barley seed treatment in Virginia. U. S. Dept. Agr. Office Coop. Ext. Work Extension Pathologist 2: 144. Dec. 1924. (mimeogr.)

Sartoris, George B. Studies in the life history and physiology of certain smuts. Amer. Jour. Bot. 11: 617-647. Dec. 1924.

Tisdale, W. H. Experiments on seed treatment at Arlington Farm. U. S. Dept. Agr. Office Coop. Ext. Work Extension Pathologist 2: 104-106. Oct. 1924. (mimeogr.)

LOOSE SMUT CAUSED BY USTILAGO NUDA (JENS.) KELL. & SW.

The several reports received would indicate that loose smut was approximately as abundant as the covered smut in the United States in 1924. Of the diseases attacking barley the smuts were the most important and caused the most damage.

Table 43. Percentage losses from loose smut of barley, as estimated by collaborators, 1924.

Percentage loss	States
5	Tennessee
4	Pennsylvania
3	Virginia, Indiana
2.5	New York, Kentucky
2	Illinois, Kansas, New Mexico
1.5	Connecticut
1	South Carolina, Georgia, Iowa, North Dakota, South Dakota
.5	Michigan, Texas
.2	Utah
t	Delaware, Wisconsin, Idaho, California, Colorado
0	Washington

The highest percentages reported are as follows:

Table 44. Maximum infections of barley loose smut found in fields, as reported by collaborators, 1924.

Highest percentage	State
40	New York
20	South Dakota
15	Pennsylvania
10	Illinois, Michigan, Minnesota, North Dakota
5	Georgia

Indiana: Hot water treatment has cleaned up loose smut in winter barley very generally in Harrison County. (Gregory)

Virginia: Perfectly controlled with hot water, formaldehyde, Semesan, and other disinfectants. (Fromme)

Arlington Farm. Controlled with Chlorophol, Corona 620, Germisan, Semesan and Uspulun. (Tisdale)

Minnesota: Black Lion susceptible. (Div. Pl. Path.)

Pennsylvania: Most varieties have smut but Black Lion appears more susceptible having 15% in the variety plots at State College. (Kirby)

In an article published recently, Tisdale and Tapke (1) show that the original floral infection of barley by the loose smut organism is not necessary for the production of loose smut in the crop. Infection of the seedling can occur directly. "Seedlings from inoculated seeds with the hulls not removed were not noticeably injured but some of them were infected," while "Seedlings from dehulled, inoculated seed of all varieties studied were severely injured and many failed to emerge." Surviving plants produce a high percentage of infected heads, except in the variety Nakano Wase, which "failed to become smutted in all experiments and apparently is highly resistant to invasion by the fungus after it enters the seedling."

Recent literature:

Cited

1. Tisdale, W. H., and V. F. Tapke. Infection of barley by Ustilago nuda through seed inoculation. Jour. Agr. Res. 29: 263-284. Sept. 15, 1924.

STRIPE CAUSED BY HELMINTHOSPORIUM GRAMINEUM RABH.

Stripe was apparently less prevalent than it has been in the last three seasons, although for the most part the estimates of loss do not vary greatly. In a few states stripe was very important. Hungerford reported that he noted it "in unusual amounts in Idaho, and also in Colorado, South Dakota, Montana, and Nebraska, this summer."

Table 45. Estimated losses from barley stripe, according to collaborators, 1924.

Percent loss	States
5	Iowa
2	South Dakota
1.8	Illinois
1.5	Wisconsin, Utah
1	North Carolina, North Dakota
.5	Ohio, Idaho
t	New York, Pennsylvania, Delaware, Virginia, Michigan, Louisiana, Colorado, Texas, Alabama, Washington, California
0	Connecticut

Iowa has reported the highest loss, 5%, each year during the last three years.

North Carolina: Most prevalent in the Piedmont Section. (Wolf)

Illinois: Records taken on 758 acres in several counties show that 1.8% loss occurred. (Tehon)

Wisconsin: Most important disease this year. Average of 28% in checks, last year same seed gave only 12%. None of seed treatments completely controlled stripe. Formaldehyde treatment best control, but caused high percent seedling injury. (Vaughan)

Minnesota: Much more abundant than usual. Minsturdi susceptible, contained 10 to 20% infection. (Sect. Pl. Path.)

North Dakota: Minsturdi most susceptible. Manchuria resistant. Controlled by two hour formaldehyde treatments but not generally practiced. (Weniger)

South Dakota: Rather common in barley throughout the eastern part of the state. (Evans)

Utah: Occurred in considerable quantities and no doubt this disease is a problem in barley production. (Richards)

Arizona: Occurred on imported barley in experimental plots at Sacaton. Three varieties or strains showed over 50% stripe while others showed only one or a few plants. (W. H. Tisdale)

Recent literature:

Smith, N. J. G. The parasitism of Helminthosporium gramineum, Rab. (Leaf-stripe disease of barley). (Abstract) Proc. Cambridge Phil. Soc. Biol. Sci. 1: 132-133. Apr. 1924.

SPOTBLOTCH CAUSED BY HELMINTHOSPORIUM SATIVUM PAM., KING, & BAK.

Spotblotch occurs wherever barley is grown. In general it may be said that the disease caused slightly more damage than last year.

Pennsylvania: Common and rather severe on Black Lion, Featherstone, and Odenbrucker varieties in experimental plots. (Kirby)

Minnesota: Less abundant than usual. Damage from rootrot appeared rather late.

South Dakota: Losses as high as 60% reported from some fields in McPherson County. (Evans)

South Dakota reports 2% loss; Pennsylvania, Minnesota and New York 1%; and traces are reported from Illinois, Wisconsin, Iowa, and North Dakota. It was reported as occurring in Indiana, Montana, and Idaho.

Recent literature:

Hayes, H. K., E. C. Stakman, F. Griffee, and J. J. Christensen. Reaction of barley varieties to Helminthosporium sativum. Minnesota Agr. Exp. Sta. Tech. Bul. 21: 1-47. July 1923.

NETBLOTCH CAUSED BY HELMINTHOSPORIUM TERES SACC.

Netblotch was less destructive than spotblotch. Iowa reported a loss of 5%, but in no other case was over a trace of damage estimated. Other states reporting it were New York, Pennsylvania, Indiana, Wisconsin, Minnesota, North Dakota, Colorado and Idaho. Several comments by collaborators are of interest.

Wisconsin: Control less satisfactory than in 1923. (Vaughan)

Iowa: Very general and destructive in the northern counties. (Porter)

North Dakota: Common on volunteer seedlings after harvest of crop. (Weniger)

SCALD CAUSED BY RHYNCHOSPORIUM SECALIS (OUD.) DAVIS

This disease has been reported from the Upper Mississippi Valley, the Pacific Northwest, and California. In 1924 reports were received from Wisconsin, Iowa, Idaho, and California.

Wisconsin: More abundant in certain fields than it has been noted before. (Cereal Courier 16: July 10, 1924.)

SCAB CAUSED BY GIBBERELLA SAUBINETII (MONT.) SACC.

Two percent loss was reported from Iowa and 1.5% from Illinois. Traces were recorded from New York, Pennsylvania, Ohio, Wisconsin, and North Dakota.

Illinois: Barley scab has been serious like the scab on wheat and rye. At Rochelle, one small field had half of the heads scabby. Several fields of that region had 20 to 30% scabby heads. Since barley began to ripen, fields usually showed 1 to 5% scab. Generally, only one or a few sets of glumes or a few grains were attacked, so that the actual damage is rather small. Scab is occasionally seen on cheat also. (Young)

Infection as high as 52% on the spikelets. Odenbrucker ran from 18 to 30%. (Tehon)

OTHER DISEASES

Bacterium translucens Jones, Johnson & Reddy, bacterial blight, was reported as appearing in very slight quantities in Minnesota and Texas.

Claviceps purpurea (Fr.) Tul. Traces of ergot were reported from Colorado, Iowa, Illinois, Wisconsin, Minnesota, and North Dakota. According to Tehon this is the first time it has been found in Illinois, where it occurred in several fields, but in very small quantities.

Colletotrichum graminicolum (Ces.) Wils. Anthracnose was of little importance in 1924. Iowa, Pennsylvania, Texas, Indiana, and Illinois reported traces. In Indiana there was more than usual.

Erysiphe graminis DC., powdery mildew. New York, Illinois, Minnesota, New Jersey and Delaware reported traces. It is reported for the first time in Illinois, on two and six-row varieties of barley. Kirby reported a loss of 1% in Pennsylvania, stating that it was prevalent on Featherstone and Odenbrucker varieties.

OATS

OAT SMUTS CAUSED BY USTILAGO AVENAE (PERS.) JENS. AND U. LEVIS (KELL. & SW.) MAGN.

The covered and loose smuts have not been distinguished in many of the reports, therefore, they are being dealt with under one heading.

A list of the estimated loss in the various states is given in table 46, and the maximum percentages noted in fields in table 47.

Table 46. Percentage reduction in yield caused by the smuts of oats, as estimated by collaborators, 1924.

Percentage loss	States
15	Arkansas
8	Kentucky
6	Virginia
5.5	Pennsylvania, Tennessee
5	South Carolina, Iowa
4	New York, Utah
3	New Jersey, Michigan, Mississippi, Maryland
2.5	North Carolina, Wisconsin
2	Connecticut, Idaho, Vermont, Indiana, North Dakota, South Dakota, Kansas, New Mexico
1.5	Ohio, Illinois
1	Delaware, West Virginia, Texas
.5	Washington
t	New Hampshire, Louisiana, California

Oats - Smuts

Table 47. Maximum percentages of infection with oat smuts noted in fields, as reported by collaborators.

Maximum percentage noted in fields	State	Maximum percentage noted in fields	State
50	Arkansas	18	North Dakota Pennsylvania
46	Wisconsin		
36	Ohio	15	Georgia
35	Illinois	10	New Jersey, South Dakota
30	Minnesota Alabama		
		4	Delaware
26	Pennsylvania	2	Nebraska
25	Iowa		
20	Virginia Mississippi		

Virginia: Smut so general in fields grown, only a few of them passed inspection. (Fromme)

West Virginia: Covered smut, Ustilago levis, was found abundantly in Preston County (elevation 2000 feet) while loose smut was found quite plentiful at lower elevations. (Giddings)

Illinois: Loose smut will be, among diseases, the chief source of loss this season. In southern Illinois the infection was lightest, ranging around 3%; but in the north the infection was much more severe. Counts of 7%, 10%, and 15% were the rule, while 20% and even 35% were by no means rare. The higher losses are of especial importance because they occurred in the oat growing section. Actual counts of shocked oats have run as high as 23%, 27%, 31%, 39% and even 55%. Counts of 25% were very common in the northeast. (Tehon)

Louisiana: Considerable in some fields. Practically none as usual in fields grown from south Louisiana seed. (Edgerton)

Arkansas: Apparently cold wet winter and spring favored development of smut. (Dept. Pl. Path.)

Control measures:

Idaho: Modified spray treatment (one part formaldehyde to 10 parts of water) used extensively with fine results. (Hungerford)

North Dakota: Seed treatment not as generally practiced as for wheat. Dust treatments not effective for smut control. (Weniger)

Wisconsin: Seed treatment with formaldehyde very good. (Vaughan)

Kansas: Formaldehyde mist method is exclusively recommended. Perfect results are always secured. Treatment for smut control is being used extensively on account of the large acreage of Kanota which is resistant. (Melchers)

Recent literature:

Arland, A. Der Hafer Flugbrand, Ustilago avenae (Pers.) Jens. Biologische Untersuchungem mit besonderer Berücksichtigung der Infektions - und Anfölligkeitsfrage. Bot. Arch. 7: 70-111. July 1, 1924.

Barney, A. F. The inheritance of smut resistance in crosses of certain varieties of oats. Jour. Amer. Soc. Agron. 16: 283-291. 1924.

Dickson, B. T., R. Summerby, and J. G. Coulson. Smut control experiments in hull-less oats during 1923. (Abstract) Phytopath. 14: 350. July 1924.

Gaines, E. F. Inheritance of disease resistance in wheat and oats. (Abstract) Phytopath. 15: 51. Jan. 1925.

Gordon, W. L. Studies concerning injury to seed oats after smut disinfection. Ann. Rept. Quebec Soc. Prot. Plants 16: 79-94. 1925.

Reed, G. M. Physiologic races of oat smuts. Amer. Jour. Bot. 11: 483-492. July 1924.

Reed, G. M., and J. A. Faris. Influence of environmental factors on the infection of sorghums and oats by smuts. II. Experiments with covered smut of oats and general considerations. Amer. Jour. Bot. 11: 579-599. Nov. 1924.

Stadler, L. J. The variety as a unit in studies of disease resistance. (Abstract) Phytopath. 15: 51. Jan. 1925.

Thomas, R. C. Effective dust treatments for the control of smut of oats. Science n. s. 61: 47-48. Jan. 9, 1925.

Tisdale, W. H. Experiments on seed treatment at Arlington Farm. U. S. Dept. Agr. Office Coop. Ext. Work Extension Pathologist 2: 104-106. Oct. 1924. (mimeogr.)

Zade, Adolf. Experimentelle Untersuchungen über die Infektion des Hafers durch den Hafer-Flugbrand (Ustilago avenae Jens.) (Experimental investigations on the infection of oats by Ustilago avenae Jens.) Fühl. Landw. Zeit. 71: 393-406. 1922.

____________ Neuere Untersuchungen uber die Lebensweise und Bekämpfung des Hafer-flugbrandes (Ustilato avenae (Pers.) Jens.) Angew. Bot. 6: 113-125. May-June 1924.

Zundel, George L. Seed treatment in Washington. U. S. Dept. Agr. Office Coop. Ext. Work Extension Pathologist 2: 101-102. Oct. 1924. (mimeogr.)

BLAST (CAUSE UNDETERMINED)

Oat blast, or sterility of part of the panicle, is a trouble which has been known for a long time, but its cause is still unknown. All attempts to prove the presence of a pathogenic organism have failed. The trouble is widespread where oats are grown, although it does not appear to be equally serious in all states.

Oat - Blast

It undoubtedly causes as much damage as, or more damage than, smut or any other oat disease in several states, and it is believed that for the most part the losses estimated have been too conservative. When entire fields show from a trace to one-third or one-half of every panicle destoryed from blast, it is evident that an appreciable reduction in yield must result. In Kansas oat blast occurs every year in every field in the state. This situation will probably hold for other states.

Table 48. Estimated percentage loss caused by blast 1924, as reported by collaborators.

Percentage loss	States
8	Illinois
5	Minnesota, Kansas
2	Iowa
1	New York, Pennsylvania, Ohio, South Dakota
.5	Arkansas, North Dakota
t.	Kentucky, Wisconsin, Idaho, Maryland

Illinois: The volunteer oats have had lots of blast, those headed out often showing 20 to 30% of the spikelets blasted. I had thought that our late, cold, wet spring caused the blast to be unusually abundant in the crop this summer, but that theory is hardly tenable any more, since the blast on the volunteer oats did not develop under such conditions. (Young)

Kansas: Blast not confined to any particular part of the panicle. It causes greater loss than oat smuts in Kansas. (Melchers)

CROWN RUST CAUSED BY PUCCINIA CORONATA CDA.

Crown rust was not nearly so widespread nor injurious as it was in 1921, 1922, nor 1923. As in the case of other cereal rusts in 1924 crown rust was of little importance in reducing the yield. Undoubtedly the same environmental factors which held the other cereal leaf rusts in check were responsible for the small amount of crown rust.

The following comments of collaborators are of interest.

Florida: Crown rust widespread, but not nearly as important a factor as it was the year before. (Weber)

Mississippi: Said to be causing considerable damage in a field of Fulghum oats. The disease was no doubt general over the state and caused about the same amount of damage as last year. (Neal)

Louisiana: The cold winter prevented planting until too late with the result that the rust did not get started until late. There was no volunteer or early oats to carry the disease over. (Edgerton)

Arkansas: Less noted than in any previous year. Probably associated with abnormally cold winter and spring. (Dept. Pl. Path.)

Ohio: Crown rust appeared rather late in the season. In the northern counties it became serious, these being killed prematurely. (Young)

Illinois: Crown rust infection much less heavy than usual and later in the season. Almost obscured by stem rust. (Tehon)

North Dakota: Neither barley nor oats has been heavily infected for the past two years. Spring very late and cool. Conditions not favorable for infection. (Weniger)

California: Crown rust entirely absent this year. It is not a factor in oat production here. Crown rust on *Notholcus*, *Lolium*, etc., is usually abundant. (Mackie)

Several reports have been made of the rust on species of Rhamnus.

Dates of observation of crown rust on Rhamnus, 1924:

May 21 (pycnia)	Nebraska	June 9	Massachusetts
May 27 (aecia)	Nebraska	June 10	South Dakota
June 1	Montana	June 16	Iowa
June 5	Wisconsin	June 27	Connecticut
June 6	Minnesota	July 1	Montana
June 7	New York	July 8	Vermont

Relation of buckthorn to crown rust:

Wisconsin: Very prevalent in the vicinity of buckthorn. (Vaughan)

South Dakota: Aecia were found on *Rhamnus cathartica* on June 10. (Evans)

Iowa: General infection on *Rhamnus lanceolata* but unfavorable weather prevented rapid spread. *Rhamnus lanceolata* first infected May 6, Lucas County. (Porter)

Nebraska: Pycnia first observed on Rhamnus May 21 at Lincoln. Most of the infection on northwest side of the bushes. Aecia observed May 27 and they were all open the next week. No crown rust was noted on oats at the College Farm. (Goss)

Wisconsin: Crown rust *Puccinia coronata* was observed June 5 on *Rhamnus cathartica* bushes. (Vaughan)

Massachusetts: First *Rhamnus cathartica* by *Puccinia coronata* June 9. (Davis)

Minnesota: Very light infection reported from the northern part of the state during the latter part of July. Several heavy local infections near Rhamnus were found in Sibley, Renville, Kandiyohi and Swift Counties where the rust had quite clearly spread from the hedge. Many fields were almost free from crown rust. (Sect. Pl. Path.)

Recent literature:

Dietz, S. M. Alternate hosts of Puccinia coronata Corda. (Abstract) Phytopath. 15: 54. Jan. 1925.

Parker, J. H. Experiencias comparativas sobre resistencia de variedades de avena a la roya o herrumbre. Defensa Agr. Uruguay 5: 46-47. Feb. 1924.

STEM RUST CAUSED BY PUCCINIA GRAMINIS PERS.

Stem rust of oats caused very little damage in 1924. The largest percentage reported was 3% from South Dakota. Most of the states indicated only a trace or no loss.

There was less stem rust than in 1921 and 1922. In general it may be said the estimated loss for 1924 was about the same as for 1923. The largest single loss, 3%, was reported from South Dakota.

Table 49. Estimated percentage loss caused by stem rust, 1924, as reported by collaborators.

Percentage loss	States
3	South Dakota
2	New Mexico
1.5	North Dakota
1	New Hampshire, Vermont, Connecticut, Texas, Kansas, Michigan, Wisconsin, Iowa
.5	Ohio, Illinois
t	New York, Virginia, West Virginia, Arkansas, Idaho, Washington, California
0	Kentucky, Mississippi, Louisiana, Nebraska, Montana, Wyoming, Colorado

Pennsylvania: Much worse on late planted fields and on late maturing fields except White Russian which is resistant. (Kirby & Orton)

Illinois: Black stem rust is also abundant, nearly all the straws in fields of some sections showing rust. However, as is generally true for black stem rust in Illinois, the attack came too late to do serious damage. Cool weather in June seems to be the chief reason why oats were not damaged seriously this year. (Young)

This was the most general as well as the most severe attack of stem rust of oats that we have observed in Illinois. (Tehon)

Minnesota: Reported slightly heavier than on wheat, but did not do much damage. (Sect. Pl. Path.)

North Dakota: Cool weather from seeding to harvest reduced rust losses except in certain isolated localities where individual fields were badly infected. (Weniger)

Kansas: No serious injury reported although many fields showed considerable infection due to lateness of the crop. (Melchers)

Recent literature:

Dietz, S. M. The inheritance of resistance to Puccinia graminis avenae, (Abstract) Phytopath. 15: 54. Jan. 1925.
Mackie, W. W., and R. F. Allen. The resistance of oat varieties to stem rust. Jour. Agr. Res. 28: 705-720. May 17, 1924

HALO BLIGHT CAUSED BY BACTERIUM CORONAFACIENS C. ELLIOTT

The following states reported the occurrence of halo blight in 1924: New Jersey, Pennsylvania, Kentucky, Arkansas, Ohio, Illinois, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Kansas, Montana and Idaho. In most cases no injury occurred.

South Dakota: Very evident. Apparently doing no damage. (Evans)

North Dakota: More severe on early than on later plantings. Common on White Tartar. (Weniger)

Iowa: Quite general this year, but caused little or no appreciable damage. (Porter)

California: Usually common, but did not appear this year in noticeable amounts. (Mackie)

Minnesota: There appears to be marked variation in varietal susceptibility. (Sect. Pl. Path.)

FOOT AND ROOTROTS DUE TO VARIOUS CAUSES

In Minnesota destruction of roots and severe foot infection occurs generally, although there is more in the southern part. Fusarium, Alternaria, Helminthosporium and Brachysporium were isolated from diseased parts. It was of considerable importance, causing a loss estimated at 1%. Valleau reported that "Root diseases are usually very severe on oats in Kentucky. This year with low soil temperatures injury was much less than usual." In Wisconsin there seemed to be less seedling blight than usual. A rootrot due to an undetermined fungus was reported from Washington.

SCAB CAUSED BY GIBBERELLA SAUBINETII (MONT.) SACC.

This disease was observed on a few panicles on several occasions in the following states: New York, Pennsylvania, Maryland, Illinois, Wisconsin, and Iowa.

Illinois: Scab frequently seen infecting occasional heads in fields. It did not do much damage. However, examinations of shocks in north central Illinois show as high as 1% of the spikelets with a pink mold so that a little damage was done as a shock mold. (Young)

LEAFSPOT CAUSED BY HELMINTHOSPORIUM AVENAE EIDAM

This disease has been known to be widely distributed in past seasons. In 1924 it was reported from Alabama, Indiana, Illinois, Wisconsin, and Minnesota. In no instance did it cause any appreciable injury. A leafspot reported as Helminthosporium sp. occurred in Delaware, Pennsylvania, Vermont, and New York.

Florida: This disease caused considerable dying of the older leaves when the plants were young. Not a factor on older plants. (Weber)

Indiana: Apparent varietal difference in susceptibility. (Mains)

Wisconsin: Damage seemed to be entirely outgrown with the progress of the crop. (Vaughan)

Delaware: Most prevalent leaf disease observed on oats. (Adams)

OTHER DISEASES AND INJURIES

Claviceps purpurea (Fr.) Tul. Ergot was reported as occurring in North Dakota. A few specimens have also been collected in Kansas.

Colletotrichum graminicolum (Ces.) Wils. In 1924 anthracnose was reported from New York, Pennsylvania, Texas, Illinois, and Wisconsin. No appreciable damage was recorded.

Erysiphe graminis DC. Powdery mildew was statewide in distribution in New York. (Chupp)

Leaf tipburn (non-parasitic) Causes a withering and dying of leaf tip. In general this corresponds with the area of severest smut. (Tehon)

Scolecotrichum graminis Fckl. This leafspot has been reported from Illinois by Tehon. The maximum found in any one field was 5%. The only other report to the Survey of its occurrence on oats was from New York in 1923. This organism is known to occur on grasses and was reported by Pammel (Jour. Myc. 7: 96) as injurious to barley in the United States in 1891.

CORN

SMUT CAUSED BY USTILAGO ZEAE (BECKM.) UNG.

The smut of maize seemed to be somewhat less prevalent in 1924 than in 1923, although the difference is slight. In 1921 a serious outbreak was reported, but each year then smut has been a little less serious. The smut of maize is one of the major cereal disease problems in the United States. The annual loss is immense as shown in table 51 which gives the annual loss for the United States and the average loss for each state for the period 1918 to 1924 inclusive.

The estimated losses for 1924 by states are also shown in table 50. Some of the greatest losses occur in Kansas and nearby states. It has been found in studies in Kansas that the yielding capacity of a corn plant severely attacked at one or more nodes is reduced about one-third.

Table 50. Estimated losses from corn smut as reported by collaborators, 1924.

Percentage loss	States
10	California
5	Pennsylvania
4	North Dakota
3.3	Illinois
3	Connecticut, Ohio, Iowa, Kansas, New Mexico
2	New York, North Carolina, Georgia
1.5	Virginia
1	Vermont, West Virginia, South Carolina, Utah
.5	New Jersey, Delaware, Indiana, Kentucky, Texas, Washington
t	New Hampshire, Michigan, Wisconsin, South Dakota, Mississippi, Louisiana, Arkansas, Idaho

Weather relations:

It has been a somewhat common opinion that corn smut is most prevalent in areas of relatively high humidity. This is erroneous, for some of the greatest damage from the disease occurs in the Great Plains area

Table 51. Estimated percentage reduction in yield of corn due to smut from 1918 to 1924 inclusive#.

State	Percentage reduction in yield due to corn smut							
	1918	1919	1920	1921	1922	1923	°1924	Average**
Me.	t	-	-	-	t	-	-	t
N. H.	-	*-	-	*-	t	-	t	t
Vt.	-	0.5	3.	3.	2.	1.	1.	1.7
Mass.	0.5	0.5	0.5	0.5	t	0.5	-	0.4
R. I.	-	0.5	0.5	*-	-	-	-	0.5
Conn.	0.1	0.5	0.5	1.5	1.5	3.	3.	1.4
N. Y.	1.	0.5	1.	1.	3.	2.	2.	1.5
N. J.	1.	1.	1.	1.	1.5	0.5	0.5	0.9
Pa.	3.	2.	1.	1.	3.	3.	5.	2.6
Del.	-	1.	1.	0.5	0.5	1.	0.5	0.7
Md.	1.	1.5	1.	2.	2.	1.5	-	1.5
Va.	1.	1.	1.	2.	1.	2.	1.5	1.3
W. Va.	4.	2.	1.	2.	2.	1.	1.	1.8
N. C.	3.	2.	2.	20.	-	2.	2.	5.0
S. C.	2.	3.	2.	5.	2.5	1.	1.	2.3
Ga.	5.	3.	2.	2.	2.	2.5	2.	2.6
Fla.	-	-	-	-	1.	-	-	1.
Ohio	3.	2.	1.	3.	3.	3.	3.	2.6
Ind.	-	3.	2.	0.5	0.3	0.4	0.4	0.9
Ill.	1.5	2.	2.	3.5	2.	3.	3.3	2.4
Mich.	1.	2.	0.5	2.	2.	1.	t	1.2
Wis.	0.5	1.	t	2.	t	0.5	t	0.6
Minn.	0.5	1.	1.	3.	t	0.5	-	0.8
Iowa	2.5	3.	1.	1.5	2.	3.	3.	2.3
Mo.	1.	2.	2.	3.	-	2.	-	2.
N. D.	1.5	1.	0.5	1.	3.	5.	4.	2.3
S. D.	5.	2.	1.	15.	3.	2.	t	4.
Nebr.	5.	3.	5.	*-	-	-	2.5	3.9
Kans.	8.	5.	8.	5.	5.	4.	3.	5.4
Ky.	1.5	2.	2.	1.5	0.5	0.5	0.5	1.2
Tenn.	7.	2.	1.	2.	2.	0.5	-	2.4
Ala.	2.5	1.	1.	*-	1.	2.	-	1.5
Miss.	0.5	1.	1.	1.	2.	t	t	0.8
La.	1.5	0.5	0.5	1.	t	t	t	0.5
Texas	8.	3.	2.	3.	2.	t	0.5	2.6
Okla.	4.	3.	2.	*-	-	-	-	3.0
Ark.	0.2	t	2.	4	3.	3.	t	1.9
Mont.	t	-	t	-	-	-	-	t
Wyo.	t	-	t	-	-	-	-	t
Colo.	30.	5.	5.	2.5	2.	1.5	-	7.7
N. Mex.	5.	1.	2.	-	-	3.	3.	2.8
Ariz.	2.	-	5.	-	*-	t	-	2.3
Utah	t	-	1.	1.	1.5	1.	1.	0.9
Nev.	t	t	t	-	-	-	-	t
Idaho	t	-	t	-	t	t	t	t
Wash.	t	t	t	1.	t	t	0.5	0.2
Oregon	t	t	t	t	t	-	-	t
Calif.	t	-	2.	10.	5.	-	10.	5.4
U. S.	2.6	2.23	2.04	3.1	1.6	1.8	°1.6	2.1
tal bushels	70,876	69,603	70,477	104,533	48,615	62,741	°39,689	66,648

\# = Three ciphers (000) omitted from total bushels.

** = Average based only on years in which estimates were made.

° = 1924 estimates tentative only.

where high temperatures and comparative dryness prevail. Furthermore, cor smut conidia can withstand a great deal of dessication without injury to their vitality.

Corn varietal and line differences in susceptibility:

It is commonly accepted that sweet corn is more susceptible to injury from smut than field varieties. There is some slight evidence that differences in susceptibility between field corn varieties exists, but there are more data to the contrary. This is to be expected on account of the heterozygous condition of corn varieties. There is ample evidence, however, to show that inbred lines of most varieties of maize, including sweet corn, can be secured that are resistant to smut.

States which are emphasizing the study of corn smut from the breeding standpoint are Kansas, Connecticut, and Minnesota.

Statements by collaborators:

New York: Most prevalent on sweet corn. One patch of several rods in diameter found in field corn where every stalk was affecte (Chupp)

Arkansas: Unlike most years there was but little smut on sweet corn this year. Field corn showed heavier infection, but even then it was less than usual. (Dept. Pl. Path.)

Illinois: Corn smut has been unusually bad this year. Most fields show 3 to 10% of the stalks infected with 1 to 5% loss of ears. Two exceptional cases should be noted. The edges of two fields ran 38% and 43% infested stalks respectively. Ear loss was 19% and 29% respectively. The opposite side of the worst field had only 3% smut and 1% ear loss. In the first field infection was much lighter farther into the field. Many corn stalks this year are only 3 to 4 feet high and end in a mass of smut so the loss includes fodder in such cases. (Young)

Wisconsin: Somewhat more prevalent than usual. (Vaughan)

Iowa: Somewhat less smut than usual. (Porter)

Kansas: Less smut than usual. Generally distributed over the state, but more prevalent in the western part. Cooler spring apparently held smut in check. (Melchers)

New Mexico: Decidedly more severe on sweet corn. (Crawford)

California: Corn smut is a limiting factor in maize production in many areas in California. The attack this year was normal, many fields showing every plant infected. The estimated loss may be 10-15%. King Phillips hybrid commonly grown in the Delta regions of the Sacramento and San Joaquin Rivers is quite resistant and seldom expresses more than a trace of injury. (Mackie)

Reoent literature:

Haynes, H. K., E. C. Stakman, F. Griffee, and J. J. Chrsitensen. Reactions of selfed lines of maize to Ustilago zeae. Phytopath. 14: 268-280. June 1924.

Sartoris, Geroge B. Studies in the life history and physiology of certain smuts. Amer. Jour. Bot. 11: 617-647. Dec. 1924.

DRYROT CAUSED BY DIPLODIA ZEAE LEV.

The organism causing this disease is found generally wherever corn is grown. It may produce ear, stalk, or seedling injury. The losses caused by the ear rot reported in 1924 are given in table 52.

Table 52. Percentage loss caused by ear rot, as estimated by collaborators, 1924.

Percentage loss	States
5	Iowa
4	Virginia, South Georgia
3.5	Delaware
3	Kansas
1	West Virginia, Wisconsin
.5	Pennsylvania
t	New York, Indiana

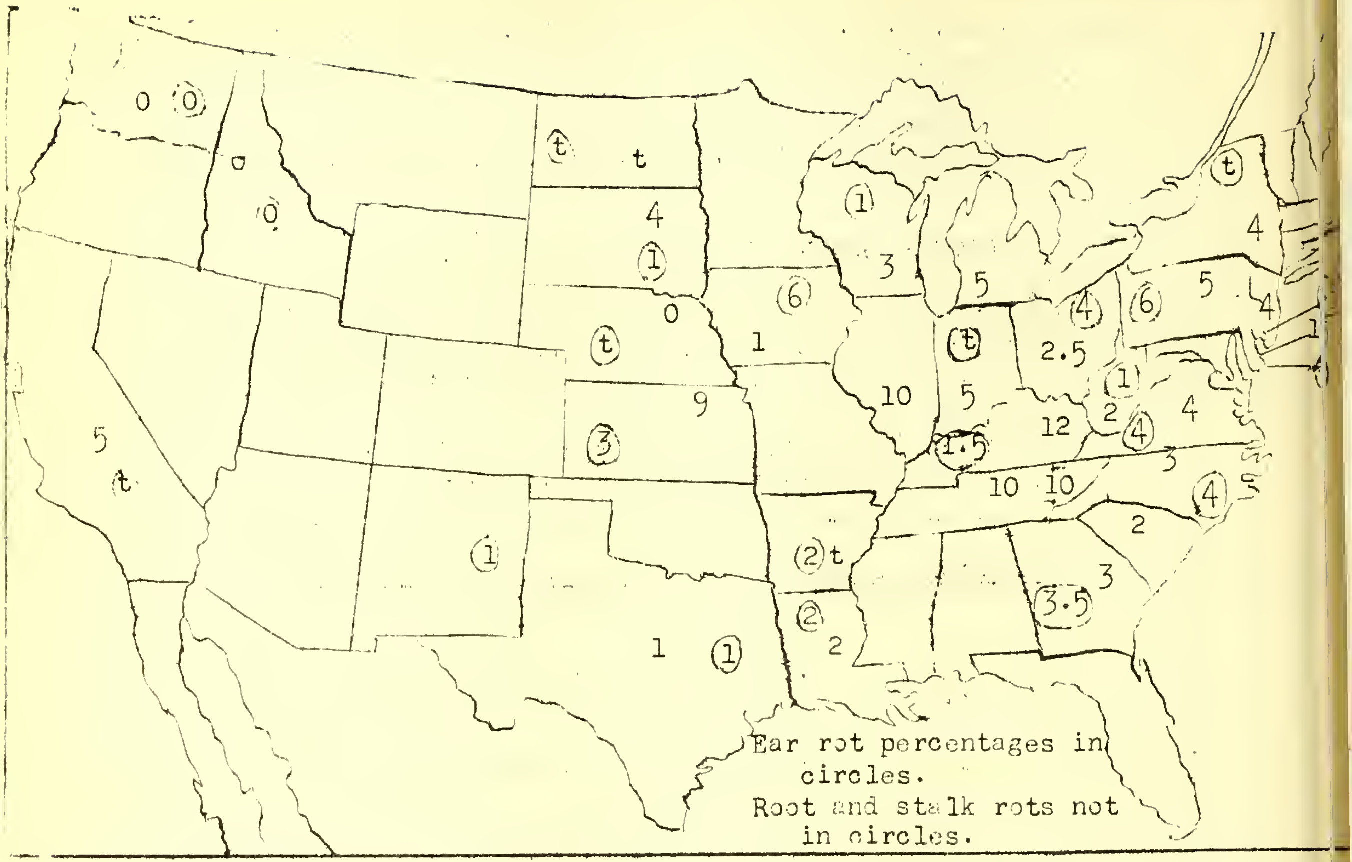
For the most part the states reported the injury as due to <u>Diplodia zeae</u>, however, in a number of cases, as in Delaware, Kentucky, south Georgia, and Indiana, <u>Fusarium</u> spp. were associated with Diplodia, and in some instances were thought to be of as much importance as the latter organism in causing ear rot.

Recent literature:

Durrell, L. W. Dryrots of corn and their control. Iowa Univ. Ext. Serv. Agr. & Home Econ. Ext. Bul. 122. June 1924.

ROOT, STALK, AND EAR ROTS OF CORN ASSOCIATED WITH DIPLODIA, GIBBERELLA, AND FUSARIUM SPP.

An examination of the records submitted by collaborators shows that it is very difficult to determine the relative importance of Diplodia, Gibberella, and Fusarium as causes of root, stalk, and ear rots; also, some reports show that soil conditions are responsible for root and stalk rots, either by themselves or in conjunction with, these organisms. Other factors which entered into this problem in 1924, adding to the difficulty of estimating losses, were the appearance of the corn borer, and the unusually cool spring which produced poor stands and necessitated replanting.



Ear rot percentages in circles.
Root and stalk rots not in circles.

Fig. 2. Estimated percentage of loss from root, stalk and ear rots of corn, as rep by collaborators, 1924.

According to the estimates, the root, stalk, and ear rots cause greater losses than any other disease of corn. Wherever means can be found to reduce these losses it means an immense saving

Several statements by collaborators are of interest.

New Jersey: Fields observed in Monmouth and Somerset Counties showed heavy infection of corn rootrot. In several instances 50% of the plants were killed. Probably most severe in low spots. (Martin & Haenseler)

Maryland: Greater losses on poorer soils. Some control has been obtained by four years' selection of resistant strains. (Jehle & Temple)

Florida: Rootrot, *Fusarium moniliforme*, was found in several localities in the state doing minor injury. (Weber)

Illinois: Effects of rootrots are heightened and largely masked from the survey point of view by the unusual abundance of southern corn root worm. (Tehon)

Kansas: Fusarium moniliforme, Rhizopus sp., and Penicillium sp. most common on seed corn. Diplodia zeae unusually prevalent for Kansas on the crop of 1923. Gibberella saubinetii very rare. (Melchers)

Recent literature:

Branstetter, B. B. Corn rootrot. Missouri Sta. Circ. 117: 1-8. 1924.

Hoffer, G. N. and J. F. Trost. Influence of balanced nutrient supply on susceptibility of corn plants to Gibberella saubinetii (Mont.) Sacc. (Abstract) Phytopath. 15: 59-60. Jan. 1925.

Holbert, J. R., W. L. Burlison, B. Koehler, G. H. Woodworth, and G. H. Dungan. Corn root, stalk and ear rot diseases and their control through seed selection and breeding. Illinois Agr. Exp. Sta. Bul. 255: 239-478. Aug. 1924.

Holbert, James R., and Benjamin Koehler. Anchorage and extent of corn root systems. Jour. Agr. Res. 27: 71-78. 1924.

Jehle, R. A., F. W. Oldenburg, C. E. Temple. Relation of internal cob-discoloration to yield in corn. (Second progress report). (Abstract) Phytopath. 15: 52. Jan. 1925.

Koehler, B., J. G. Dickson, and J. R. Holbert. Wheat scab and corn rootrot caused by Gibberella saubinetii in relation to crop succession. Jour. Agr. Res. 27: 861-880. 1924.

Manns, T. F., and C. E. Phillips. Corn rootrot studies. Jour. Agr. Res. 27: 957-964. Mar. 22, 1924.

Moore, W. D. Corn root and ear rot studies. New Jersey Agr. Exp. Sta. Ann. Rept. 44: 404-407. 1924.

Tiemann, O. P. Physical characteristics of disease-free seed corn. Jour. Amer. Soc. Agron. 16: 37-40. 1924.

RUST CAUSED BY PUCCINIA SORGHI SCHW.

Rust of maize seems to have been decidedly more abundant than last year. Indiana, Illinois, Wisconsin, Iowa, North Dakota, and Kansas reported its prevalence as "more" or "much more," although no appreciable loss occurred in those states. In other sections of the country it appeared to be about the same.

One might infer that the cool, backward spring was favorable for corn rust infection and spread. Traces of injury were reported by New York, Pennsylvania, Indiana, South Georgia, Alabama, Mississippi, Wisconsin, Iowa, North Dakota, and South Dakota, while North Carolina reported 1%, Illinois, 0.5% and Iowa 3% reduction in yield of sweet corn.

Kansas: Experiments in Kansas with inbred lines of corn of such varieties as Pride of Saline, Commercial White and Colby Bloody Butcher show very outstanding differences in reaction to rust. Lines are showing from 100% susceptibility to 0% infection. (Johnston & Melchers)

Florida: This disease was rather severe during July 1923 in the vicinity of Gainesville and early in 1924 in south Florida. It was widespread and common. (Weber)

Illinois: This disease is unusually abundant in corn in the northern half of the state this year. Two fields of sweet corn showed about 85% of the leaves infected. One garden patch in Mercer County had heavy rust on most of the leaves. (Young)

Recent literature:

Reyes, G. M. On the occurrence of maize rust in the Philippines. Philippine Agr. Rev. 17: 3-9. 1924.

Rice, Mabel A. Internal sori of Puccinia sorghi. Bul. Torrey Bot. Club 51: 37-50. 1924.

BACTERIAL WILT CAUSED BY APLANOBACTER STEWARTII (EFS.) McCUL.

Bacterial wilt was reported from Kansas, New York, Maryland, West Virginia, Mississippi, Ohio, Indiana, and North Dakota. In all cases it was causing only a trace of damage to sweet corn, although several instances are cited where injury to individual fields was large.

West Virginia: Golden Bantam very susceptible. (Giddings)

Kansas: In the vicinity of Kansas City it was causing 30% loss in some fields. (Melchers)

North Dakota: Growing season not favorable for development of corn and more favorable for the disease than for several years past. (Weniger)

Recent literature:

Rand, Frederick V. and Lillian C. Cash. Further evidence of insect dissemination of bacterial wilt of corn. Science n.s. 59: 67-69. 1924.

Thomas, R. C. Stewart's disease or bacterial wilt of sugar corn. Month. Bul. Ohio Agr. Exp. Sta. 9: 81-84. May-June 1924.

BROWNSPOT CAUSED BY PHYSODERMA ZEAE-MAYDIS SHAW.

Brownspot has in past years been destructive only in the southern states. Although it has occurred in the corn belt, it has never assumed an alarming condition in that region.

Illinois: Physoderma brownspot is abundant, most fields showing 10 to 100% of the stalks infected. This disease is not known to injure corn seriously in this state. (Young)

Florida: This disease was found in a field near Miami causing considerable damage. Forty percent of the plants were affected. Quite common and generally distributed over the state. (Weber)

Table 53. Percentage loss from brownspot, as estimated by collaborators, 1924.

Percentage loss	States
5	South Georgia
1	Illinois
.5	North Carolina, Florida, Alabama
.3	Mississippi
t	Maryland
0	Kansas, Arkansas

OTHER DISEASES

Bacterial leafspot (undetermined), Idaho, Texas, and Florida.

Bacterium dissolvens Rosen. Bacterial rootrot was more severe on sweet corn this year in Arkansas than in any previous year, according to Rosen. A trace of damage is recorded for field corn. This disease does not seem to be widespread, since it has not been reported definitely from any other state.

Cephalosporium acremonium Cda. The following losses due to blackbundle disease were reported this year:, Illinois,3%; Pennsylvania, 0.5%; In Illinois, Holbert made the following observation last summer.

> "During a recent tour through southeastern, southern and southwestern Illinois I found very heavy infections of the blackbundle disease of corn. It was my observation that the Illinois Plant Disease Survey did not report this infection any too high. This year it seems to be the prevailing corn disease in that territory." (Pl. Dis. Reporter 8: 97. Oct. 1, 1924.)

Coniosporium gecevi Bub. (Basisporium gallarum Moll.) Cobrot was reported from Connecticut and Iowa. In Iowa, Porter reports a trace of injury on sweet corn, while on field varieties he states 2% damage occurs.

Helminthosporium sp. A new leaf disease of corn recently reported by Drechsler (2) as occurring in Florida.

Helminthosporium sp., associated with stalkcanker, was observed by Boyd in south Georgia. Apparent infection at nodes; greenish discoloration. Isolations produced only pure cultures of Helminthosporium.

Helminthosporium turcicum Pass., leafblight, was reported from Pennsylvania and Florida.

Mosaic (undetermined). Louisiana. Edgerton reports from 2 to 3% reduction in yield.

Phyllosticta sp., causing leafspot, was widely distributed in Florida but caused no damage. In 1923 it caused early firing of many corn fields and was widespread and generally severe, seriously damaging field crops. (Weber)

Corn - Other diseases

Sorosporium reilianum (Kuehn) McAlp. Head smut has occasionally been found in fields of maize in the United States, perhaps most frequently in Washington. Its occurrence in New York and Idaho was reported for the first time this year. The following states have reported it up to 1924: Kansas, Ohio, California, Washington, Idaho, and New York.

Yellow leafspot (undetermined). Arkansas, "Probably no spreading noted. Inheritable. Comparable to the disease described by Emerson." (Dept. Pl. Path.) Also reported from Kansas.

Variegation disease, or streak, occurs in South Africa (1). It is infectious, but neither bacteria or fungi are responsible. The disease is similar to mosaic but has a different insect carrier, a jassid leafhopper of the genus Balclutha, which has failed to transmit mosaic in infection experiments. Aphis maidis, the known carrier of the mosaic disease, has also failed to transmit the variegation disease, so that the theory that the two maladies are the same is untenable.

Recent literature on miscellaneous corn diseases:

1. Anon. The variegation disease of maize: preliminary investigations. Jour. Dept. Agr. South Africa 9: 194-195. Sept. 1924.
2. Drechsler, Charles. Leafspot of maize, a disease distinct from leafblight. Phytopath. 15: 47. Jan. 1925.
3. Marquez, S. Leafblight of corn. Philippine Agr. 12: 453-458. Mar. 1924.
4. Reddy, C. S. and J. R. Holbert. The blackbundle disease of corn. Jour. Agr. Res. 27: 177-206. 1924.
5. Storey, H. H. A disease of maize and its probably relation to the control of streak disease in Uba cane. South African Sugar Jour. 8: 647,649. Sept. 1924.

RICE

Blast, Piricularia grisea (Cke.) Sacc. Traces were reported from Arkansas and Texas.

Straighthead, non-parasitic. In Arkansas the season was apparently too dry to allow sufficient irrigation to cause straighthead. (V. H. Young) In Texas Taubenhaus reports it as prevalent, but only causing 1% damage.

Blight, Helminthosporium oryzae van Bredade Haan, causing injury to young plants in Florida.

Leafspot associated with Helminthosporium spp. was reported from Porto Rico and Arkansas.

Footrot due to Ophiobolus sp.? was reported from Arkansas as follows:

> "For several years Ophiobolus has been associated with rotted bases of stems and rotted roots. To be published shortly." (Dept. Pl. Path.)

Stemrot, Sclerotium oryzae Cat. caused a loss of 1% in Arkansas. All important varieties were attacked. One case of a loss of 50% of an 80 acre field was observed. (V. H. Young)

Recent literature:

Copeland, E. B. Rice. Macmillan 1924. Diseases and pests p. 52-100.

Kasai, M. Cultural studies with Gibberella saubinetii (Mont.) Sacc. which is parasitic on rice-plant. Ber. Ohara Inst. Landw. Forsch. 21: 259-272. 1923.

Ocfemia, G. O. The Helminthosporium disease of rice occurring in the southern United States and in the Philippines. Amer. Jour. Bot. 11: 385-408. June 1924.

______________ The relation of soil temperature to germination of certain Philippine upland and lowland varieties of rice and infection by the Helminthosporium disease. Amer. Jour. Bot. 11: 437-460. July 1924.

FLAX

WILT CAUSED BY FUSARIUM LINI BOLLEY

Wilt was serious in North Dakota where it caused 10% damage. This seems to be close to the average annual loss in North Dakota. In Minnesota there was a loss of 2%, while in Wisconsin there was less than usual and the loss was only a trace. The disease was reported from Montana also.

North Dakota: General on lands previously planted to flax, particularly in eastern half of state. Too cool for best development. Wilt resistant seed in demand due to increased acreage. Not sufficient available so that more wilt resulted. (Brentzel)

Minnesota: Reports 2% loss, the maximum percentage of wilt found in any field was 85%. The disease was general. Abundant rainfall and low temperatures no doubt prevented much wilt damage. (Sect. Pl. Path.)

Recent literature:

Barker, H. D. A study of wilt resistance in flax. Minnesota Agr. Exp. Sta. Tech. Bul. 20: 1-42. Nov. 1923.

Reynolds, E. S. Some relations of Fusarium lini and potassium cyanide. Amer. Jour. Bot. 11: 215-217. 1924.

Stoa, T. E. and A. C. Dillman. Flaxseed production. North Dakota Agr. Exp. Sta. Bul. 178: 1-43. Apr. 1924. Wilt disease, p. 11-19.

RUST CAUSED BY MELAMPSORA LINI (SCHUM.) DESM.

Wisconsin: Fairly prevalent but no reduction in yield. (Vaughan)

Minnesota: More abundant than last year. One percent loss. Causes reduction in yield in heavily infested fields. (Sect. Pl. Path.)

North Dakota: More prevalent than last year and more than average. More general this year than the average range of distribution. First observed at Fargo, July 11. (Brentzel)

South Dakota: About the same amount of rust as last year. A trace of damage. Sixty percent of fields showed infection. (Evans)

Recent literature:

Hart, Helen. Factors affecting the development of Melampsora lini (Pers.) Desm. (Abstract) Phytopath. 15: 53-54. Jan. 1925.
Henry, A. W. and E. C. Stakman. The control of flax rust. (Abstract) Phytopath. 15: 53. Jan. 1925.

PASMO CAUSED BY PHLYCTAENA LINICOLA SPEG.

South Dakota is a new state reporting the occurrence of pasmo. According to Evans it has done a lot of damage to a number of fields. It was especially severe on the experimental plots. Minnesota reported more than last year.

North Dakota: Less severe than usual. Maximum infection found in any field 100%. General over the state. Found June 20, at Fargo. Some varieties much more resistant than others. Life history being worked on. (Brentzel)

OTHER DISEASES AND INJURIES

Colletotrichum linicolum Peth. & Laf. Anthracnose has not been observed to occur for many years in North Dakota. In Wisconsin it was more prevalent than last year and more than average, while Minnesota reports more than last year but no damage is recorded.

Hail injury in Michigan is said to have produced galls as a result of bruising.

Heat canker, non-parasitic. North Dakota reported 3% loss from this disease, South Dakota 1%, and Montana "abundant injury."

Rhizoctonia sp. on flax roots was reported as doing slight injury to some plants in Minnesota. Specimens collected June 24 in Wilkin County.

Recent literature:

Hiura, M. On the flax anthracnose and its causal fungus, Colletotrichum lini (Westerdijk) Tochinai. Japanese Jour. Bot. 2: 113-132. Nov. 1924.

Schoevers, T. A. C. Some preliminary experiments for disinfecting flaxseed carrying Botrytis disease. Rep. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 116-117. 1923.

SORGHUM

COVERED KERNEL SMUT CAUSED BY SPHACELOTHECA SORGHI (LK.) CLINT.

This is the most common and destructive disease attacking the sorghums. It was less prevalent than in 1923, however. Kansas reports 2.5%, North Dakota and Texas 1%, Minnesota trace.

Studies in Kansas indicate that soil temperatures are less important for infection than moisture relationships. Infection has been obtained over a very great range of soil temperatures.

KERNEL SMUT OF MILO, FETERITA, AND DWARF HEGARI

Extensive studies in Kansas, Missouri, New York and Washington, D. C., during the last seven years have shown that several varieties of sorghum have been consistently immune to all three sorghum smuts occurring in the United States. Three varieties of special interest are Milo, Feterita, and Dwarf Hegari. Recently, however, these varieties have become infected by kernel smut. Specimens of smut on all three have been collected in Kansas, Texas, and New Mexico. Reports from these three states came in to the Office of Cereal Investigations of the Bureau of Plant Industry and to the Kansas Station simultaneously. There are indications that this smut has been present in the southern states for several years. It has assumed an alarming condition in Texas where the acreage of Dwarf Milo is very large and the crop important.

The smut on these varieties appears to be a physiologic strain of one of the kernel smuts, the exact identity of which is being determined. Host hybridity is not an explanation of this peculiar condition. Investigations are being conducted cooperatively by W. H. Tisdale of the Cereal Office and L. E. Melchers and C. O. Johnston of the Kansas Station. The nature of the organism, susceptibility of hitherto resistant varieties, and control measures are being studied.

The report of the occurrence of head smut on yellow milo in Kansas, recorded in Plant Disease Reporter, Supplement 35, page 297 is an error. This should have been the kernel smut. (Melchers)

OTHER DISEASES

Bacillus sorghi Burr. Blight was reported as producing a trace of injury from Kansas, Arkansas, Texas and Minnesota. Iowa reports 2% loss.

Colletotrichum falcatum Went. Anthracnose was reported from Mississippi by Neal and Wallace as causing a trace of damage.

Puccinia purpurea Cke., rust, Florida and Kansas.

Sorosporium reilianum (Kuehn) McAlp. In Kansas head smut occurs in scattered fields in small amounts. Red Amber seems to be one of the most susceptible sorghums. A loss of 1% was reported from Minnesota, where the maximum infection observed was 30%. Traces were observed in 1924 in Texas, Oklahoma, and New Mexico by Melchers and Tisdale. It probably occurred in small quantities in most of the states growing sorghums.

Sphacelotheca cruenta (Kuehn) Potter - The only report of the occurrence of loose kernel smut was from Texas where it caused 1% loss.

Recent literature on sorghum diseases:

Faris, J. A. Modes of infection of sorghums by loose kernel smut. Mycologia 17: 51-67. Mar. - Apr. 1925.

Kulkarni, G. S. Resistance of sorghum to loose and covered smuts. Phytopath. 14: 288. June 1924.

Melchers, L. E., and G. M. Reed. Sorghum smuts and varietal resistance in sorghums. U. S. Dept. Agr. Bul. 1284. 1925.

Reed, G. M., and J. A. Faris. Influence of environmental factors on the infection of sorghums and oats by smuts. I. Experiments with covered and loose kernel smuts of sorghum. Amer. Jour. Bot. 11: 518-534. Oct. 1924.

SUDAN GRASS

Kernel smut caused by Sphacelotheca sp. occurred in Colorado. Although the species was not determined it was probably S. sorghi, which was also rather common in Kansas.

DISEASES OF FORAGE CROPS

A. LEGUMES

ALFALFA

LEAFSPOT CAUSED BY PSEUDOPEZIZA MEDICAGINIS (LIB.) SACC.

The following estimates of losses indicate that this particular leafspot was no more serious than frequently occurs. All sections of the United States seem to be included.

Table 54. Estimates of losses caused by leafspot, 1924.

Percentage loss	State
7	Maryland
5	New Mexico
4	Illinois
2	Iowa
trace - 1	New York
.5	Ohio
0	Wisconsin, Colorado

Other states reporting the occurrence are New Jersey, Texas, Michigan, Minnesota, North Dakota, South Dakota and Idaho, but the injury was in most cases of minor significance.

Delaware: Heavy infection generally observed. Severe defoliation where cutting of first crop was delayed. (Adams)

Wisconsin: Very little evidence of leafspot where there is a plentiful supply of available lime. (Vaughan)

Minnesota: Very heavy infections reported about the middle of July from Hennepin, Stearns and Wright Counties. (Sect. Pl. Path.)

North Dakota: Much more than last year; common and destructive. Very severe on second cutting or on fields saved for seed production. Difficult to estimate loss. (Weniger)

Idaho: Found throughout the state, but not as common as the yellow leafblotch nor as destructive. (Hungerford)

YELLOW LEAFBLOTCH CAUSED BY PYRENOPEZIZA MEDICAGINIS FCKL.

Yellow leafblotch was scarecely to be found in the United States, at least in amounts sufficient to cause any appreciable damage. Only traces were noticed in a few fields in New York, Illinois, Wisconsin, Iowa, and Idaho.

Idaho: Usually causes considerable dropping of leaves of the first crop and necessitates early cutting. (Hungerford)

Kansas: Entirely absent from the first crop which is the one chiefly attacked. The cool spring followed by dry weather is believed to have been a factor in preventing infection and spread. (Melchers)

DOWNY MILDEW CAUSED BY PERONOSPORA TRIFOLIORUM D BY.

In 1924 downy mildew seemed confined mostly to the Central States, the only state in the East reporting its occurrence being Connecticut, where it was observed for the first time, according to Clinton. In the West it was reported from Idaho. In all instances it caused only a trace of injury, except in Iowa where Porter reports 2% loss. The other states reporting it were Illinois, Kansas, Colorado, Indiana, Wisconsin, and Minnesota.

Statements by collaborators:

Connecticut: Downy mildew on alfalfa found for the first time in the state. No serious damage resulted as dry weather prevented spread. (Clinton)

Illinois: This is an unusual outbreak. We rarely find this disease in Illinois. (Tehon)

Wisconsin: Downy mildew has been reported quite prevalent this spring on alfalfa. First noted May 15 on sweet clover. It was especially noticeable June 5 where plants were weakened by winter injury. (Vaughan)

Iowa: Unusually prevalent. Defoliation resulted. (Porter)

Colorado: This disease was more common than leafspot. Most fields showed trace in survey made in June. (Learn)

ALFALFA NEMATODE (TYLENCHUS DIPSACI (KUEHN) BAST.)

During 1924 the known geographic range of Tylenchus dipsaci was widene by the addition of three more states, Idaho, Utah and New Mexico, and by its being found in many new counties in Colorado. In 1923 it was found in two Colorado counties. Commencing in May 1924 many complaints from that state were received. The situation appeared so serious that a field survey for the purpose of gathering further information concerning the disease was conducted by the Plant Disease Survey, cooperating with the Colorado Station, with the result that the nematode has now been found to be present in sixteen counties, for the most part in the southern portion of the state. In all cases specimens were taken and sent to Washington where the determination was verified by microscopic examination. Other serious alfalfa trouble not attributable to nematode was found especially in Weld County and in eastern Colorado. The cause or causes of this trouble, which takes the form of a rot at the base of the crown, have not been determined (See report in this section on dying of alfalfa.)

The present known distribution of the alfalfa nematode is shown on the accompanying map and details concerning the situation in Colorado and the three new states have been given previously (Plant Disease Reporter 8: 3, 17, 78, and 128. 1924.) No new information is at hand concerning the disease in the Pacific Coast States.

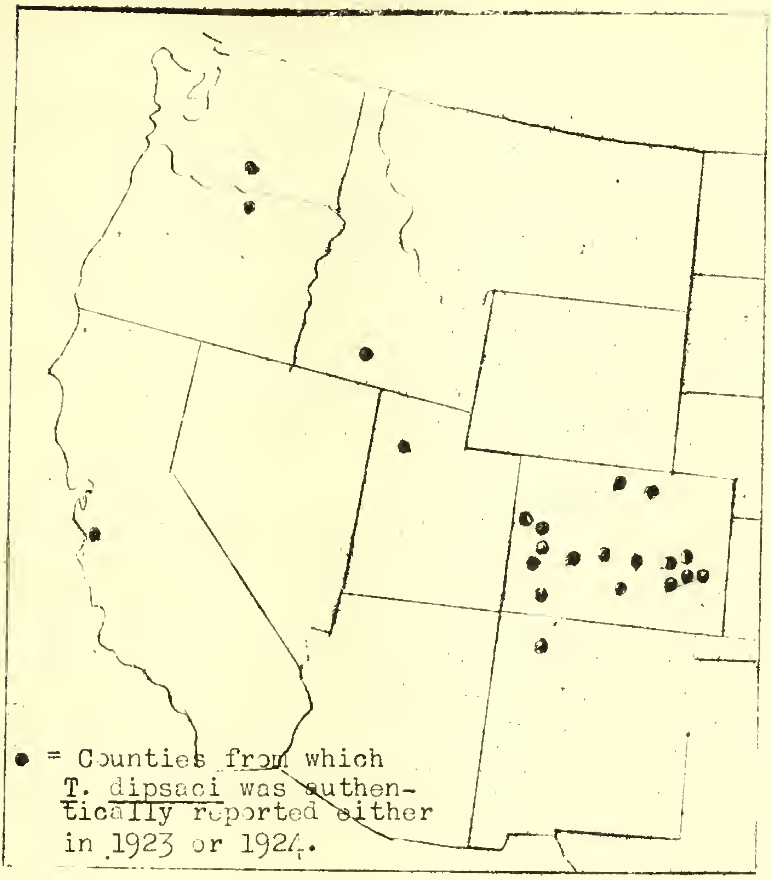


Fig. 3. Present known distribution of the alfalfa nematode, Tylenchus dipsaci, according to records of the Plant Disease Survey.

Recent literature:

Godfrey, G. H., and M. B. McKay. The stem nematode Tylenchus dipsaci on wild hosts in the Northwest. U. S. Dept. Agr. Bul. 1229: 1-9. Mar. 1924.

_____________ Dissemination of the stem and bulb infesting composites. Jour. Agr. Res. 28: 473-478. 1-3. May 3, 1924.

BACTERIAL BLIGHT CAUSED BY BACTERIUM MEDICAGINIS (SACK.) EFS.

Bacterial blight was reported as occurring in Nebraska, Idaho, and Washington, but did practically no damage. It is interesting to note that in Nebraska it was only observed in irrigated regions. This necessarily holds for Washington and Idaho also, therefore, it would be of interest to learn whether this disease is confined chiefly to irrigated sections. Records for the last four years indicate that this is true.

DYING OF ALFALFA

Commencing in May 1924 numerous reports concerning the dying of alfalfa were received from some of the western states, particularly Colorado and Wyoming. At first it was suspected that this dying might be due to the alfalfa nematode, Tylenchus dipsaci, which upon investigation was found to occur frequently in Colorado. However, field observations and examinations of material from parts of Colorado where the disease was most serious, particularly in Weld County, by persons in the Bureau of Plant Industry and at the Colorado Experiment Station, failed to show the nematode associated constantly with the disease. Dr. Gerald Thorne was detailed to make a study of the Colorado conditions, and concerning the situation in Weld County he wrote on July 10:

> "Apparently the nemas are not the cause of the most seriously damaged fields (in Weld County). Ine one of the very worst I have been unable to find Tylenchus dipsaci, even after careful soil washings and careful examination of plants in all stages from dead to healthy. In others the Tylenchi are very scarce and hard to find. When they do appear, the stems have the bases infested and easily pull off, being black and decayed in the basal portions. This condition is not present in hundreds of plants that I have examined from fields where 70-80% of the plants are dead."

However, from another section of the state he reported that,

> "Out of 62 fields which I have examined the last two days in the vicinity of Fort Collins and Windsor, I have found almost 50 to be definitely infested with Tylenchus dipsaci, and in practically all the rest there were probably infested plants in which I was unable to definitely locate the pest. In some sections there is probably 100% infestation.
>
> "One 65 acre field did not have an acre on which I failed to find the nema, much of it being infested on every square rod. The oldest portion of it, 5 and 6 years, must be plowed up as about 60% of the plants are dead. In the portion just in its third season a few are beginning to die and many show some of the injury."

The symptoms of the disease as it occurs in Colorado and Wyoming have been given as follows by Director C. P. Gillette of the Colorado Experiment Station, June 17.

> "Sometimes the entire top growth is wilted down as if from lack of water, and at other times only a portion of the plant. Often the plant does not make more than three or four inches of growth before the top wilts and later turns brown, while in other cases the plants may grow to a foot or more in height and then dry up and die with plants all about them in a perfectly healthy and vigorous condition.

"All of these dying or dead plants seem to be diseased in the crown or immediately beneath the crown in the upper part of the tap root, which ultimately is entirely decayed and will readily break off. In plants that show but little of the wilt, the lower root seems practically sound and healthy, but on removing the bark next the crown the cambium is brown and soggy, indicating to me that there is a plant disease organism present. As the disease advances the root for some distance down turns brown also.

"There are various theories among the farmers. Some think the trouble due to spring freezing; others to the application of too much water. Some think the plants have not received water enough, still others think that it is due to the age of the plants. My attention was also called to soil conditions, where light or heavy soil or an excess of sodium nitrate which causes so much trouble in the growth of some of our crops, but I find no reason to think that any of these possible causes are worthy of much consideration in the dying of the alfalfa. I have not yet seen a single plant showing the characteristic swellings that are supposed to be produced by the true alfalfa eelworm."

A number of specialists, including agronomists and pathologists from the Department of Agriculture and from the states of Colorado and Wyoming, have observed the trouble and concur in the belief that it is not due primarily to nematodes nor is it especially an agronomic problem but are of the opinion that it is a disease of fungous or bacterial origin.

In Kansas also many alfalfa fields showed poor stands and both bacteria and fungi were found associated with the trouble. According to Melchers it has been becoming increasingly conspicuous during the last three years.

Recent literature:

Headden, W. P. The alfalfa "failure." Through the Leaves 12: 551-552. Nov. 1924.

ROOTROTS DUE TO VARIOUS CAUSES

Rootrots associated with Fusarium spp. Kentucky, Illinois, Montana, and Idaho have reported a root and crownrot associated with Fusarium sp. While no definite statements are made in the reports, this disease probably attacks individual plants rather than large numbers in definite areas or spots as in the case of the violet rootrot.

Ozonium omnivorum Shear. In western Texas alfalfa grown under irrigation is seriously affected with rootrot. The estimated loss for the state has been placed at 10%. It is very prevalent in the Rio Grande Valley. (Taubenhus) Streets estimated a loss of 3% in Arizona.

Violet rootrot caused by Rhizoctonia crocorum (Pers.) DC. (Rhizoctonia violacea Tul.) This disease proved to be somewhat prevalent in Kansas. In Iowa it caused damage locally. It was also reported from Michigan and Minnesota.

A careful review of the history and occurrence of this disease shows that in this county it has most consistently occurred in the group of states including Kansas, Nebraska, and Iowa. From the records available, it is evident that violet rootrot has caused the greatest loss in Kansas over a series of years.

Buddin and Wakefield (1), in an article describing the growth in pure culture of the organism, which they state should be known as *R. crocorum*, suggest that the relatively high optimum temperature, about 25.5°C., obtained in their experiments may explain the geographic distribution of the fungus in the field. It occurs mostly in rather dry localities where soil temperatures would be comparatively high. The strain with which they were working was isolated from red clover roots, but inoculation experiments showed that it was capable of causing complete decay of the roots and death of young carrot plants.

Sclerotinia trifoliorum Eriks. Stemrot was apparently inconspicuous the past year. Idaho, Kentucky, and Washington reported it merely as having been observed.

Recent literature:

Cited:

1. Buddin, W., and E. M. Wakefield. Some observations on the growth of Rhizoctonia crocorum (Pers.) DC. in pure culture. Annals Appl. Biol. 11: 292-309. Oct. 1924.

OTHER DISEASES AND INJURIES

Ascochyta imperfecta Pk. This leafspot was widely distributed in Illinois, being more prevalent than usual and causing a trace of injury.

Cercospora medicaginis Ell. & Ev. This leafspot was reported from Illinois and Texas as occurring in traces.

Colletotrichum trifolii Bain. The only report of anthracnose received was from Illinois where it was serious in a 45 acre field in Alexander County. (Tehon)

Cuscuta sp. In New Mexico Crawford says dodder has been damaging the alfalfa crop to an extent of 4%. It has been known to occur in Kansas for many years. In the past season several definite inquiries concerning it came to the Agricultural College.

Heterodera radicicola (Greef) Muell. Rootknot is important in Texas where the hairy Peruvian variety is not grown. (Taubenhaus)

Leafspots (in general). The various common leafspots of alfalfa were said to be very much less conspicuous in Louisiana and Kansas than usual.

Macrosporium sarcinaeforme Cav. Illinois reported this leafspot for the first time to the Survey.

Pleosphaerulina briosiana Poll. Said to be widely distributed in Illinois on alfalfa, causing a trace of damage. This is the first report to the Plant Disease Survey from Illinois.

Uromyces medicaginis Pass. Rust was observed in Iowa, Wisconsin, Ohio, and Texas and probably several other states. In no instance did it cause any appreciable injury, except perhaps in a few cases one of the crops may have suffered slightly. In Kansas it generally occurs on the last crop just before cutting.

Urophlyctis alfalfae (Lagh.) Magn. The only report of crownwart received was from Utah, where it is dais to be widespread, and it is believed to be more important than the alfalfa nematode. It was found in Salt Lake, Uinta, Utah, Davis, Boxelder, Weber, and Morgan Counties according to Richards.

White top or yellows, (non-parasitic) was reported from Washington, Montana, and North Dakota. In Montana it was prevalent over the state.

CLOVER

ANTHRACNOSE CAUSED BY COLLETOTRICHUM TRIFOLII BAIN

This disease was reported from Kentucky, Mississippi, Texas, Indiana, Wisconsin and Idaho. In no instance was it said to be doing any noticeable injury.

Wisconsin: On varietal plots at Branch Experiment Station found some on all varieties. (Vaughan)

Indiana: Found by A. G. Johnson to be serious on Italian varieties. (Gardner)

Kentucky: This disease observed on several occasions but in no case was it very serious. (Valleau)

A report of interest on this disease is one by Pieters (1) as follows:

> "In using the term disease factor, reference is made especially to the anthracnose caused by Colletotrichum trifolii, which, as is well known, has been so disastrous to clover culture in Tennewsee and which was studied especially by Bain and Essary. This disease has been quite serious on the clover plots at the Arlington Farm, where tne disease destroyed nearly or quite 100% of the stand on the plots sown to Italian and German seed and made very heavy inroads on the stand of the plots sown to Bohemian, English, French, and Polish seed. Plots seeded to Chilean seed also suffered, but not nearly as much as the other plots. Plots seeded to Oregon seed lost more than 90% of the stand and plots seeded to Idaho and Minnesota seed also suffered to a certain extent. The only plots which showed approximately no injury were those seeded to the Tennessee disease-resistant strain and to some seed purchased in southwestern Ohio, the exact origin of which is not known beyond the fact that it was Ohio grown.
>
> "How far this disease is responsible for the loss of stands of red clover is not known, but there is considerable evidence to indicate that this factor is much more important in the states south of the Ohio than has been suspected. Whatever the facts may be in this regard, it is quite evident

that there is a considerable difference in susceptibility between various strains, and that the Italian strain is particularly susceptible to this disease." (A. J. Pieters)

Recent literature:

Cited:

1. Symposium - The forage problem. Jour. Amer. Soc. Agron. 16: 153-238. Mar. 1924.

POWDERY MILDEW CAUSED BY ERYSIPHE POLYGONI DC.

Powdery mildew was apparently as widespread as in the last two years, although several states growing clover did not report. For the United State as a whole it would appear as though powdery mildew was not as abundant. It is interesting to note how the severity of powdery mildew has fluctuated since 1921. In that year there was a sudden outbreak. In 1922 it was worse and more widespread over the United States. In 1923 there was less over the country as a whole except perhaps in the Northeast where it remained about the same. In 1924 there seemed to be somewhat less in some states, more in others, and approximately the same in the remainder. The distribution and dates of earliest appearance are shown in the map, (fig. 4.)

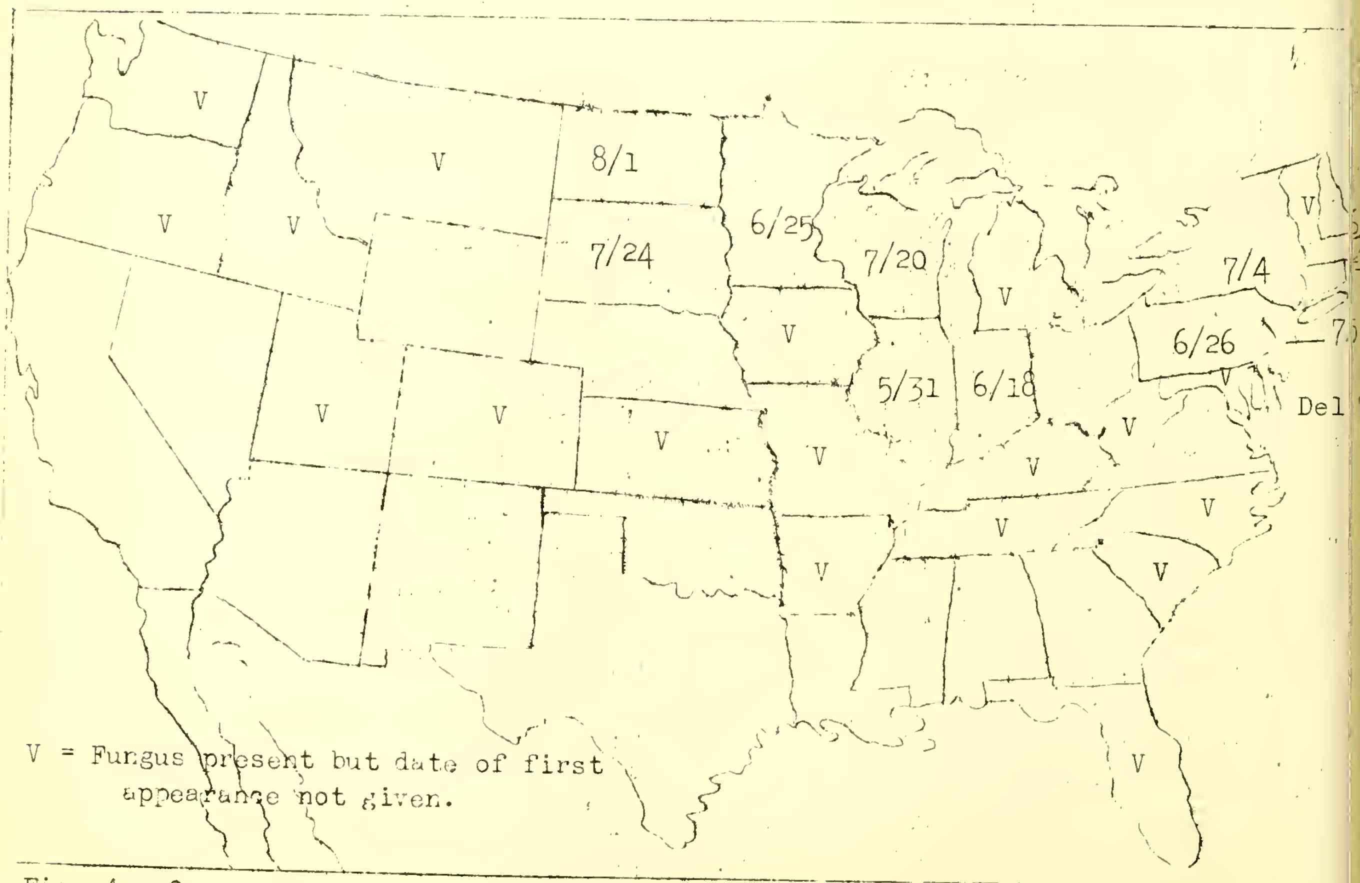


Fig. 4. Occurrence and dates of first observation of clover powdery mildew in 1924

Clover - Powdery millew

A noteworthy feature of the clover powdery mildew situation in 1924 was its greater prevalence in some of the western states, particularly Oregon, Washington, Idaho, Montana, and Utah. A powdery mildew has long been known in the Rocky Mountain Section but not until this year have there been so many complaints and reports. In Oregon it was noted early in August, and seemed to spread out from centers of infection. In Washington it was so abundant in parts of Pend Oreille County that the spores resembled dust clouds at haying time, according to Zundel.

It is possible that the strain of Erysiphe that has been so prevalent in the East during the past four years has now spread to the West. A few of the collaborators' reports follow:

> Idaho: Very widespread. Perithecia found only in irrigated section of southern Idaho. (Hungerford)
>
> North Dakota: Appeared later than in 1922 or 1923. Most severe on second cutting. No perithecia found. (Weniger)
>
> Wisconsin: Apparently heavy on second crop. Smooth varieties of foreign clovers are immune. (Vaughan)

Recent literature:

Noffray, E. Le blanc des trefles. Jour. Agr. Prat. 84 (2): 72-75. July 22, 1920. Erysiphe communis.

CLOVER RUST CAUSED BY UROMYCES SPP.

Only in a few instances did collaborators report the kind of clover on which rust was found. Since several species of rust are known to occur on as many different species of Trifolium, there is some chance for doubt as to which rust was meant in the reports.

In a recent article, Davis (1) gives a summary of his investigations on clover rusts:

White clover rust, Uromyces trifolii-repentis (Cast.) Liro, occurrs only on white clover, Trifolium repens L.

Red clover rust, Uromyces trifolii (Hedw. f.) Lév., occurs on red clover, Trifolium pratense L., and zigzag clover, Trifolium medium L.

Alsike clover rust, Uromyces hybridi Davis, occurs on alsike clover, Trifolium hybridum L.

The rusts reported by collaborators this year are as follows: Uromyces fallens (Desm.) Kern. occurred on clover (species not given) in New Jersey, Washington, North Dakota, Wisconsin and Pennsylvania.

Uromyces hybridi Davis, occurred on T. hybridum in New York, Connecticut, and Washington.

Uromyces trifolii (Hedw. f.) Lév. was reported on T. repens from Connecticut, Pennsylvania, New York, New Jersey, and Iowa.

Uromyces sp. was reported feom New Jersey and Maryland.

Clover - Rootrots

Recent literature:

Cited:

1. Davis, W. H. Summary of investigations on clover rusts. Mycologia 16: 203-219. Sept. 1924.

ROOTROTS DUE TO VARIOUS CAUSES

Rootrot caused by Sclerotinia trifoliorum Eriks.

Maryland: Crimson clover most susceptible. (Jehle & Temple)

Rootrot associated with Fusarium sp.

Kentucky: A 40% reduction in stand has occurred in Kentucky. It occurs in all fields over the state. (Valleau)
The small rootlets badly rotted, many plants will not withstand drought period. The stand of plants is generally reduced about 80% the first summer, slightly the next winter, and about 90% of the remaining plants are killed the next summer. (Fergus & Valleau)

What seems to be this same trouble is reported from Idaho by Hungerford who states that it is not very important except in isolated cases.

OTHER DISEASES AND INJURIES

Ascochyta imperfecta Pk. An unusual outbreak of this leafspot is reported from Illinois where it caused 1% injury. This is the first report to the Plant Disease Survey. No previous record of this fungus was found on clover.

Bacterium trifoliorum Jones, Williamson, Wolf & McC. Bacterial leafspot was found in Indiana and Wisconsin.

Botrytis sp. Greymold was very prevalent as a marginal infection of lower leaflets in thick stands of crimson clover in Delaware. (Adams)

Cercospora medicaginis Ell. & Ev. Illinois.

Cuscuta sp. No reports of dodder were received in 1924. In an article which should be of interest, Saunders describes a magnetic process used in place of screening for separating dodder seed from clover seed. (Jour. Min. Agr. Great Britain 30: 928-931. 1924.)

Gloeosporium caulivorum Kirch. The only report of anthracnose received came from Illinois. Tehon states the injury is slight except in rare instances.

Hollow crown (undetermined). This condition is said to be very serious where it occurs in Illinois. It was seen in Grundy County early in August. The cause was not apparent according to Tehon.

Mosaic (undetermined). In Indiana it is statewide but not causing any appreciable injury. (Gardner)

Clover - Miscellaneous diseases

Phyllachora trifolii (Pers.) Fckl. Reported from Louisiana, Indiana, Pennsylvania on T. repens and New Jersey on T. hybridum. Elliott and Stansfield (3) have transferred the fungus to the genus Dothidella.

Pseudopeziza trifolii (Biv.) Fckl. Reported on T. pratense from Pennsylvania, Maryland, Wisconsin, Iowa, South Dakota, and Idaho. It was not considered of economic importance by collaborators.

Tylenchus dipsaci (Kuehn) Bast. This nematode is important where it occurs in Idaho; especially common in Twin Falls and in Canyon Counties. (Hungerford)

Recent literature:

1. Bonar, L. Studies on the biology of Brachysporium trifolii. Amer. Jour. Bot. 11: 123-158. 1924.
2. Ciferii, R. Esperienze sulla propagazione della batteriosi fogliare del Trifoglio e sulla lotta mediante la sterilizzazione parziale del suolo. (Experiments in connection with the spread of leaf bacteriosis of clover and on its control by means of partial sterilization of the soil.) Staz. Sperim. Agrar. Ital. 57: 165-177. 1924.
3. Elliott, J. S. and O. P. Stansfield. The life history of Polythrincium trifolii Kunze. Trans. Brit. Mycol. Soc. 9: 218-228. Aug. 1924.
4. Foy, N. R. Dodder in white clover. New magnetic process of removal. New Zealand Jour. Agr. 29: 44-45. July 1924.
5. Pieters, A. J. Clover failure. U. S. Dept. Agr. Farmers' Bul. 1365: 1-24. 1924.
6. ____________ Clover problems. Jour. Amer. Soc. Agron. 16: 178-182. 1924.

SWEET CLOVER

Leafspot, Ascochyta meliloti (Trel.) J. J. Davis, caused some blasting of seed in late fields in North Dakota. (Weniger)

Leafspot, Cercospora davisii Ell. & Ev., was reported as being present on lowermost leaves of Melilotus alba in Illinois and Pennsylvania.

Mosaic (undetermined). Reported as prevalent from South Dakota and somewhat common from North Dakota.

Downy mildew, Peronospora trifoliorum D By., was reported from Wisconsin for the first time to the Plant Disease Survey. Vaughan stated that "F. R. Jones has examined the specimens carefully and advises that there is no difference in the fungus on sweet clover and pea. Quite prevalent in the state, the first infection being noted May 15." (Vaughan)

Recent literature:

Newton, Robert and R. R. Brown. Is the apparent winter-killing of sweet clover and red clover a result of disease injury? Scient. Agr. 5: 93-96. Nov. 1924.

COWPEA

BACTERIAL LEAFSPOT CAUSED BY BACTERIUM VIGNAE GARD. & KEND.

Illinois, Kansas, Indiana and Iowa reported bacterial leafspot.

Indiana: Serious on seedlings and pods. Fairly high rainfall favorable. No resistant varieties have been noted. New Era, the variety largely grown in southern Indiana, is very susceptible and was generally infected. Infection has been obtained on velvet bean and the disease has been found on Desmodium canescens. (Gardner)

Kansas: Has been common some seasons for several years. (Melchers)

Illinois: Caused leaves to shed badly on white cowpeas in vicinity of Quincy, Illinois. (Tisdale)

OTHER DISEASES AND INJURIES

Leafspot, Amerosporium oeconomicum Ell. & Tr., was found on New Era in southern Indiana according to Gardner. Adams of Delaware observed that wet weather in September was favorable for its spread.

Leafspot, Cercospora cruenta Sacc., New Jersey, Delaware, Florida, Texas, Indiana, Illinois, Porto Rico reported it as common. In Indiana Gardner reports it in variety plots. This disease was serious on the Blackeye and Early Buff varieties. It was present on Whippoorwill; absent on Iron, Groit, New Era, Early Red and Catjang.

Chlorosis, due to excess of lime. Taubenhaus of Texas reports such a condition.

Powdery mildew caused by Erysiphe polygoni DC.

Florida: Very severe in a field at Plant City. Eighty percent of the leaves were overgrown. Not found elsewhere. (Weber)

South Carolina: Common in the northwest but doubtless general. Over 60% of the plants in the state affected. One percent reduction in yield. (Ludwig)

Very severe throughout Coastal Section. Some fields partially defoliated. (Moore)

Stemrot, Fusarium vasinfectum tracheiphilum EFS., caused a loss of 2% in Texas, and was reported from Virginia, South Carolina, and Indiana. (Indiana: noted on new Era variety. Disease serious locally.(Gard

Anthracnose, Glomerella lindemuthianum Shear. - A specimen was sent in from Waldo, Florida, where it was attacking the seed pods of the host plant. The disease is not common, however. (Weber)

Rootknot, Heterodera radicicola (Greef) Muell. In Florida, Brabham and Iron cowpeas are resistant; the former is practically immune.

Mosaic (undetermined). Moderate in some localities in Louisiana.

Cowpea - Miscellaneous diseases

Rootrot, Ozonium omnivorum Shear, caused a 2% reduction in yield in Texas; less important than in 1923 on account of dry season. (Taubenhaus)

Leafspot, Phyllosticta phaseolina Sacc. Reports received from Illinois and Delaware. Said to be causing a trace of damage.

Podspot (fungs? undetermined). Manns and Adams report a disease of soybeans and cowpeas which attacks the pods.

Crown and rootrot associated with Rhizoctonia sp. Serious locally in Indiana, attacking young plants. Wet weather favorable. On New Era 25% of plants were dying in one field. (Gregory & Gardner)

Rust, Uromyces vignae Barclay, caused a loss of 3% in Texas. (Taubenhaus) According to Fromme (2) rust of cowpea, which has formerly been reported as U. appendiculatus (Pers.) Fr., is a distinct species, and has been recorded from Maryland, Virginia, Florida, Alabama, Texas, Indiana, Iowa, Missouri and California in the United States.

Recent literature:

1. Anon. Nematode resistant varieties of cowpeas. Florida Grow. 29: 9. Jan. 1924.
2. Fromme, F. O. The rust of cowpeas. Phytopath. 14: 67-69. 1924.
3. Smith, C. E. Transmission of cowpea mosaic by the bean leaf beetle. Science 60: 268. Sept. 19, 1924.

SOYBEAN

Leafspot associated with Alternaria sp. A bad infection occurred in Clay County, Illinois. Some other thing may have been the primary cause. (Tehon)

Bacterial spot (undetermined). A bacterial spot which seems to resemble Bacterium phaseoli sojense Hedges was reported from Louisiana and Maryland, but the records do not state specifically what the organism is.

Bacterial blight, Bacterium glycineum Coerper, was reported from Mississippi for the first time. It appears to be common in Indiana and Illinois.

Bacterial pustule, Bacterium phaseoli sojense Hedges, is known to occur in Delaware, Virginia, South Carolina, Louisiana, Texas, Arkansas, and Kansas (1).

Leafspot, Cercospora sp. Found in one field in South Carolina.

Pod and stemblight, Diaporthe sojae Lehman; a few plants were found in a field in Cass County, Indiana, by Gardner.

Mosaic (undetermined).

Indiana: Not common in the commercial crop. The variety now commonly grown, the Manchu, is not as susceptible as Midwest, the variety formerly predominating. (Gardner)

Delaware: This disease is said to have appeared in various parts of the state and in some instances the presence of woolly aphis is thought to have been associated with the disease. (Manns & Adams)

Soybean - Miscellaneous diseases

Downy mildew caused by Peronospora sojae Lehman & Wolf was described from North Carolina (3). Reports and specimens were received from collaborators in Delaware and Kentucky.

Podspot, Phomopsis sp. Thought to be perhaps the same as Diaporthe sojae Lehman (Phomopsis sojae Lehman) recently described and reported from North Carolina. Reported from Delaware.

Stemrot, Rhizoctonia solani Kuehn, was serious locally in Indiana in early season. Plants were killed by infection at surface of soil. High rainfall and cool weather were favorable to the disease. (Gardner)

Stemrot, Sclerotium rolfsii Sacc., was found in Mississippi for the first time on cowpea, and caused a loss of 10%. Data on the amount of infection on four varieties gave the following averages, taken from three plots where all the varieties were growing: Laredo, 22+%; Biolox, 25+%; Oototan, 17%; and Mammoth Yellow, 21%. (Neal & Barker)

Leafspot, Septoria glycines T. Hemmi (?), seems to occur only on seed leaves according to Adams of Delaware. This is the first report to the Plant Disease Survey.

Recent literature:

1. Hedges, Florence. A study of bacterial pustule of soybean, and a comparison of Bacterium phaseoli sojense Hedges with Bacterium phaseoli EFS. Jour. Agr. Res. 29: 229-251. Sept. 1, 1924.
2. Kendrick, J. B. and M. W. Gardner. Soybean mosaic. Seed transmission and effect on yield. Jour. Agr. Res. 27: 91-98. 1924.
3. Lehman, S. G. and F. A. Wolf. A new downy mildew on soybeans. Jour. Elisha Mitchell Sci. Soc. 34: 164-169. 1924.
4. Wolf, F. A. Bacterial pustule of soybean. Jour. Agr. Res. 29: 57-68. July 15, 1924.
5. Woodworth, C. M. and L. J. Cole. Mottling of soybeans. Jour. Hered. 15: 349-354. Aug. 1924.

VELVET BEAN

Leafspot, Bacterium vignae Gardner & Kendrick; Indiana, produced by inoculation with the organism and natural infection occurred also in rows of velvet beans growing near diseased cowpeas.

Leafblotch, Cercospora stizolobii Syd., causing some defoliation in Florida.

Mosaic (undetermined) occurred in experimental plots in Indiana.

HORSE BEAN

Root and stemrot caused by Rhizoctonia sp., Washington.

B. GRASSES

TIMOTHY

Ergot, Claviceps purpurea (Fr.) Tul., Pennsylvania.

Anthracnose, Colletotrichum graminicolum (Ces.) Wils., Pennsylvania.

Leafspot, Heterosporium phlei Gregory, New York and Pennsylvania.

Take all, Ophiobolus graminis Sacc., New York.

Rust, Puccinia graminis Pers., was reported from Connecticut, New York, Pennsylvania, Illinois, Minnesota, Iowa, Montana, and Colorado. An epidemic in fall was noted in Minnesota; very little during spring and early fall.

Leafspot, Scolecotrichum graminis Fckl., seems to be the most destructive timothy disease in New York where two percent loss was recorded. In Pennsylvania the disease was found in 1924 for the first time. It caused a loss of 1%. Illinois also reports it for the first time.

Leafspot, Septoria sp., was observed for the first time in the breeding plots in Pennsylvania. Septoria sp. was also recorded from Illinois where it has occurred several seasons, as causing a loss of 1%.

Smut, Ustilago striaeformis (West.) Niessl, New York, Pennsylvania, Illinois, Wisconsin, Minnesota, Iowa, North Dakota, and Montana. Pennsylvania reports 0.5% loss, New York 0.2%, and the other states a trace.

Recent literature:

Barker, H. D., and H. K. Hayes. Rust resistance in timothy. Phytopath. 14: 363-371. Aug. 1924.

Davis, W. H. Spore germination of Ustilago striaeformis. Phytopath. 14: 251-267. June 1924.

MISCELLANEOUS GRASSES *

Bacterium coronafaciens atropurpureum Reddy & Godkin
- °Avena barbata - Kansas
- °Avena fatua - Kansas
- °Avena sterilis - Kansas
- Bromus sp. - North Dakota, **South Dakota (specimen determined by A. G. Johnson)

Claviceps purpurea (Fr.) Tul.
- Agropyron repens - Pennsylvania, Iowa
- Avena sativa - **Kansas
- Bromus inermis - Iowa
- Bromus sp. - North Dakota
- Festuca elatior - Pennsylvania
- Lolium sp. - Washington
- Phalaris arundinacea - Pennsylvania

Colletotrichum graminicolum (Ces.) Wils. - from Pennsylvania, on
- °Agropyron repens
- °Agrostis palustris
- °Anthoxanthum odoratum
- Bromus secalinus

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*NOTE: A large number of reports of fungi on grasses are included from Kansas and Pennsylvania, by C. O. Johnston and R. S. Kirby, respectively.

° = First report to Survey

*** = First report from state

Miscellaneous grasses

  - Dactylis glomerata
  - Festuca rubra
  - °Hordeum jubatum
  - °Lolium perenne
  - Notholcus lanatus
- Colletotrichum sp.
  - Holcus halepensis - Missouri
- Dothichloe atramentosa (Berk. & Curt.) Atk.
  - Lawn grass - southern Georgia
- Erysiphe graminis DC.
  - Agropyron repens - Pennsylvania
  - Dactylis glomerata - Pennsylvania
  - Elymus canadensis - Pennsylvania
  - Hordeum jubatum - Mississippi
  - Poa sp. - Washington, Iowa
  - Poa compressa - Minnesota
  - Poa pratensis - Pennsylvania
- Gibberella sp.
  - Lolium perenne - Pennsylvania
- Helminthosporium sp.
  - Dactylis glomerata - Pennsylv nia
- Helminthosporium bromi Died.
  - Bromus inermis - Pennsylvania, Iowa
- Helminthosporium dictyoides Drechs.
  - Festuca elatior - Pennsylvania
- Helminthosporium giganteum Heald & Wolf
  - Elymus virginicus - Pennsylvania
- Helminthosporium gramineum Rabh.
  - Pennisetum glaucum (pearl millet) Florida
- Helminthosporium sativum Pam., King, & Bak.
  - Elymus canadensis - Pennsylvania
- Helminthosporium vagans Drechs.
  - Poa pratensis - Pennsylvania
- Leptosphaeria sp.
  - Agrostis palustris - **Pennsylvania
- Leptosphaeria culmorum Auer.
  - Lolium perenne - **Pennsylvania
- Phyllachora graminis (Pers.) Fckl.
  - Agropyron repens - Pennsylvania
  - Bouteloua curtipendula - **Kansas
  - Elymus canadensis - Pennsylvania
  - °Panicum virgatum - Kansas
  - °Paspalum setaceum - Kansas
- Phyllosticta sp.
  - °Agropyron repens - Pennsylvania
- Physarum cinereum (Batsch) Pers.
  - Poa pratensis - Pennsylvania
  - Stenotaphrum secundatum - Florida
- Piricularia grisea (Cke.) Sacc.
  - Chaetochloa italica (millet) - Illinois
  - Panicum sp. - Illinois
  - Syntherisma sanguinalis - Florida, **Kansas
- Puccinia amphigena Diet.
  - Calamovilfa longifolia - Kansas
- Puccinia andropogi Schw.
  - Andropogon furcatus - Kansas
  - Andropogon scoparius - Kansas
- Puccinia chloridis Speg.
  - Chloris verticillata - Kansas
- Puccinia coronata Cda.
  - Avena barbata - Kansas
  - Avena fatua - Kansas
  - Avena sterilis ludoviciana - Kansas
  - Festuca elatior - Pennsylvania, Missouri
  - Notholcus lanatus - Pennsylvania
- Puccinia emaculata Schw. (P. graminis brevicarpa Pk.)
  - Panicum capillare - Pennsylvania
- Puccinia epiphylla Wetts. (P. poarum Niessl)
  - Poa pratensis - Pennsylvania
- Puccinia glumarum (Schm.) Eriks. & Henn.
  - Hordeum jubatum - Montana
- Puccinia graminis Pers.
  - Agropyron repens - Pennsylvania, Wisconsin
  - Agropyron smithii - Kansas
  - Agropyron violaceum - Kansas
  - Agrostis palustris - Connecticut, Pennsylvania, Wisconsin, Iowa
  - Chaetochloa sp. - Illinois
  - Dactylis glomerata - Pennsylvania
  - Elymus canadensis - Pennsylvania
  - Festuca elatior - Pennsylvania
  - Hordeum jubatum - Pennsylvania, Wisconsin, Iowa, Kansas
  - Hordeum pusillum - Kansas
  - Poa compressa - Pennsylvania
- Puccinia graminis poae Eriks. & Henn.
  - °Reported by Stakman and Levine (9) on Poa compressa in 1922 and 1923 in Michigan and 1923 in

Indiana. No previous records

- Puccinia hibisciata (Schw.) Kell. (P. muhlenbergiae Arth. & Holw.)
  - Muhlenbergia schreberi - Pennsylvania
- Puccinia montanensis Ell.
  - Elymus virginicus - Kansas
- Puccinia spegazzinii DeToni (P. australis Speg.)
  - Mikania scandens - Florida
- Puccinia sydowiana Diet.
  - Sporobolus asper - Kansas
- Puccinia triticina Eriks.
  - °Aegilops cylindrica - Kansas
  - Agropyron repens - Pennsylvania
  - Elymus canadensis - Pennsylvania
- Puccinia windsoriae Schw.
  - Triodia flava - Kansas
- Sclerospora graminicola (Sacc.) Schroet.
  - Chaetochloa magna - Florida
  - Chaetochloa viridis - Pennsylvania, Iowa
- Scolecotrichum graminis Fckl.
  - Agrostis palustris - Pennsylvania
  - Arrhenatherum elatius - Pennsylvania
  - Dactylis glomerata - Pennsylvania
  - Poa pratensis - Pennsylvania
  - Reported on several grasses from South Dakota
- Septoria sp.
  - Poa pratensis - Pennsylvania
- Sorosporium syntherismae (Pk.) Farl.
  - Panicum sp. - New Jersey, Pennsylvania
- Urocystis agropyri (Preuss) Schroet.
  - Agropyron repens - Pennsylvania, New York
- Uromyces hordei Tracy
  - Hordeum jubatum - Mississippi
- Ustilago crameri Koern.
  - Chaetochloa italica (millet) - Montana, Colorado, Pennsylvania
- Ustilago levis (Kell. & Sw.) Magn.
  - Avena fatua - Kansas
- Ustilago neglecta Niessl
  - Chaetochloa lutescens - Pennsylvania, Kansas
- Ustilago panici-miliacei (Pers.) Wint.
  - Panicum miliaceum - North Dakota
- Ustilago perennans Rostr.
  - Arrhenatherum elatius - Pennsylvania, Missouri
- Ustilago pustulata Tr. & Earle
  - Panicum dichotomiflorum - Kansas
- Ustilago rabenhorstiana Kuehn
  - Syntherisma sanguinalis - Pennsylvania
- Ustilago striaeformis (West.) Niessl
  - Agrostis sp. - Pennsylvania
  - Agrostis palustris - Pennsylvania
  - Dactylis glomerata - Pennsylvania
  - Elymus sp. - Iowa
  - Poa sp. - Pennsylvania
  - Poa pratensis - Pennsylvania

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THE PLANT DISEASE REPORTER

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The Office of Plant Disease Survey
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Supplement 41

Diseases of Field and Vegetable Crops
In the United States in 1924

June 1, 1925

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

DISEASES OF FIELD AND VEGETABLE CROPS IN THE UNITED STATES IN 1924.

Prepared by

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Plant Disease Survey, Bureau of Plant Industry.

Plant Disease Reporter
Supplement 41

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CONTENTS

As with the other summaries that have been issued by the Plant Disease Survey, the present one is based on reports of collaborators, on information contained in recent literature, and on information supplied by plant pathologists and other agricultural workers. The map (Fig. 5) indicates the states from which collaborators sent in annual reports on vegetable diseases for 1924. Collaborators in the states not marked sent occasional information during the year, but no annual reports were made.

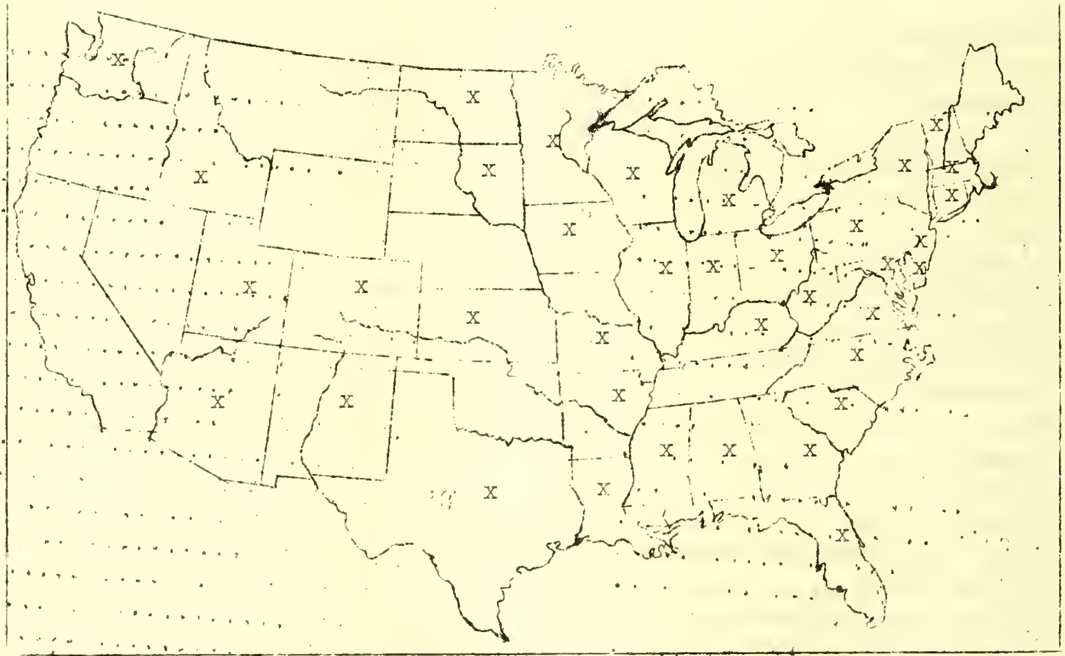

Fig. 5. States from which annual reports on vegetable diseases for 1924 were received.

OUTSTANDING OBSERVATIONS

Among the outstanding diseases of the year the late blight of potato (Phytophthora infestans (Mont.) D By.) should be mentioned. It was more destructive than usual, appearing late in the season in the northern potato states and causing heavy losses in many cases from tuber rot. In Wisconsin, where it was epiphytotic, it was the worst that it has been since 1915. Potato blackleg (Bacillus phytophthorus Appel) was more important than usual in many states, and the newly described potato disease, yellow dwarf, continued to spread and increase in importance in New York. No new occurrences of potato wart (Synchytrium endobioticum (Schilb.) Perc.) were noted outside of the quarantined areas of Pennsylvania, Maryland, and West Virginia. Owing to temperature and other climatic conditions, mosaic of potato was more conspicuous than usual, the symptoms being intensified rather than masked.

It is a satisfaction to learn that certain diseases, particularly mosaic, leafroll, and other degeneration diseases, as well as potato scab, are being reduced in several states owing to the use of better seed, and the application of seed treatment and other control measures.

Of the tomato diseases, yellow blight, of undetermined cause, which occurs in the western states, was unusually severe owing to peculiar climatic conditions which favored it. It was even found occurring for the first time in western Kansas.

The bacterial blight of beans (Bacterium phaseoli EFS.) was very destructive in New York and Michigan. The downy mildew of onion (Peronospora schleideni Ung.) was the worst that it has been for several years in New York.

Bacterial wilt of cucumber and cantaloupe (Bacillus tracheiphilus EFS.) was one of the most important diseases of these crops during the year. The mosaic of cucurbits was also of major importance and a limiting factor to the growth of cucumbers and melons in certain sections. On the other hand less of the downy mildew of cucurbits occurred during the year.

The primary cause of rootrot of peas that is often destructive, particularly in the older pea growing sections, has been determined as the fungus Aphanomyces euteiches Drechs. The range of the bacterial blight of peas (Bacterium pisi (Sackett) EFS.) has been extended greatly through the examination of specimens from various states.

An unusual feature of the cotton disease situation was the occurrence of the Ascochyta blight (Ascochyta gossypii Syd.) in severe form in Virginia, North Carolina, and South Carolina. Soil treatment with an organic mercury compound has been used successfully in Arkansas in the control of damping off of cotton seedlings.

Progress in the control of cabbage diseases by means of seed and soil treatment, and of celery diseases through spraying and dusting in seed beds and field is reported.

The blackfire of tobacco (Bacterium angulatum Fromme & Murray) was one of the outstanding tobacco leafspots of the year, being probably more important than wildfire, which in other years has been important in some states.

Very poor stands of sugar cane occurred in the spring of 1924 owing to the heavy infection of seed pieces by the redrot organism (Colletotrichum falcatum Went.). Mosaic continued to be a serious problem in the growing of sugar cane in the southern states.

MOSAIC DISEASES

A surprisingly large number of field and vegetable crops are affected by mosaic. The only important ones that have not been found attacked as yet are cotton, cabbage, onion, peanut, asparagus, the common beet, rhubarb, and a few, comparatively unimportant, miscellaneous vegetables. On the other hand, there will be found in the pages of this summary records of mosaic, or mosaic-like diseases, some of which are of major importance, on the following crops: potato, tomato, sweet potato, bean, lima bean, Chinese cabbage, rutabaga, horseradish, cucumber, cantaloupe, squash, pumpkin, celery, lettuce, pea, tobacco, sugar cane, sugar beet, carrot, eggplant, pepper, and spinach.

Research on the nature and cause of the mosaic diseases has progressed. Some of the more important contributions of the past year that have been mentioned in this summary are: Johnston's work on the tobacco and potato mosaics and combinations of them; Olitsky's work on propagation of the causal agent in pure culture; and Severin's work on the transmission and rate of spread of the agent causing curly top of sugar beet.

NEW DISEASES

During 1924 several new diseases of field and vegetable crops were reported for the first time in the United States either in literature or in the form of direct reports to the Plant Disease Survey. Some of these reports, however, concern troubles which have not been under observation long enough to be determined definitely and although notes concerning some of these may appear in the following summary, information on others has been withheld for further investigation. The most definite of these new diseases are as follows:

Alternaria solani (Ell. & Mart.) Jones & Grout, although not a new parasite of the potato, was reported this year for the first time as the cause of a tuber rot by Donald Folsom of Maine (Phytopath. 15: 49. 1925).

Bacillus aroideae Town. was reported as the cause of a softrot of green tomato fruit in Virginia by S. A. Wingard (Phytopath. 14: 451-459. 1924).

Phyllosticta sp. was reported as causing a leafspot of tomato in Florida. (See page 235 of this summary)

Aphanomyces euteiches Drechs. has been demonstrated as a major cause of rootrot of pea and has been found in material from New York, New Jersey, Pennsylvania, Delaware, Maryland, Ohio, Indiana, Illinois, Michigan, Wisconsin, Utah, Idaho, Montana, and California.

Mottle necrosis, a new disease of sweet potato, was reported by Harter. (Phytopath. 15: 45. 1925)

Sclerotinia intermedia Ramsey, a new fungus, has been described as the cause of a rot of carrot and salsify. (Phytopath. 14: 323-327. 1924)

Sclerotinia sp. causing a crownrot of onions was reported by E. H. Smith of California. (Phytopath. 14: 125. 1924)

Brittle (undet.) of onion was reported from New York. (See page 251 of this summary)

Bacterial stem girdle (undet.) of lettuce was reported from New York. (See page 280, this summary)

NEW HOSTS FOR PREVIOUSLY DESCRIBED ORGANISMS

Bacterium phaseoli EFS. on Strophostyles helvola. (Gardner, Phytopath. 14: 340. July 1924)

Cercospora althaeina Sacc. on cotton in Illinois.

Mycosphaerella brassicicola (Fr.) Lindau caused ringspot of kale in Washington.

Peronospora trifoliorum D By., the cause of the common downy mildew of alfalfa, was found on pea for the first time in Wisconsin.

Septoria flagellifera Ell. & Ev. Reported on pea in Wisconsin.

Rio Grande disease, hitherto reported only on lettuce has now been reported on carrot in Texas.

Bacterial leafspot of pumpkin undetermined but suspected as being due to Bacterium lachrymans EFS. & Bryan was reported from Indiana and Illinois.

A mosaic-like disease of pea occurred in Maryland and New Jersey.

DISEASES REPORTED FROM NEW STATES IN 1924

Aplanobacter michiganense EFS., on tomato - Connecticut, Ohio.
Ascochyta gossypii Syd., on cotton - North Carolina, *Virginia, *South Carolina.
Ascochyta rhei Ell. & Ev., on rhubarb - *New Jersey.
Bacillus phytophthorus Appel, on potato - Alabama.
Bacterium angulatum Fromme & Murray, on tobacco - Wisconsin.
Bacterium lachrymans EFS. & Bryan, on cucumber - *New York, (western New York: previously reported from Long Island)
Bacterium maculicolum McCulloch, on cabbage and cauliflower - Connecticu
Bacterium pisi (Sackett) EFS., on pea - *Delaware, *New York, *Maryland, *South Carolina, *Florida, *Illinois, *Wisconsin.
Bacterium vitians Brown, on lettuce - *New Mexico.
Cercospora bloxami Berk. & Br., on cabbage - Illinois.
Cercospora concors (Casp.) Sacc., on potato - Iowa.
Cercospora flagelliformis Atk., on spinach - Georgia.
Cercospora sp., on bean - Illinois.
Cercospora sp., on asparagus - California (Phytopath. 14: 125. 1924).
Cercosporella albo-maculans (Ell. & Ev.) Sacc., on turnip - *Georgia.
Colletotrichum atramentarium (Berk. & Br.) Taub., on potato - New York.
Colletotrichum circinans (Berk.) Vogl., on onion - Kansas.
Diplodia tubericola (Ell. & Ev.) Taub. (Java blackrot), on sweet potato - Georgia.
Fusarium malli Taub., on onion - Ohio.
Fusarium conglutinans Woll., on kale and cabbage - California (Phytopath. 14: 125. 1924).
Helminthosporium sacchari Butler, on sugar cane - Mississippi.
Isariopsis griseola Sacc., on bean - Florida (1923).
Peronospora effusa (Grev.) Ces., on spinach - *New Jersey.
Peronospora schleideni Unger, on onion - Georgia.
Phoma destructiva Plow., on tomato - Illinois.
Phytophthora infestans (Mont.) D By., on potato - Illinois.
Pseudoperonospora cubensis (Berk. & Curt.) Rost., on watermelon - California (Phytopath. 14: 125. 1924).
Ramularia areola Atk., on cotton - Florida.
Sclerotium bataticola Taub., on sweet potato - Iowa.
Uromyces betae (Pers.) Lev., on garden beet - *Oregon.
Western yellow blight (undet.), on tomato - Kansas.
Witches' broom (undet.), on potato - Washington (Phytopath. 14: 372-383. 1924).
* = Specimens received.

POTATO

LATE BLIGHT CAUSED BY PHYTOPHTHORA INFESTANS (MONT.) D BY.

During 1924 late blight was much more destructive than usual. In parts of northern New England, New York, Pennsylvania, and Ohio it became prevalent late in the season as a tuber rot and resulted in very heavy losses. In the important potato state of Wisconsin the disease was the most destructive it has been in years. Not since 1915 has such an epiphytotic as that of the past year swept Wisconsin. It did considerable damage also in Minnesota and Michigan, and the first authentic report of the occurrence of the disease in Illinois was received from the northern part of the state. In West Virginia it was not only destructive as a tuber rot but also caused heavy loss by blighting the vines earlier in the season. As usual it occurred in the mountains of North Carolina, and it was present, but not especially destructive in the early potato sections of Hastings, Florida, and Beaufort, South Carolina.

The following reports and table give more details concerning prevalence and distribution, and the accompanying map (Fig. 6) shows the geographic distribution as closely as can be determined from collaborators' reports.

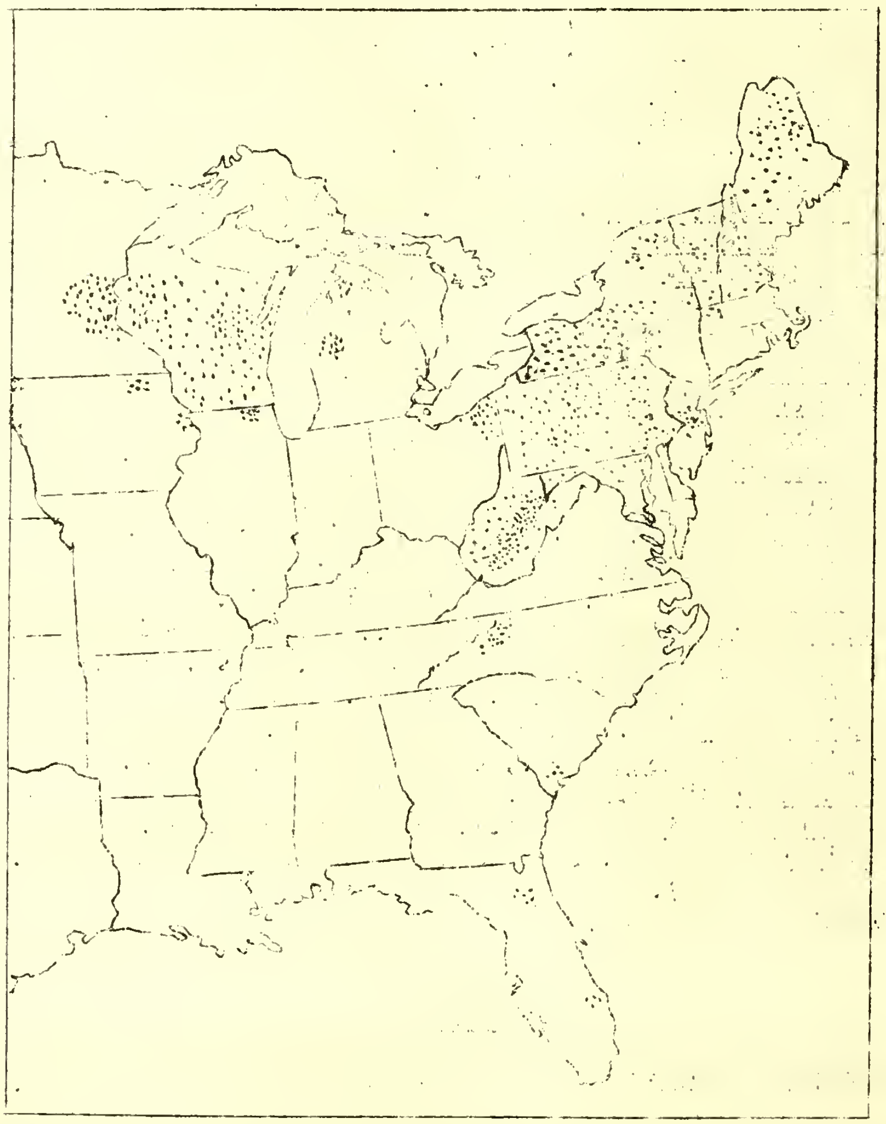

Fig. 6. Geographic distribution of late blight and rot of potato, 1924. Heavy stippling indicates areas where disease was most important.

Table 55. Dates of earliest appearance, estimated loss and relative prevalence of late blight and rot in 1924.

State	First appearance		Estimated state loss %	Prevalence compared with	
	Date	Place		1923	Average year
Fla.	April 1	Hastings	-		
S. C.	March 6	Beaufort	1	Less	Less
N. C.	July 1	Watauga Co.	3		Same
W. Va.	July 3	Webster Co.	25	More	More
N. J.	July 1	Mercer Co.	2	More	More
N. Y.(L.I.)	July 5	Riverhead, L.I.	trace		
Pa.	July 21	Chester Co.	9	Much more	More
N. Y.	Aug. 19	Monroe Co.	8	Much more	More
Mass.	-	-	trace	Less	Less
Vt.	Sept.	-	15	More	More
N. H.	Sept. 3	Grafton Co.	10	More	More
Me.	Sept.	-	-		
Ohio	-	-	1	More	More
Ill.	Sept. 15	McHenry Co.	trace	More	More
Mich.	Sept. 1	Alpena Co. Montcalm Co.	5	More	More
Wis.	Aug. 11	Barron Co.	16	Much more	More
Minn.	Oct. 20	Pine Co.	1	Much more	More
Iowa	-	-	trace	More	-

Maine: In check plots, with some foliage infection in every hill, no rot was found at digging. These plots yielded 99% as well as the sprayed plots (each series triplicated). The dusted plots yielded about the same. No complaints of rot have come in from growers. (Folsom)

New Hampshire: Destructive especially in northern part of state, Coos and Grafton Counties. (Butler)

Vermont: Distributed over the state and generally resulted in serious tuber loss where spraying was inefficient or lacking. (Gilbert)

Massachusetts: Not seen on vines: A very few tuber lesions noted at harvest time. (Osmun)

Connecticut: Not reported in state this year. (Clinton)

New York: Very important, not much foliage infection but many rotting tubers. It was surprising to receive so many reports during November of trouble with tuber rot when there was so little blight on the foliage. (Chupp)

New Jersey: Important in limited areas, blighting foliage but causing only a trace of tuber rot. Occurred in Central Jersey. None found in South Jersey (Gloucester County) on either the early or late crop. (Martin)

Pennsylvania: Foliage blight of average importance but tuber rot very severe in numerous localities. (Orton)

Occurrence in three southeastern counties most unusual. (Thurston)

West Virginia: The bulk of the commercial potato crop in this state is raised in central section and in the Ohio Valley. The Valley section is a comparatively narrow strip, and early potatoes are grown almost exclusively. In ordinary years potatoes in the central section where late blight is common, are planted early enough to mature at least part of the crop before late blight can cause much damage. This past year, however, the crop was planted unusually late, due to so much wet, cold weather in early spring. Much of the crop, therefore, which would ordinarily escape the blight was just about in the stage when the blight will cause the most damage.

I found the blight in advanced stage on July 3 in Webster County. Soon after this I found it prevalent all through the lower central section. Here the crop was greatly reduced. In the northern part of the central section the blight got started somewhat later, but still in time to cause considerable damage. A number of county agents and I estimated the damage fully 50%.

As potatoes in the Ohio Valley were not affected, and the crop in the eastern part of the state was almost a total failure due to very dry weather (east of the mountains), I estimated that the entire crop produced in the state this year was reduced about 25%. This estimate has been strengthened later by samples and reports coming in of considerable damage from tuber rot. Late season observations and reports indicate that the blight appeared in many counties further west than usual, and was in time to cause tuber rot, though not early enough to reduce the yield materially. Throughout the mountainous section of the state the weather was unusually wet all summer, but was followed generally by a fairly dry fall. (Sherwood)

Illinois: Found only in McHenry County. (Tehon)

Michigan: Reported from Antrim, Montcalm, Alpena, and Kent Counties. (Coons)

Wisconsin: Very important on late varieties. Statewide in occurrence, less on sandy soil and in northern tier of counties where vines were killed by early frost. Traces of leaf infection were followed by general tuber infection. (Vaughan)

Minnesota: Serious in northeast section of state. Observed chiefly as tuber rot in bins. First serious outbreak since 1915. (Sect. Pl. Path.)

Iowa: Slightly important, causing rotting of tubers in storage in Mitchell and Dubuque Counties. (Porter)

As already stated the disease became especially noticeable late in the season in the more northern late potato states. In many cases the blight of the leaves was not noticed at all or was confused with frost injury. However, when the potatoes were dug and especially after they were stored for a few weeks the damage from rot became very evident. This late, destructive appearance is directly correlated with a wet August in Wisconsin and adjacent territory, and a wet September in the New England and North Atlantic States.

Fig. 7. August rainfall in Wisconsin and adjacent states. (Shaded area = more than six inches)

The average precipitation for August in Wisconsin was 7.29 inches or 4.11 inches above normal. This is the highest August rainfall in the past 34 years or since complete records have been taken in that state. The map (Fig. 7) shows the distribution of this rainfall and it will be seen that in general the regions of highest rainfall are coincident with those of most blight. In Indiana, Illinois, and parts of Iowa, however, August was wet but no blight, or at least only a slight amount of it, occurred. In these cases perhaps temperature is the limiting factor. The disease has never been reported authentically from Indiana, and this year we have the first report from Illinois, in a northern county. In Iowa also the disease is usually not destructive except occasionally in the northeast section. Comparatively high temperatures in these states are probably largely influential in holding blight in check and even when, on rare occasions, favorable weather for late blight does occur, the lack of inoculum prevents development.

In New England and the North Atlantic States a correlation with September rainfall is evident. The disease was not noticed in New England until September and in upstate New York until August 19. The areas of heavy rainfall indicated on the map (Fig. 8) correspond more or less to areas of principal damage from late blight and rot.

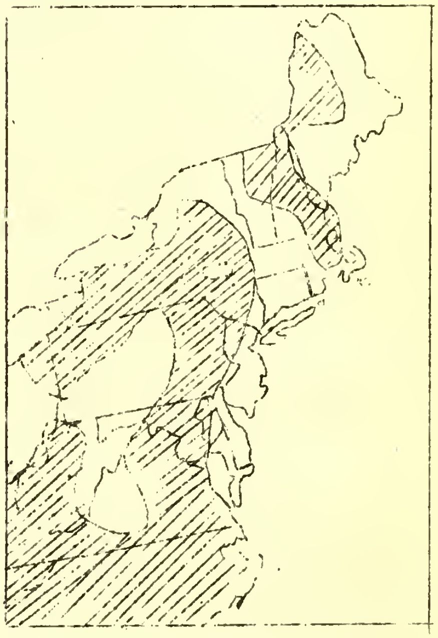

Fig. 8. September rainfall. Shaded area had more than 6 inches rainfall. Practically all remaining area had 4-6 inches.

In central New Jersey and on Long Island the disease appeared on the foliage early in July but it was checked by dry, hot weather and did no more damage.

In West Virginia there was an excess of rain during the summer. The average total rainfall for the state was 5-1/2 inches or over for each of the four months, June, July, August, September, and the average for these four months was 4.94 inches.

Only one collaborator, W. H. Martin of New Jersey, mentions the subject of varietal resistance. He reports the occurrence of only slight infection on several German varieties, whereas Green Mountain, Rose, Rural, and Cobbler in the same plots were affected more severely.

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3. Löhnis, Maria P. On the resistance of the potato tuber against Phytophthora. Rept. Intern. Conf. Phytopath. & Econ. Entom. Holland, 1923: 174-179. 1923.

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6. Zimmerman, H. Phytophthoraknollenfäule dur Pflanzkartoffeln (Anbauversuch). (Phytophthora tuber rot of seed potatoes (cultivation experiment).) Angew. Bot. 6: 51-53. 1924.

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EARLY BLIGHT CAUSED BY ALTERNARIA SOLANI (ELL. & MART.) JONES & GROUT

In occurrence, the early blight was widespread as usual. However, for the most part it was not especially serious, except in restricted areas of certain states. States reporting more early blight in 1924 were New Hampshire, New York, New Jersey, Delaware, South Carolina, Minnesota, and Iowa. In New Hampshire, Butler reported it as especially destructive in the southern part of the state during late August and September. In one field he estimated 20% reduction in yield on account of the foliage being destroyed. On Long Island, New York, it was serious in some fields, especially where plants were growing under unfavorable conditions. In New Jersey where 3% loss was estimated, it was most severe in the southern part of the state, being more abundant than for the past several years. In Delaware heavy infection of the early crop occurred but the late crop was only slightly infected, according to J. F. Adams. In South Carolina, the state which reports more loss than any other, early blight was said to be very important generally over the state, and most severe on sandy land, due, probably to a weakened condition of the plants. In Minnesota and Iowa, although there was more than usual, the loss was only a trace.

In the Gulf States and Georgia the disease was mentioned as occurring especially in the southern potato sections.

Table 56. Estimated percentage loss from early blight of potato, according to collaborators, 1924.

Percentage loss	States reporting
15.	South Carolina
5	Kentucky
3	New Jersey
2	North Carolina
1.5	Illinois
1	New Hampshire, Vermont, Delaware, Alabama, Mississippi, Texas, Arkansas, Arizona.
0.5	Connecticut, Pennsylvania, Maryland, Ohio, Tennessee,
0.3	New York.
Trace	West Virginia, Georgia, Louisiana, Michigan, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Kansas, Utah, Idaho, Washington.
0 or no data	Other states.

Regarding susceptibility of varieties, the collaborator from Wisconsin reported that Triumph, Irish Cobbler, and Green Mountain seem to be more susceptible than other varieties. In Maryland, late Irish Cobblers were most severely affected.

Plots sprayed with Bordeaux mixture in New Jersey showed good control. On July 14, in demonstration plots, 46% of the leaves of unsprayed plants were killed as compared with 5% of the leaves of sprayed plants. Yield of the former was at the rate of 189.4 bushels per acre, and of the latter 239.8 bushels.

The observation of R. E. Vaughan of Wisconsin, that most disease occurs where there was no rotation is of interest and probable significance in connection with the control of the disease.

Hitherto <u>Alternaria solani</u> has been regarded as a fungus attackkng the foliage only of the potato plant. However, at the Washington meeting of the American Phytopathological Society, Folsom and Bonde (1) reported the fungus as the cause of a tuber rot. It was isolated from lesions in tubers taken from commercial storage in different years and places, and successfully inoculated into and reisolated from leaves and tubers. These workers think that under Maine conditions the chief loss involved from this type of rot is due to secondary infection through the early blight lesions.

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SCAB CAUSED BY ACTINOMYCES SCABIES (THAX.) GUESSOW

Scab was widespread over the United States, as usual, during 1924. However, according to collaborators, in the southern states from South Carolina to Louisiana and Arkansas the disease was of very minor importance and in some states extremely rare. Collaborators in Florida report that scab is not considered of much importance in the important Hastings potato section. It would be of interest to determine the reasons for this comparative scarcity of scab in the South.

For the most part the disease was of average prevalence in the various states, however, in New York it was reported as being worse than last year and the average and was very important, causing a reduction in yield estimated at 5%. In one field of twenty acres, which yielded over 300 bushels per acre, only forty bushels of salable potatoes per acre were harvested. Kentucky and Tennessee reported an excess of scab on the second crop. In all sections of Tennessee it was especially bad. Indiana and Kansas were the other states indicating more than average severity. In the latter state where it was particularly serious in the western end of the Kaw Valley potato section, the situation was particularly interesting, scab being the worst that it has been in years. An average of 4% was thrown out on account of scab in order to make U. S. Grade No. 1, and the state loss from scab was estimated at 3%. Older fields showed more infection than new fields, and in some, every potato was infected. This unusual prevalence was correlated with weather conditions as will be shown later.

Table 57. Percentage losses from scab, as estimated by collaborators, 1924.

Percentage loss	States reporting
5	New York, Iowa, Michigan
3	North Carolina, Kansas, New Mexico
2	New Jersey, Pennsylvania, Arizona
1.5	Maryland
1	Illinois, North Dakota, Alabama, Texas
Trace	West Virginia, Wisconsin, South Dakota
No data	Other states

Weather relations

Considerable work has been done during the last few years on the influence of temperature, moisture, and other environmental factors on the development of scab. Jones, McKinney, and Fellows (3) concluded that 22° -25°C. may be accepted as about the optimum soil temperature for scab under the conditions of their experiments; and Sanford (9), of Minnesota, found that the most scab develops in soils that are comparatively dry. In moist or wet soils scab is inhibited.

It is difficult to explain the occurrence of and variations in the amount of scab on the basis of temperature and soil moisture relations. It is not unlikely that the scarcity of scab in some of our extreme southern states is influenced by one or both of these factors. Concerning the relation of soil moisture to scab development in 1924, the collaborator from New Jersey reports less scab this year on account of a wet season, and the collaborators in Kansas report more scab than usual, particularly in Shawnee County, on account of dry weather. On the other hand, collaborators from New York and Indiana report more scab than usual and attribute it to wet weather during the early stages of tuber formation. These reports are as follows:

New Jersey: Scab counts made on ten plots for 1923 showed 46% of the crop unsalable. On these same plots this year, only 5% of the crop was unsalable. This difference is probably due to the fact that the season of 1923 was dry while the past season was very wet. (W. H. Martin)

Kansas: The most outstanding feature in regard to this report is the increase in the amount of scab. I was in several fields this season where you could not find a potato without a deep scab pit. Such fields were not uncommon in Shawnee County at the western end of our main potato growing section. This epidemic of scab is correlated with precipitation. The months of March, April, and May were far below normal in the whole valley. June had normal or above normal precipitation throughout the valley except Shawnee County, which remained 2.84 inches below. In Shawnee County the scab epidemic was most severe. (R. P. White, Nov. 12)

New York - Long Island: Scab was unusually severe in many fields. This apparently was associated with wet weather during the early stages of tuber formation. (Clayton, Oct. 30)

Indiana: Scab serious. Wet June favored it. (Gardner)

Wisconsin: Freedom from scab seems to be associated with the lower temperature and more moisture, rather than any greater amount of seed treatment. (Vaughan)

Varietal susceptibility:

New York: The following results were obtained from the potato inspections:

No. of fields	Variety	Acres	% scab
40	Irish Cobbler	190	6.08
166	Green Mountain	733	12.5
33	Russet Rural	156	1.8
47	Smooth Rural	287	5.3

(Chupp)

New Jersey: In a variety test the number of clean tubers in each variety was as follows:

Variety	Percent clean tubers
Irish Cobbler	40.8
Green Mountain	28.4

Variety	Percent clean tubers
American Giant	60.0
Burbank	37.0
No. 9	56.0
Rural Russet	69.0

Pennsylvania: Green Mountain most susceptible, Cobbler very susceptible, White Rurals moderately resistant, Russet Rurals quite resistant. (C. R. Orton)

In the valleys formerly constituting the "safety zone" about the area infested with potato wart, scab was much less prevalent than in 1922 and 1923. This seems largely due to the return to Russet Rurals as the principal late potato. Where Green Mountains were planted, scab was severe, in spite of temperature and moisture conditions, generally regarded as unfavorable to scab; thus the mean temperature (May to Sept.) was 57.6°F. in 1924, as against 61.7° in 1923, and 64.2° in 1922; the precipitation in 1924 (May to Sept.) was 30 inches, compared to 22.69 inches in 1923 and 22.77 in 1922. Every month during the 1924 season was cold and wet as compared to normal. In adjacent rows, from local seed, Green Mountain gave no clean tubers, 50% salable and 50% unsalable, and Russets gave 73% clean, 27% salable and no unsalable on account of scab. The Green Mountains in this instance yielded 151 bushels per acre; the Russets 87 bushels. The application of 300 to 600 pounds of inoculated sulfur increased the proportion of clean Green Mountains to 20%, and salable to 80%. (Freeman Weiss)

Michigan: Russet Rural reported markedly resistant. (Coons)

Kansas: Irish Cobbler very susceptible, Early Ohio less so. (White)

Idaho: Idaho Rural and other white and red potatoes much more susceptible than Netted Gem. (Hunderford)

Control:

Since so many of our plant diseases are not decreasing as fast as one would expect when the efforts at control are considered; it is satisfactory to learn that in Vermont and probably in Wisconsin, scab is on the decrease due to the more extensive use of seed and soil treatments. It is not unlikely that the same could be said of certain other states in which considerable extension work in seed and soil treatments has been done.

New York:- Long Island: Many farmers are using inoculated sulfur and securing good control. (Clayton, Oct. 30)

New Jersey: In a comparison of nitrate of soda and sulfate of ammonia 13.4% of tubers were clean on former as compared with 33% in latter. In a test where sulfur was broadcasted at the rate of 350 pounds per acre there was an increase of 40% in the number of clean tubers of the Irish Cobbler variety, 32% for Green Mountains and 34% for American Giants.

Disinfection of seed potatoes with cold corrosive sublimate gave good results. In Middlesex County the average yield increase on 8 farms was 17.6 bushels and the average increase in clean tubers 11.7%. In Monmouth County similar tests conducted on farms gave an average yeild increase of 10.2 bushels and an increase of 13% in the number of tubers free from scab. (Martin)

Kentucky: Very marked results from treating with mercuric bichloride; partial control apparently obtained by sulfuring seed at cutting time. (Valleau)

Wisconsin: More general treatment is giving cleaner seed stock. Results of treatment were less conspicuous than usual in the central section of the state. (Vaughan)

Iowa: Treatment reduced infection from 30 to 5%. (D. E. Porter)

North Dakota: Crop rotation not effective. Experiments to date conducted on heavy clay loam of Fargo do not indicate profitable application of sulfur to soil. (Weniger).

Idaho: Experiments with inoculated and uninoculated sulfur for the control of scab of potatoes showed in two cases that inoculated sulfur applied at the rate of 300 and 600 pounds per acre gave fairly good control. (Idaho Exp. Sta. Bul. 133: 13. 1924)

Literature:

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BLACKLEG CAUSED BY BACILLUS PHYTOPHTHORUS APPEL

According to collaborators' reports, blackleg was more important than usual in New York, New Jersey, Pennsylvania, Maryland, Ohio, Michigan, Wisconsin Minnesota, and Iowa. In New England, and the southern and western states, the disease was of about normal, or perhaps subnormal prevalence. In the South, from South Carolina to Arkansas and Texas, the disease appeared to be absent or at least very rare, in which respect the situation is the same as in other years.

Table 58. Estimated losses from and maximum percentage of blackleg observed, according to collaborators, 1924.

Average percentage reduction in yield	State	Maximum percentage observed	State
2	Michigan, Minnesota, North Dakota	50	Illinois
1	Maryland, West Virginia, North Carolina, Ohio, Iowa, South Dakota, Kansas	30	Minnesota, Kansas
0.5	Connecticut, Idaho	25	Maryland
0.2	New York	12	Iowa, Pennsylvania
Trace	New Hampshire, Vermont, Massachusetts, New Jersey, Indiana, Illinois, Wisconsin, Alabama, Washington	11	New Jersey
0	Georgia, Kentucky, Tennessee, Mississippi, Louisiana, Texas	10	Vermont, Wisconsin, South Dakota
No data	Other states	7	Michigan
		5	New York
		4.25	New Hampshire
		1	West Virginia

Some of the collaborators' statements concerning the distribution of the disease within the states are of interest. In New Hampshire it is not usually seen outside of the northermost county, Coos County. In New York it was widespread, probably occurring slightly in every county. In New Jersey it is chiefly in central and southern Jersey. In West Virginia the Ohio Valley section and Tucker and Randolph Counties are chiefly affected. In North Carolina the reports came from the Coastal Plains region. In Ohio the disease was general, and in Illinois it was especially prevalent in the southwestern section. In Wisconsin the disease was scattered throughout the potato belt, and it was abundant in the Red River Valley of Minnesota and North Dakota. In Iowa it was common throughout the state, and in Kansas it was most serious in the Kaw Valley, particularly in Jefferson and Shawnee Counties.

Collaborators in Connecticut, New Jersey, Maryland, and Ohio remarked that as usual the disease was most serious in seed shipped in from the outside, and that in some cases even certified seed showed considerable blackleg. In Connecticut and New Jersey some complaints were received concerning Maine seed, and in Maryland seed from Prince Edward Island showed heavy percentages of blackleg. On the other hand, in New York, where the disease was more prevalent than usual, the collaborators' report that this is the first season it has been noticed to any extent on plants grown from homegrown seed. In previous years most of the blackleg was in fields from Maine seed. Collaborators in Michigan and a few of the other states mention the fact that certain seed-stocks become contaminated and can be detected in various localities where grown. In Michigan also the disease is said to be spreading.

Literature:

Couey, Worth Graham. Dissemination of blackleg by cutting and planting machines, North Dakota. U. S. Dept. Agr. Office Coop. Ext. Work, Extension Pathologist (mimeogr.) 2: 142-143. Dec. 1924.

STEMROT AND SCURF CAUSED BY CORTICIUM VAGUM BERK. & CURT.

The Rhizoctonia disease occurred widely over the country as usual. However, reports indicate that it was not at all common in the southern portion of the country, that is, from Tennessee and southern Missouri south. It was said to be the most important parasitic disease of the year in the states of Michigan, Minnesota, North Dakota, Iowa, Missouri, and Kansas, and was second in importance to late blight in Wisconsin. A greater amount than usual was reported from Vermont, where it proved to be a limiting factor in seed certification. In Massachusetts it was said to be responsible for about one-fourth of the missing hills occurring in potato fields, and in New York, where it is always an important disease, it was about as prevalent as last year, causing an estimated reduction in yield of 5%. In Kentucky it is usually common in the spring crop, but this year it appeared to some extent in the second crop for the first time, and is associated by collaborators in that state with cool weather during the latter part of the season. In the Red River Valley of Minnesota and the Kaw Valley of Kansas, the disease was destructive, and the following reports concerning it in these sections are of interest.

> Minnesota: The disease is present in 100% of the fields in the Red River Valley, varying from a trace to practically 100% of the plants infected. Many young plants are completely girdled and killed, others are badly stunted. Undoubtedly this is the most destructive disease of potatoes this year. The estimated reduction in yield for the entire valley is about 5%. (Sect. Pl. Path., Aug. 1)

> Kansas: In the eastern part of the state where rainfall has been plentiful there is considerable damage from Rhizoctonia. Yield records there show treated seed yielding from 25 to 50 bushels more per acre than untreated seed. In the western counties in the Kaw Valley, dry weather affected the crop and Rhizoctonia was not as severe. Yield records show from 0 to 25 bushels more on treated plots. (Stokdyk)

Table 59. Estimated percentage losses from Rhizoctonia disease of potato as reported by collaborators, 1924.

Percentage loss	States reporting
10	Kansas
8	Michigan, Iowa
6	Arizona
5	New York, Kentucky
4	North Carolina, North Dakota
3	Minnesota, South Dakota, Pennsylvania, Maryland
2	Vermont, Utah, Idaho, Washington
1	New Jersey, Ohio, Louisiana
Trace	Connecticut, West Virginia, Georgia, Illinois, Alabama, Mississippi, Texas, New Hampshire, Florida
0 and no data	Other states

Collaborators in New York have furnished data giving the results of potato inspections with regard to Rhizoctonia. The figures show that an average of about 1.5% of the tubers inspected bore sclerotia.

Table 60. Percentage of potatoes with Rhizoctonia sclerotia as shown by inspections in New York, 1924.

Number of fields	Variety	Acres	Percentage of Rhizoctonia
40	Irish Cobbler	190	2.6
47	Smooth Rural	287	1.0
33	Russet Rural	174	0.5
166	Green Mountain	733	1.7

As indicated in the report from Kansas given above, the disease was undoubtedly influenced by weather conditions, particularly low temperatures. The states of Michigan, Wisconsin, Minnesota, Iowa, Missouri, and the Dakotas, in all of which Rhizoctonia was destructive, all experienced subnormal temperatures from May to September. A number of collaborators make mention of the probable influence of low temperatures in their annual reports.

The following statements concerning control have been furnished:

New York: In Genesee County, 10,000 bushels were treated by the hot corrosive sublimate method. (Chupp)

New Jersey: Good control followed seed treatment. Results of numbers of tests in central Jersey showed increase in yield following use of mercuric chloride. (Martin)

Michigan: Seed treatment not general. (Div. Botany)

Wisconsin: Corrosive sublimate treatment highly satisfactory, and is commended by all seed growers. (Vaughan)

Missouri: Sixty to seventy-five percent control by the use of hot formaldehyde. (E. M. Page)

North Dakota: Best results from combination of crop rotation, seed selection, and treatment. (Weniger)

Kansas: The hot formaldehyde treatment on the whole is looking better and has given better control of Rhizoctonia than a ninety-minute treatment with corrosive sublimate. There was a large acreage planted this year with seed treated with hot formaldehyde, and the indications are that this method will replace the corrosive sublimate. One community is, at present time, erecting a community grading shed and treating outfit, located on track. Our fall treatments are showing up well and we expect to have as large increases in yield from fall treated seed as from spring treated. (R. P. White)

An important piece of work on Rhizoctonia control and potato seed treatment in general is that of G. H. Cunningham (2) of Australia. He noted that solutions of corrosive sublimate of the strengths ordinarily used (1-2000) were absolutely ineffective in killing Rhizoctonia sclerotia and that solutions as strong as 1-500 failed to give complete control. However, when he added hydrochloric acid in as small amounts as 0.1%, complete killing was obtained, even at a strength of 1-3000; and with 0.25% H Cl, corrosive sublimate 1-4000 was effective.

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WILT CAUSED BY FUSARIUM OXYSPORUM SCHLECHT.

This disease was apparently relatively unimportant during 1924, except in Colorado, Utah, and some of the western states where it is oftentimes destructive. In the states of Pennsylvania (eastern and southeastern portions), Michigan, Iowa, and Kentucky also it was of some importance, but was secondary when compared with some of the other diseases of those states.

Table 61. Percentage reduction in yield due to Fusarium wilt of potato as estimated by collaborators, 1924.

Percentage loss	States reporting
4	Pennsylvania, Utah
2	Michigan, Iowa, Kentucky, Arizona
1.5	North Dakota, Idaho
1	New York, Alabama, Texas, South Dakota
0.5	Georgia, Mississippi, Ohio
Trace	New Jersey, West Virginia, Florida, Kansas, Minnesota
0	Wisconsin, Louisiana.
No data	Other states

It is not unlikely that the cool summer was influential in suppressing Fusarium wilt in some of the late potato states where it is destructive some years.

Recently Goss (1), of Nebraska, has reported that the Fusarium causing by far the most damage to potatoes in Nebraska is Fusarium eumartii Carpenter. Prior to the work of Goss, the damage from this fungus in Nebraska was attributed to F. oxysporum. It is not unlikely that some of the Fusarium troubles of other states may be due to F. eumartii. Investigation should be made to obtain more light on this subject.

Literature cited:

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WILT AND STEM-END ROT CAUSED BY FUSARIUM EUMARTII CARPENTER

This was reported only from New York, Pennsylvania, and Nebraska in 1924. In the last named state it made its first appearance July 7 on plants grown from infected seed. According to Goss, the wilting symptoms were very pronounced this year as a result of dry weather, and in general the disease was more prevalent than last year, percentages varying from a trace to 20%.

In Pennsylvania, according to C. R. Orton, the disease is increasing annually and probably caused an estimated loss for the state of about 3%. The loss was chiefly in storage but in some cases such severe field infection occurred that many tubers were left on the ground. The Rural group appeared most susceptible.

Literature:

See reference under F. oxysporum above.

BACTERIAL WILT CAUSED BY BACTERIUM SOLANACEARUM EFS.

Maryland, South Carolina, and Florida are the only states reporting this disease in 1924. In Maryland it was noted causing a trace of loss in the southeastern part of the state. In South Carolina it was common and quite important, being first noticed April 21 in the Charleston section. From Florida, L. O. Gratz reports it as one of the more important potato diseases in the Hastings district. The loss in 1924 was estimated at from 1 to 2%. One field was observed where at least 60% of the plants were diseased in four acres at one end of the field.

WART CAUSED BY SYNCHYTRIUM ENDOBIOTICUM (SCHILB.) PERC.

The only new occurrence of wart reported to the Survey during 1924 was one new infested garden found one mile south of Frostburg, Maryland. This is already within the territory known to be infested with the wart organism. The immune variety Irish Cobbler is being used in all infested gardens in Maryland.

From Pennsylvania, C. R. Orton, reported that the disease was of no economic importance except from the quarantine standpoint. The distribution was the same as last year, the disease occurring only on occasional plants where seed mixtures took place.

Literature:

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——— The group reaction of potato varieties to wart disease. Potato News Bul. 1 (5): 18-19. March 1924.

——— and C. R. Orton. Further results in the inheritance of immunity to potato wart. (Abstract). Phytopath. 14: 59. Jan. 1924.

——— Deux ans d'essais de culture de quelques variétés francaises de Pomme de terre en terrain contaminé par le Synchytrium endobioticum a Freeland (Pennsylvania). (Two years' trial of cultivating some Frech varieties of Potato in soil infected with Synchytrium endobioticum at Freeland (Pennsylvania).) -- Rev. Path. Vég. et Ent. Agri. 11: 93-98. 1924.

MOSAIC (CAUSE UNDETERMINED)

A considerable number of states mention the fact that mosaic was especially evident this year, not necessarily on account of an increase in the amount of the disease, however, but rather because of cooler temperatures which made the symptoms more pronounced. From North Dakota this was reported to be the first year that the symptoms have not been masked. It is satisfactory to note that in Vermont, New York, Louisiana, and apparently some other states the amount of mosaic seems to be decreasing, due to the use of better or certified seed. Table 62 gives the estimated percentages of loss for 1924.

Table 62. Estimated reduction in yield of potatoes due to mosaic as reported by collaborators, 1924.

Percentage loss	States reporting
15	Arkansas
10	New Hampshire, Kentucky, Tennessee, Mississippi, Louisiana, Utah, Idaho, Washington
5	Vermont, Maryland, North Carolina, Georgia, Florida, Alabama
4	New York
3	New Jersey, Ohio, South Dakota
2	Pennsylvania, Michigan, Minnesota, Iowa, Kansas, New Mexico
1	West Virginia, North Dakota
0.5	Delaware
Trace	Connecticut, South Carolina, Illinois, Wisconsin, Texas, Arizona

In New York 354 fields of 1587 acres showed an average of 1.71% mosaic before roguing and 1% after roguing. In New Jersey, in a comparison of certified and non-certified seed, the former showed 7.5% mosaic as compared with 92% for the latter; the yields were 271.4 and 199.1 bushels per acre respectively. In Kentucky only about 3% of the plants in fields from certified seed seemed to be affected. McClintock in Tennessee reported that certified seed of Bliss Triumph from Wisconsin and Nebraska were remarkably free from mosaic and gave good yields. In the Hastings section of Florida mosaic on Spaulding Rose No. 4 was of a mild form, but the percentage of infected plants averaged at least 15, the maximum and minimum limits being 50 and 1%. The few fields of Bliss Triumph planted in the Hastings section were all badly diseased, the percentage ranging from 10 to 100.

The following percentages of infection were observed in the New York state seed plot at Ithaca, N. Y.:

Table 63. Percentages of Mosaic observed on different varieties in seed test plots, Ithaca, New York.

Variety	Number of strains	Percentage mosaic
Bliss Triumph	4	16.5
Burbank	1	10.0
Early Harvest	1	9.0
Early Rose	1	7.0
Spaulding Rose No. 4	7	2.3
Irish Cobbler	24	1.1
Green Mountain	84	2.4
Smooth Rural	55	0.1
Russet Rural	24	0.04

As usual, Bliss Triumph is reported as the most susceptible variety from many states, however, in Maryland, the McCormick is said to be most susceptible.

Concerning varieties, R. E. Vaughan of Wisconsin reported that mosaic was coincident with Triumph, scattered on Green Mountain, and not observed on Irish Cobbler or Rural New Yorker.

Literature:

1. Ducomet, V. Sur la visibilite des symptomes de la mosaique de la pomme de terre. Rept. Intern. Conf. Phytopath. & Econ. Entom. Holland, 1923: 39-42. 1923.
2. Folsom, D., and E. S. Shultz. The importance and natural spread of potato degeneration diseases. Maine Agr. Exp. Sta. Bul. 316: 1-28. 1924.
3. Hungerford, Chas. W. and J. M. Raeder. Mosaic and leaf roll of potatoes in Idaho. (Abstract) Phytopath. 14: 123. 1924.
4. Johnson, James. A virus from potato transmissible to tobacco. (Abstract) Phytopath. 15: 46-47. Jan. 1925.
5. Murphy, P. A., and Robert McKay. Investigations on the leaf-roll and mosaic disease of the potato. Jour. Dept. Agr. & Techn. Instr. Ireland 23: 344-364. Feb. 1924.
6. Smith, K. M. On a curious effect of mosaic disease upon the cells of the potato leaf. Ann. Bot. 38: 385-388. April 1924.
7. Tompkins, C. M. Effect of intermittent temperatures on potato mosaic. (Abstract) Phytopath. 15: 46. Jan. 1925.

LEAFROLL (CAUSE UNDETERMINED)

The following table not only gives the estimated losses from leafroll in various states, but also lists the states from which the disease was reported to the Survey in 1924.

Table 64. Estimated percentage reduction in yield of potatoes due to leafroll as reported by collaborators, 1924.

Percentage loss	States reporting
7	Pennsylvania
5	New Hampshire, Vermont, Connecticut, Ohio, Michigan, Kentucky
2	Maryland, Tennessee, New Mexico, Utah, Idaho, Washington.
1.5	New Jersey
1	North Carolina, Georgia, South Dakota
Trace	Delaware, West Virginia, South Carolina, Florida, Illinois, Wisconsin, Minnesota, Iowa, North Dakota, Nebraska, Kansas, Louisiana
No data	Other states

As in the case of mosaic, some decrease in the amount of leafroll in commercial plantings seems to be evident. The best growers are taking precautions to get good seed. In the field inspections for certified seed in New York in 1924, 1587 acres were inspected, and an average of 2.39% leafroll was found before roguing and 0.6% after roguing. In a comparative test of certified and non-certified seed in New Jersey, the former showed 3% leafroll as compared with 50% in the latter. Thirty lots of certified seed were employed in this test. In Pennsylvania the loss from leafroll is gradually being reduced by the use of local certified seed and Michigan seed which rarely shows more than 2% leafroll.

Leafroll is the chief cause of degeneration of Rural seed stocks in Indiana, according to M. W. Gardner, and is therefore the main reason for the use of certified seed in that state. The Netted Gem in Idaho is more commonly infected than other varieties, according to Hungerford. The following table, giving percentages of leafroll in various varieties in New York, has been furnished by collaborator Charles Chupp.

Table 65. Percentages of leafroll in New York state seed plots, Ithaca, New York.

Variety	Number of strains	Percentage leafroll
Spaulding Rose No. 4	7	1.7
Irish Cobbler	24	2.2
Green Mountain	84	1.3
Smooth Rural	55	2.9
Russet Rural	24	2.8
Bliss Triumph	4	15.3

Literature:

1. Brehmer, W. von. Der einfluss der kalidungung auf die blattrollkrankheit der kartoffel. Ernahr. Pflanz. 20: 12. Jan. 15, 1924.

2. Gardner, M. W., and J. B. Kendrick. Potato leaf roll in Indiana. Indiana Agr. Exp. Sta. Bul. 284: 1-23. July 1924.

3. Gram, Ernst. Potato leaf-roll influenced by the origin of the tubers. Rep. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 38-39. 1923.

4. Himmelbauer, Wolfgang. Die blattrollkrankheit der kartoffel. Wiener Landw. Zeitg. 74: 43-44. 1924.

5. Murphy, P. A., and R. McKay. Investigations on the leaf-roll and mosaic diseases of the potato. Jour. Dept. Agr. & Techn. Instr. Ireland 23: 344-364. 1924.

6. Whitehead, T. Transmission of leaf-roll of potatoes in N. Wales during 1921. Rept. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 147-149. 1923.

7. ——————— Potato leaf-roll and degeneration in yield. Ann. Appl. Biol. 9: 31-41. 1924.

SPINDLE TUBER (CAUSE UNDETERMINED)

This comparatively new and infectious disease was reported this year not only from Maine, Vermont, New York, New Jersey, Ohio, and Nebraska, from which states it was reported in 1923, but what seems to be the same thing was noticed in Florida, Michigan, Wisconsin, and Washington. There was only one authentic record from Michigan, and this was in the progeny from a stock showing spindle tuber in 1923. In Wisconsin it was found on Green Mountain and Triumph.

Concerning the disease in New York, Chupp reports it as occurring in every county in the state, especially important on Irish Cobbler, and probably reducing the yield of potatoes in the state 0.5%. He gives the following figures showing the incidence of spindle tuber in the varietal seed test plot at Ithaca.

Table 66. Percentages of spindle tuber in New York state seed plots, Ithaca, New York.

Variety	Number of strains	Percentage spindle tuber
Early Record	1	4.0
Early Rose	1	23.0
Spaulding Rose No. 4	7	3.0
Irish Cobbler	24	2.8
Green Mountain	84	0.04
Smooth Rural	55	0.05
Russet Rural	24	0.0

In New Jersey, W. H. Martin reports it as present to some extent in almost every field examined, especially in the central and southern parts of the state. In some cases 3% of the plants were affected, and a maximum of 10% was found in one field. A loss of 1.5% is estimated for New Jersey. In Nebraska spindle tuber is more common than mosaic or leafroll, according to R. W. Goss.

OTHER DEGENERATION DISEASES

Witches' broom (undet.) - The states of Idaho and Washington are the only ones reporting witches' broom in 1924. In Idaho it is very important in some fields, being found most commonly in the northern part of the state, but present also in the south. In Washington the disease was observed on Bliss Triumph and Irish Cobbler but was considered of minor importance when compared with mosaic.

Giant hill (undet.) - Reported as occurring in about 95% of the fields in Pennsylvania and causing a reduction in yield estimated at 1 to 2%. It occurred also in Vermont according to A. H. Gilbert (3).

Literature on degeneration diseases:

1. Folsom, Donald. Advance in the study of the virus diseases of Irish potatoes in 1923. Proc. Potato Assoc. Amer. 10: 39-42. 1924.

2. ________________ and E. S. Schultz. The importance and natural spread of potato degeneration diseases. Maine Agr. Exp. Sta. Bul. 316: 1-28. Jan. 1924.

3. Gilbert, A. H. Spindle-tuber and giant hill. Potato News Bul. 1: 291-292. Oct. 1924.

4. Goss, R. W. Effect of environment on potato degeneration diseases. Nebraska Agr. Exp. Sta. Res. Bul. 26: 4-40. 1924.

5. Hungerford, C. W., and B. F. Dana. Witches' broom of potatoes in the Northwest. Phytopath. 14: 372-383. Aug. 1924.

6. Quanjer, H. M. General remarks on potato diseases of the curl type. Rept. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 23-28. 1923.

YELLOW DWARF (CAUSE UNDETERMINED)

Yellow dwarf is continuing to spread in New York. It was reported from twenty-four counties in the state and was said to be more prevalent in Steuben County than ever before. As high as 15% affected plants was seen in various fields and a loss of from one-half to one percent is estimated for the state.

TIPBURN AND HOPPERBURN

The following estimates of losses supplied by collaborators indicate less loss from these troubles in 1924 than during some of the other years. Illinois is the only state reporting more damage than usual. From some of the Great Lakes states reports were received that weather conditions were unfavorable for the development of these diseases.

New Jersey collaborators report good control from thorough spraying with Bordeaux mixture.

Table 67. Percentage losses from tipburn and hopperburn of potato as estimated by collaborators, 1924.

Percentage loss	States reporting
15	Minnesota
12	West Virginia
10	Tennessee, New Mexico
5	New York, Ohio, South Dakota
3	Pennsylvania, New Jersey, North Carolina, Texas, Arkansas
2	Georgia, Iowa
1.5	Maryland
1	Illinois
0.5	Connecticut, Delaware, Kansas, Mississippi
Trace	Michigan, Wisconsin, North Dakota, Idaho, Washington
No data	Other states

OTHER NON-PARASITIC DISEASES

Black heart was reported from New York, Wisconsin, and Washington. In New York a loss of 1% was estimated. (Literature: Coons, G. H. The use of black heart potatoes for seed. Michigan Agr. Exp. Sta. Quart. Bul. 6: 182-184. May 1924)

Calico was said to be unimportant in Idaho.

Internal brown spot - reported from Connecticut and Washington.

Literature:

Anon. Internal brown fleck of potatoes. Jour. Dept. Agr. South Africa 8: 266. March 1924.

Paine, S. G. "Internal rust spot" disease of the potato tuber. (Synonyms: Sprain, net necrosis, eisenfleckigkeit, kringerigheid, buntwerden and maladie des taches en couronne). Rept. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 74-78. 1923.
Pseudomonas solaniolens n. sp. considered by author as cause of disease.

Streak was reported from New York as rare and found mostly in fields grown from Maine seed.

Sulfur injury caused by too heavy application of sulfur - reported from Suffolk County, New York.

References:

Coons, G. H. The use of black heart potatoes for seed. Quart. Bul. Michigan Agr. Exp. Sta. 6: 182-184. 1924.

Heim, R. La filosité des pommes de terre. Jardinage 12: 172-173. Feb. 1925.

OTHER PARASITIC DISEASES

Bacterium sp., softrot - C. W. Edgerton of Louisiana reports considerable loss from a soft, mushy rot of the tuber caused by bacteria. It is estimated that 2 to 5% of the crop was lost on account of this rot.

Cercospora concors (Casp.) Sacc., leaf mold - Reported for the first time from Iowa.

Colletotrichum atramentarium (Berk. & Br.) Taub., anthracnose - Found attacking plants in the greenhouse in New York.

Fusarium radicicola Woll., jelly-end rot - Idaho collaborators report some trouble from this fungus attacking both the vines and tubers in certain localities. For the state as a whole, however, it was unimportant.

Heterodera radicicola (Greef) Muell., rootknot - Collaborators in Delaware, North Carolina, Texas, New Mexico, and Washington reported nematode injury in 1924. It was only local in occurrence in the first two states; in Texas it was prevalent in light sandy soils; in New Mexico it was very prevalent in the light soils of the Mesilla Valley where it was probably causing a loss of 2% of the crop, according to R. F. Crawford. Collaborators in Washington report much more than in 1923.

Pythium debaryanum Hesse, leak - Reported from Idaho and Washington. It is always important in the midseason crop in Idaho, when not handled properly.

Sclerotium rolfsii Sacc., stemrot - All of the Gulf Coast States from Florida to Texas, and also Georgia reported this disease in 1924. In most of these states it caused only occasional loss, but in Louisiana, where it was more troublesome than usual, the loss was considerable, averaging about 2% for the state, according to Edgerton. It occurred mostly in southern Louisiana and was favored by the climatic conditions of the season.

Spondylocladium atrovirens Harz., silver scurf - Although doubtless widespread, it was only reported from New York, Idaho, and Washington.

Spongospora subterranea (Wallr.) Johnson, powdery scab - One report of this disease was received from Connecticut. It occurred on seed potatoes imported from outside the state.

Literature on other parasitic diseases of potato:

1. Cavadas, D. Sur la biologie de Vermicularia varians Duc. Rept. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 181-183. 1923.

2. Dickson, B. T. Saltation in the organism causing "black rot" disease of potato in Canada. Proc. & Trans. Roy. Soc. Canada III, 17 (Sect. V): 123-128. May 1923.
   Undetermined but belongs in the "Colletotrichum-Vermicularia-Velutella" group.

3. Maruda Rajan, D. A new remedy for the potato ring disease. Jour. Madras Agr. Stud. Union 12: 281-284. July 1924.
   Dry heat.

4. Millard, W. A., and Sydney Burr. The causative organism of skin spot of potatoes. Bul. Misc. Inform. 1923: 273-287. Aug. 17, 1923.

The pathogenicity of Oospora pustulans is proved by inoculation with pure cultures. There is no relation between skin spot and powdery scab (Spongospora subterranea). The previous work of Owen is confirmed.

5. ________________ The supposed relation of potato skin spot to corky scab. Rept. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 78-79. 1923.

Literature on potato diseases in general:

Anon. Potato diseases. Ohio Agr. Exp. Sta. Bul. 374: 1-30. 1924.

Arnaudi, C. Le malattie della patate in Italia. (Potato diseases in Italy.) Atti Ist. Bot. Univ. di Pavia, 3rd Ser. 1: 71-75. 1924.

Coons, G. H., and J. E. Kotila. Michigan potato diseases. Michigan Agr. Exp. Sta. Special Bul. 125: 55 pp. 1923.

Ducomet, V. and E. Foex. Les principales maladies de la pomme de terre 2nd Ed. Paris 1924.

Goss, R. W. Potato diseases. IN Ann. Rept. Nebraska Potato Improvem. Assoc. Ann. Rept. Nebraska State Bd. Agr. 1924: 469-493. 1924.

Tilford, P. E. Diseases of the potato which may be detected in the seed tubers. Month. Bul. Ohio Agr. Exp. Sta. 9: 5-6, 85-87. 1924.

Vaughan, R. E., and J. W. Brann. Control potato diseases. Wisconsin Univ. Agr. Ext. Serv. Circ. 52: 1-24. May 1924.

Werner, H. O. The present and future of seed potato certification. IN Ann. Rept. Nebraska Potato Improvement Assoc. Ann. Rept. Nebraska State Bd. Agr. 1924: 502-511. 1924.

TOMATO

LEAFSPOT CAUSED BY SEPTORIA LYCOPERSICI SPEG.

Leafspot was reported from practically all states east of the 100th meridian and also from New Mexico. For the most part it occurred more or less generally in these states but in certain of them it was much worse in some sections than in others. The following are some of the more localized areas where the infection was severe, - southern New Jersey, southern Delaware, eastern Tennessee, central Indiana, northern Illinois, and southeastern Iowa. According to McClintock the disease does not appear in western Tennessee in time to injure the crop seriously but in the eastern part of the state it was especially bad.

The disease was most important in central eastern United States, or in the area from New Jersey and South Carolina westward to Iowa and Kansas. In the Gulf Coast States with the possible exception of Texas it was of very little importance and for the most part in the western states it was absent.

Table 68. Estimated percentage loss from leafspot, 1924.

Percent reduction in yield	States reporting
35	Delaware
15	Maryland, Virginia, South Carolina, Missouri, Kentucky
10	New Jersey, Mississippi, Wisconsin, Iowa, Tennessee
8	Georgia, Indiana
5	West Virginia, Kansas
4	Alabama, Texas, New Mexico
2	North Carolina
1	Vermont, Illinois, Minnesota
Trace	Massachusetts, Rhode Island, New York, North Dakota, South Dakota, Florida, Mississippi, Arkansas, Idaho

The following states reported that the leafspot was more prevalent than usual: Delaware, Kentucky, Indiana, Illinois, Wisconsin, Iowa, Nebraska, and New Mexico. In the case of Indiana, M. W. Gardner reported that cool weather in the central part of the state retarded ripening and gave Septoria time to destroy the foliage while the fruit was still green. In southern Indiana, however, a good yield was obtained, despite the disease, due to higher temperatures.

Table 69. Dates of earliest appearance, 1924.

Date	Location	Date	Location
June 1	Pavo, Ga.	July 14	Columbus, Miss. and Rock Island, Ill.
June	Beaufort, S. C.		
June 9	Gloucester, N. J.	Aug. 1	State College, N. Mex.
June 16	Tifton Co., Ind.	Aug. 10	Rochester, Wis.
June 20	Manhattan, Kans.	Aug. 15	Ft. Collins, Colo.
July	Jackson, Tenn.		

Practically no data are given on varietal susceptibility or on control, however, during the year spraying and dusting experiments have been reported on by R. F. Poole (1).

Literature:

1. Poole, R. F. Tomato spraying and dusting experiments at Riverton. Ann. Rept. New Jersey Agr. Exp. Sta. 43: 561-565. 1921-22. (1924)

2. Pritchard, Fred J., and W. S. Porte. The relation of temperature and humidity to tomato leafspot (Septoria lycopersici Speg.). Phytopath. 14: 156-169. 1924.

3. ———————————————— The control of tomato leaf spot. U. S. Dept. Agr. Bul. 1288: 1-18. Dec. 1924.

EARLY BLIGHT CAUSED BY ALTERNARIA SOLANI (ELL. & MART.) JONES & GROUT

Under this heading are reported three distinct typesof injury, all of which have been attributed to Alternaria solani. However, judging from the differences in symptoms of these troubles, and in the pathogenicity, and in some cases morphology of the fungus, it will probably be found, after careful investigation, that there is more than one organism involved.

Early blight (leafspot and fruit rot)

This disease, which is generally considered as the true early blight, was reported from the states in the eastern part of the country, from New Hampshire to South Carolina and westward to North Dakota and Kansas. Most of the states reported it as not very destructive although in New York 3% reduction in yield occurred and considerable losses to many growers were noted in Wayne County. In Pennsylvania it was severe in Erie County. In West Virginia also, the disease was considered important as a blight of leaves and caused perhaps 5% reduction in yield for the crop as a whole. At the Arlington Farm in Virginia there was much more than usual. One-half percent loss was reported for Delaware and 2%, 4% and 1/2% loss for South Carolina, Illinois, and North Dakota, respectively. In Louisiana, where the growing season was very dry for that state, Edgerton reported that for the first time in years tomato plants lived through the whole summer without being killed by early blight.

Nail-head spot

This fruit spot is decidedly southern in its range and was reported especially from Florida, but also from Alabama and Mississippi. From Florida, G. F. Weber reported:

> "Nail-head (Macrosporium solani Ell. & Mart.) was the most serious and destructive disease of tomatoes in Florida during the past season. It was not as bad as the previous year, however,

> The lower East Coast sections were hit hard, harvesting only quarter of a crop. The sections around Bradentown also suffered considerably. The disease was state wide and severe wherever found."

Alabama reports 1% reduction in yield and Mississippi 2%.

Collar rot

Collar rot is a disease of young tomato plants and also of older plants after they have been set out in the field, infected, however, probably originally in the plant bed. Rosenbaum (3) attributed this disease to Macrosporium solani Ell. & Mart., and Pritchard & Porte (2) determined that not only could that fungus produce it but also Verticillium lycopersici and to some extent Rhizoctonia solani. The condition, therefore, as it was reported in 1924 is probably due to the presence of more than one organism. In Delaware, J. F. Adams reported a reduction in yield of 15% for the state, there being much more than during the average year. It was more prevalent in old than in new plant beds. One nursery in Sussex County showed a reduction in yield of 50%. In Maryland it was the worst it has been since 1919 according to Temple and Jehle, and concerning it Jehle writes,

> "Early blight was found to be severely injuring the tomato plants in Dorchester County. Diseased plants were found both in the beds and in the fields. Cankers on the stem and doing the greatest damage, some of them completely girdling the plants and others weakening them so that they are easily broken off by the wind. In some fields as many as 50% of the plants are affected. The disease is not as prevalent in fields which were set out from sprayed beds." (June 27)

According to Temple the diseased plants often recover under favorable conditions, if the soil is ridged up around the stem so that new roots can be produced above the girdle.

Collar rot was also reported as serious in plant beds in Indiana this year by M. W. Gardner and he also mentions having found this as a serious trouble on plant farms in Arkansas and Texas early in June. Collaborators from Arkansas substantiate this report as follows: "Quite common in southwest part of the state on young plants grown for shipping and causing considerable injury." (Dept. Pl. Path.)

Literature:

1. Massee, Ivy. On the presence of hibernating mycelium of Macrosporium solani in tomato seed. Bul. Misc. Inform. Kew 1914: 145-146.

2. Pritchard, F. J. and W. S. Porte. Collar rot of tomato. Jour. Agr. Res. 21: 179-184. May 2, 1921.

3. Rosenbaum, J. Stem disease of tomato caused by Macrosporium solani E. & M., (Abstract) Phytopath. 10: 59. 1920.

FUSARIUM WILT CAUSED BY FUSARIUM LYCOPERSICI SACC.

This important tomato disease was reported to the Survey from a majority of the states south of a line from New Jersey to California, and also from Connecticut, New York, Wisconsin, and North Dakota. As usual, it was most important in the southern states, the loss decreasing from south to north. In Ohio, Indiana, and Illinois it was most prevalent in the southern portions. In Tennessee it caused most damage in the western section although it was present in the central and eastern parts of the state. In Arkansas it was particularly severe in the southern part and in the canning area of the northwestern section, while in Kansas the southeastern quarter was most affected.

Fusarium wilt of tomato is a disease that has been increasing rapidly in range during the past few years. More states are reporting trouble from it than formerly. For instance, in 1924 New York reported it important in some of the fields in the western part of the state and on Long Island, and in Chautauqua County of that state it was estimated that 10% of the plants in a 45 acre field were killed. It is only within the past few years that the disease has been reported from New York. From Florida the report was received that it was more plentiful and more widely scattered than in 1923. Some fields that had shown the disease during the previous season were a total loss in 1924. Miles wrote that the disease was becoming general in Alabama, and Shapovalov reported that in Utah:

> "The contamination of Utah soil should be regarded as very serious and requires immediate measures to prevent further spread as well as intensification of infection in fields already contaminated."

The spread of the disease from state to state and from locality to locality has probably been facilitated greatly by the shipment of contaminated soil or infected seedling plants. In Utah a casual survey of fields set with plants grown at home, in California, and in Georgia, did not establish definitely that the sources of these plants had any influence on the amount of disease, however, a more thorough examination might have given other results.

Table 70. Estimated percentage loss from Fusarium wilt, 1924.

Percent reduction in yield	States reporting
20	Arkansas, Tennessee
15	Louisiana
10	Kansas, Alabama, Mississippi
8	Ohio
6	Georgia
5	Maryland, North Carolina
4	Kentucky
3	Texas, Utah
2	Virginia
1	New York, Indiana, Wisconsin

The maximum percentage of infection in any one field as reported by collaborators may be of interest: New York 10%; Georgia 75%; Alabama 75%; Mississippi 100%; Louisiana 100%; and Utah 87%.

Table 71. Dates of earliest appearance of Fusarium wilt, 1924.

Date	Location
June 1	Richmond County, Ga.
June 13	Hutchinson, Kans.
June 20	A. & M. College, Miss.
July 3	Gloucester County, N. J.
July 12	Clemson College, S. C.
July 14	Harrison County, Ind.
July 17	North Haven, Conn.
July 22	Platteville, Wis.
August	Chautauqua County, N. Y.

Statements concerning varietal susceptibility are as follows:

Tennessee: Wilt resistant varieties such as Professor Essary's Tennessee Beauty produce profitable crops even on infested soils. (McClintock)

North Carolina: Marvel and Norton varieties proved satisfactory in controlling this disease in a dozen or more tests conducted this year. (Fant)

Georgia: Ponderosa more susceptible than Globe or Greater Baltimore. (Boyd)

Alabama: Wilt resistant varieties satisfactory. (Miles)

Mississippi: Resistant varieties gave good results on badly infested soil. (Neal & Wallace)

Louisiana: More general use of resistant varieties is decreasing the loss. (Edgerton)

Arkansas: Resistant tomatoes hold up well in all parts of the state. (Dept. Pl. Path.)

Indiana: Marvel resistant in greenhouses. (Gardner)

Kansas: Norduke, Marvana, Marglobe, Norton, Marvel, and Louisiana red and pink varieties as well as some of our own hybrids and selections showing up well to resistance. (White)

Utah: Norton highly resistant to at least one strain of *Fusarium lycopersici*. This variety is of good canning quality which, if it can be combined with a sufficient degree of earliness will make it a possible substitute for local susceptible varieties. (Richards)

California: Norton becoming more popular wherever Stone is grown. It is being used in cases when rotation is not practicable or possible. (Shapovalov)

Adequate rotation of crops is important in the control of tomato wilt. This statement is borne out by the following reports received in 1924.

Kentucky: The reason for reduction in amount of wilt in canning sections is due to the fact that infested lands have been abandoned. (Valleau)

Texas: Very prevalent on old land where no rotation is practiced. Where tomatoes are grown on new land or land previously devoted to Bermuda pasture, wilt is of little importance. (Taubenhaus)

California: Fields that showed a very high percentage of infection last year are not planted to tomatoes this year. This season only one field was observed where a slight to medium stage of the disease was present on nearly all of the plants in the field. This field was in tomatoes two years ago. Out of ten fields surveyed by the writer in Santa Cruz County none showed a single plant suffering from wilt. Slight to moderate amount of infection may be observed in every tomato growing locality from San Jose and Stockton south including the early sections of Imperial and Coachella Valleys. (Shapovalov)

Recent literature:

Elliott, J. A. Tomato wilt and its control in Arkansas. Arkansas Agr. Exp. Sta. Bul. 194: 1-11. Sept. 1924.

Lesley, J. W. Fusarium wilt of tomato and its control by means of resistant varieties. California Agr. Exp. Sta. Circ. 274: 1-6. Jan. 1924.

Pritchard, F. J. Tomato wilt and varietal resitance. Seed World 17: 7-9. Feb. 1925.

Scott, Irl T. The influence of hydrogen-ion concentration on the growth of Fusarium lycopersici and on tomato wilt. Missouri Agr. Exp. Sta. Res. Bul. 64: 3-32. 1924.

Shapovalov, M., and J. W. Lesley. The behavior of certain varieties of tomato to the wilt disease (Fusarium) in California. (Abstract) Phytopath. 14: 121. 1924.

YELLOW BLIGHT, CAUSE UNDETERMINED

Yellow blight, the important disease of tomatoes in the West, was esecially severe in 1924 in Utah, Idaho, Washington, Oregon, California, and probably other western states. It was reported also for the first time from ansas by Melchers and Stokdyk, who wrote that it was widely distributed in the western part of the state but was not doing much damage. The following reports from Utah, Idaho, Washington, and California give details concerning the disease in those states.

Utah: Final field observations in the Counties of Boxelder, Weber, Davis, Utah, and Salt Lake, together with estimates of canning company officials indicate that the loss from western yellow blight this year will range between 30 and 35% of the state crop. Fields were commonly observed during the growing season in which 30 and 40% of the plants were diseased. Occasionally fields exhibited a loss of as high as 75% of the plants. Relatively few fields were found where the number of plants diseased remained below 10%.

From the most reliable reports obtained it is evident that the disease this year is by far the most serious since the epidemic of 1905 and far exceeds the average annual distribution of the disease in the state. The destruction is undoubtedly intensified by the exceptional climatic conditions, characterized by low precipitation, low relative humidity and high wind velocity.

A close correlation was found to exist between the severity of the disease and the soil type. The more severe attacks occurred on light sandy or gravelly soil. (Richards)

Idaho: Western yellow tomato blight was especially severe in Idaho this year. Greater losses resulted from this disease than for any year since 1919. Many fields, in those sections of the state where tomatoes are grown for commercial canneries, were practically destroyed. The estimated total loss for the state has been placed at 25%. This estimate is very conservative.

The serious shortage of irrigation water in many sections of the state coupled with the extremely dry, hot weather which prevailed throughout the summer brought about conditions which were ideal for the development of the disease. High soil temperatures with low moisture content of the soil are very conducive to the development of this disease. Shading of the plants and supplying them with an abundance of irrigation water will aid materially in checking the disease under Idaho conditions.

The study of the relation of various cultural practices to the control of western yellow tomato blight and the tests of various varieties and selections of tomato for resistance to the disease have yielded some interesting results this year.

The following table gives the percentage of blighted plants in several promising selections at Lewiston this year in comparison with several strains of Dwarf Champion, a very resistant variety, which were secured from various seed companies. In all, 73 varieties and selections were tested. The range of percentages of all other tests is also given for comparison.

Table 72. Results of tests of various varieties and selections of tomatoes for western yellow tomato blight, Lewiston, Idaho, 1924.

Variety	Percentage infection
Dwarf Champion, Burpee	58
Dwarf Champion, Inland	58
Dwarf Champion, Dreer	58
Dwarf Champion, Thorburn	50
Dwarf Champion, Wedge	38
Dwarf Champion, Livingston	74
Selection 1	44
Selection 2	42
Selection 3	44
Selection 4	44
Selection 5	45
John Baer (Av. of 5 tests)	82
Limits of percentages of all other tests	58 - 100

The selections 1-5 listed above were originally selected in 1919 from the John Baer variety. As will be noted above, the resistance of these selections is twice as great as the commercial stock of John Baer. Many of the diseased plants among the various selections were only slightly blighted and the effect upon the yield was not serious. (Hungerford)

Washington: This disease was very severe in Washington during the past season. I believe that a 50% average would not be too high for the plants affected. I saw many patches that had as many as 75% of the plants dead or dying from this disease. There was a field near the college buildings which I kept under observation throughout the summer and there was an early infection of perhaps 50% in this field with a few plants showing the disease later in the season. (Dana)

California: The most severe outbreak of the season has been observed at Shafter, California. It has developed there to the extent of 99.5% to fully 100%. Further south, at Bakersfield it has been noted in amounts up to 50%. The next section, probably, is Riverside where damage reaches 40 to 50%. In the San Fernando Valley a similar high maximum of western blight has been observed, but only in exceptional cases; mostly the outbreak is mild. Very little of the disease has appeared so far in the Manteca section, usually not exceeding 1%, and in Santa Clara Valley. Only one instance has been noted in Santa

Cruz County where western blight developed to the extent of 10%, and it is usually less than 5% and a number of fields have less than 1%. The disease has shown also in small quantities in the Imperial and the Coachella Valleys toward the end of their growing season (latter part of April). It has been very exceptional in the coastal sections of San Diego, Orange, and Los Angeles Counties. (Shapovalov).

Literature:

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MOSAIC, CAUSE UNDETERMINED

Mosaic is another tomato disease that has been increasing during recent years, not only appearing in new states and new localities on both greenhouse and field crops, but also becoming more severe in some of the sections where it was first reported. During 1924 it was reported from 31 states scattered all over the country, whereas in 1918 it was reported from only 15 states; in 1919 from 17 states, and in 1920 from 12 states. Some of the following statements from collaborators will give an idea of the importance of the disease.

New York: Ten percent of the plants in a two acre field in Erie County were dying from mosaic. About 10% loss occurred in one field in Monroe County where infected seedlings were set out. (Chupp)

Pennsylvania: Throughout state, especially severe in Erie County. (Orton)

New Jersey: In many fields on both early and late varieties. In comparison with the past two years, it is equally as serious. (Poole)

Delaware: Very general in distribution, cutting yield. (Adams)

Kentucky: In southwest Kentucky mosaic was of slight severity but at Salt Lick, a new canning section, about 60% mosaic occurred. (Valleau & Gardner)

Florida: More generally distributed and caused more losses than ever before. The east coast sections suffered very little while the west coast regions and the central part of the state were heavy losers. Plant City seems to be hit the worst. There it was an exception to find a plant free from the disease for many miles. The crop was cut 60% by this disease alone in that locality. (Weber)

Louisiana: Severe as usual. Very important, occurring in nearly all of the tomato fields of the state. (Edgerton)

Arkansas: Very common and did considerable damage in the canning sections. (Dept. Pl. Path.)

Ohio: In the trucking section mosaic was the most serious disease. (Young)

Indiana: Serious in greenhouses but not as bad as usual in fields. (Gardner)

Wisconsin: Serious in greenhouses around Milwaukee. More prevalent than usual, at least 25% of the plants seen in southern part of the state showed mosaic. (Vaughan)

Minnesota: Extremely severe throughout the state. Very severe type of disease with bushy brittle plants accompanied by purplish discoloration. (Sect. Pl. Path.)

Iowa: Common over the state. (Porter)

Nebraska: Much more serious than usual and causing considerable loss. It could be correlated with insect infection during wet weather. (Goss)

New Mexico: More important than usual, causing mottling and dwarfing of plants in Mesilla Valley. (Crawford)

Utah: Found this year rather generally distributed in tomato growing districts. Only occasionally, however, were the more extreme forms of the disease encountered, although the general distribution and the high percentage of diseased plants indicates that the loss from this trouble will be considerable. One field was observed in which 54% of the plants showed mosaic. (Richards)

Idaho: Common and important. (Hungerford)

California: Generally distributed but in extremely varying amounts and manifestations. These variations have not yet been connected with any known factor. (Shapovalov)

Very little information has been received during 1924 concerning varietal susceptibility to mosaic. From Connecticut, G. P. Clinton reported that the occurrences noted in that state were on Earliana and Bonny Best, especially the latter; and from New Jersey, R. F. Poole reported the filiform leaf streak, and mottled leaf conditions of the disease were observed in many fields of Stone, Bonny Best, Greater Baltimore, and Acme.

Table 73. Estimated losses from tomato mosaic, 1924.

Percentage reduction in yield	States reporting
15	Louisiana
10	Ohio
6	New York
5	Minnesota
3	New Mexico
2	Iowa
1	Indiana, Illinois
0.5	Maryland
0.2	Utah
Trace	South Carolina, Michigan, Wisconsin

Table 74. Dates of first appearance of tomato mosaic, 1924.

Date	Location
April	Baton Rouge, La.
April 22	Hazlehurst, Miss.
June 9	Gloucester Co., N. J.
June 16	Clemson College, S. C.
June 24	Orange Co., Ind.
June 26	Erie Co., N. Y.
July 20	Madison, Wis.
July 23	Lee Co., Ill.
Aug. 1	State College, N. Mex.
Aug. 13	Wethersfield, Conn.
Aug. 20	Milford, Del.

A piece of work of great significance in the solution of the broad mosaic problem has recently been announced by Peter K. Olitsky (2 and 3) of the Rockefeller Institute for Medical Research. Olitsky has apparently succeeded in propagating and multiplying the causal agent on an artificial medium made up of an aqueous extract from healthy tomato plant tissue. He states that, "The conclusion seems justified that the incitant of mosaic disease of tobacco and tomatoes is a living microvic body which can be cultivated in an artificial medium."

Literature:

1. Poole, R. F. Tomato crop losses may be reduced. Streak and filiform diseases checked by destroying weeds and insects. New Jersey Agr. 6: 5, 8. Jan. 1924.
   He advocates eradication of annual and perennial weeds harboring mosaic and control of plant lice by use of nicotine.

2. Olitsky, P. K. Experiments on the cultivation of the active agent of mosaic disease of tomato and tobacco. Science 60: 593-594. Dec. 1924.

3. ————— Experiments on the cultivation of the active agent of mosaic disease in tobacco and tomato plants. Jour. Exp. Med. 41: 129-136. Jan. 1, 1925.

BACTERIAL WILT CAUSED BY BACTERIUM SOLANACEARUM EFS.

This disease in general was of minor importance in 1924 except in the Gulf Coast, and possibly certain other of the Southern and Southwestern, States. In Florida it was one of the important diseases, being widely distributed with the crop and according to Weber, killing plants in many fields but usually not affecting more than 10% of the plants. In Alabama it was locally severe, causing a loss estimated at 0.5% for the state. From Mississippi reports of slightly more injury than usual were received together with the statement that the disease was important in certain localities. In Louisiana it was of some importance and apparently occurred in greater amounts than usual, reducing the crop yield by 2% or 3%. From Arizona it was reported as prevalent in Navajo, Apache, and Cochise Counties and it was estimated that the crop would be reduced there by about 4%. From the other states reporting the disease, namely, Maryland, South Carolina, Georgia, Texas, and Arkansas, only a trace of injury was recorded.

BACTERIAL SPOT CAUSED BY BACTERIUM VESICATORIUM DOIDGE

Indiana and Michigan are the only states definitely reporting this disease in 1924, although a suspected case was observed in Illinois and it was also thought likely that the disease occurred near Clyde, Kansas, from which place it was originally collected in that state. In Indiana it was more prevalent than usual and during September was very serious in Marion and Hancock Counties. According to Gardner and Kendrick, canners have neglected seed treatment in these counties which accounts somewhat for the increased prevalence. The first observation in Indiana was July 10 in Grant County.

GRAND RAPIDS DISEASE, APLANOBACTER MICHIGANENSE EFS.

The Grand Rapids disease, first reported from Michigan in 1909, is now known definitely to have occurred in New York, Mississippi, Pennsylvania, New Jersey, Connecticut, Ohio, Indiana, and Iowa on tomatoes in the fields and in the greenhouses. Miss Mary K. Bryan of the Bureau of Plant Industry found the disease in 1924 associated with Fusarium wilt. Two fields near Cleveland, Ohio were severely affected with both diseases. Sometimes one plant would be infected with the two organisms. Because of certain similarities in the symptoms, and because of this association, pathologists should be careful to distinguish between the two diseases.

In 1924 collaborators reported the disease from Connecticut, where it was first observed July 26 at Wallingford, from Erie County, Pennsylvania, and from Ohio where it was noted both in the greenhouse and in the field causing moderate damage. Collaborators in Illinois suspect that it was present in tomato fields of that state although no certain diagnosis was made.

LEAFMOLD CAUSED BY CLADOSPORIUM FULVUM CKE.

The states of New York, Pennsylvania, New Jersey, Kentucky, Florida, Indiana, and Iowa, and Porto Rico report leafmold in 1924. In New York it was very important in greenhouses. It was never known to be any worse in the greenhouses in the vegetable section about Rochester. Collaborators in Pennsylvania, New Jersey, Indiana, and Iowa also indicate that it was most important in greenhouses. In Kentucky, however, it reduced the yield in many fields, causing losses of 25% in some cases.

M. W. Gardner of Indiana reported not only the infection of foliage, but also a black stem-end rot of fruit caused by this fungus.

BLOSSOM-END ROT, NON-PARASITIC

Blossom-end rot was widespread where soil moisture conditions favored its development. Judging from the reports received, it was for the most part no more severe than usual and was probably subnormal if anything, in prevalence. A greater and more uniform supply of moisture than usual favored it suppression in many parts of the country.

Table 75. Estimated losses from blossom-end rot, 1924.

Percentage reduction in yield	States reporting
6	Mississippi
5	Georgia, Texas
4	North Carolina, Iowa
2	New York, New Jersey, South Carolina, Alabama, Arkansas.
1	North Dakota, New Mexico, Arizona

The following remarks concerning varieties were given in collaborator's reports.

New Jersey: Slight loss in many fields of Earliana and Greater Baltimore varieties. (Poole)

Georgia: Florida Special most susceptible variety noted. (Boyd)

Mississippi: No varietal differences noted on ten varieties. (Neal & Wallace)

Missouri: Severe on Early Stone at Columbia. (Maneval)

North Dakota: No varietal difference noted. (Weniger)

OTHER DISEASES

Bacillus aroideae Town., bacterial soft rot - Has recently been reported by Wingard (6). It is capable of causing severe losses in Virginia. It attacks green fruit especially and is a wound parasite. The organism has been studied and reported on by A. B. Massey (3).

Colletotrichum phomoides (Sacc.) Chester, anthracnose - Reported from New York, New Jersey, Indiana, and Illinois causing rot of ripe fruit. In New Jersey it caused severe loss of canning tomatoes; in some fields all ripe tomatoes were affected, especially during the latter part of the picking season. First observed July 25 in Burlington County, New Jersey and Adams County, Illinois; September 5, Indianapolis, Indiana; September 10, Tompkins County, New York.

Corticium vagum Berk. & Curt., soilrot - Rotting of fruit in the fields from this organism was reported as general and of some consequence in Florida. A trace was reported from Texas and it was serious in one garden at least, in Indiana, on fruit touching the soil. Considerable loss is also mentioned as occurring in the Norfolk section of Virginia.

Fusarium sp., fruitrot - In one garden in Tompkins County, New York, about 5% of the fruit was rotted with a Fusarium, red in culture, and with 5 - 6 septate spores. (Chupp)

Heterodera radicicola (Greef) Muell., rootknot - Reported from the southern states and from Kansas, New Mexico, Arizona, and California. In New Jersey it was observed in several greenhouses, and in Kansas where it is often an important factor in greenhouses, it was reported as causing trouble in the field. The following estimates of losses were reported: Georgia 5%, Texas 0.5%, New Mexico 5%, and Arizona a trace. In California it occasionally destroyed more than 75% of the crop in certain local sandy areas according to Shapovalov.

Oospora lactis parasitica F. J. Pritchard & W. S. Porte, fruitrot - Mentioned as causing heavy loss in some fields in New Jersey, especially to canhouse tomatoes which were cracked and dead ripe. R. F. Poole (4) has recently reported on this.

Phoma destructiva Plow., blackspot - G. F. Weber makes the following statement for Florida: "Ripe rot (Phoma destructiva Plow.) was of considerable importance in the state during the past year. It was of first rank as a transit disease and caused considerable loss. It was well distributed." In North Carolina a crate of tomatoes shipped in from Florida in April was badly diseased. The rot was confined mostly to the stem-end of the fruit. L. E. Miles of Alabama reported less than last year and says that it was of negligible importance. One field in Mobile County, however, showed 40% fruitrot and it was observed in a few other fields in that section. The disease was also reported from three counties in Illinois.

Phyllosticta sp., leafspot - This leafspot was reported for the first time from Florida where it was collected at Quincy on June 20. It caused spots on the leaves very much resembling nail-head spots but more circular and larger. The disease appeared during the rainy season about the time the fruit began to ripen, and practically ruined the plants in a one-acre field within the period o two weeks.

Phytophthora sp., stem girdle - This disease, described by Reddick in 1920, was reported this year only from New York where it was observed in one infected greenhouse near Ithaca, April 17. The grower boughtdiseased plants.

Phytophthora infestans Mont. & D By., late blight - This disease occurred in abundance in Giles County, Virginia. Infection first appeared about August 1 according to Fromme and by August 15 the blight had become general enough to attract notice of the growers. The loss probably averaged 50% for the canning section of Giles County. It was noted also infecting tomatoes slightly on the college farm at State College, Pennsylvania, October 6.

Phytophthora terrestris Sherb., buckeye rot - In Florida, buckeye rot was general over the state during 1924 but caused less damage than in 1923 according to G. F. Weber. In Indiana one specimen was found on August 16 in the plot at Lafayette where it occurred last year. From Michigan a Phytophthora rot was reported from a greenhouse but the exact identity of the species has not been reported at yet.

Sclerotium rolfsii Sacc., stemrot - Reported from a number of southern states during 1924, and also from Porto Rico and the Philippine Islands. For the most part it was not of great importance but in South Carolina, where it was very much more prevalent than usual, it was of much importance. In Beaufort County, South Carolina alone it was estimated that 50% loss occurred on account of this disease and death of mature plants was common throughout the coastal region. J. A. B. Nolla of Porto Rico reported as high as 80% injury in certain instances.

Blossom drop, cause unknown, was a serious factor in the production of a good crop in several localities in Florida and was very prevalent in Texas according to G. F. Weber and J. J. Taubenhaus respectively.

A dying back of tomato plants in California was reported by Michael Shapovalov, August 10 as follows:

> "A peculiar trouble, not previously reported in the literature, showed this season in a number of widely separated localities. It manifests itself in the majority of typical cases as dying back of the branches down to about 7 to 12 inches from the apex. Black longitudinal streaks appear on the affected stems from the outside. This 'streaky' cortex, coupled with greater brittleness of the diseased portions, reminds one of the potato 'streak'. In the majority of typical cases brown patches in the pith can be observed. Last year this trouble was noted for the first time in Santa Clara County and in the Suisun-Fairfield region. This year a severe outbreak of it is to be found in some fields in Santa Cruz County and in Los Angeles County (Some at Baldwin Park, but especially south of Gardena where more than 50% of the plants are affected, some every branch being killed back), A few scattered specimens have been found this year in Alameda, Santa Clara and Stanislaus Counties. None so far near Bakersfield or near Riverside. Isolations from the discolored patches of the pith have so far yielded no organism. There is no definite evidence that the disease is of a virus nature."

A leafcurl of undetermined cause affected from 5% to 10% of the plants in certain localities in southeastern South Dakota. Diseased plants were dwarfed, deep green in color and the leaves were decidedly brittle. The leaf edges were curled up (spoon shaped) and the blades were thicker than normal. Plants affected set no fruit. (Petry)

Powdery mildew, cause undetermined. One report of this mildew was received from Porto Rico by Mel T. Cook.

Streak, cause undetermined. In 1922, Gardner and Kendrick (1) suggested that this disease might be a manifestation of mosaic. Vanderpool (4) now reports experiments in which he transmitted the disease successfully. Healthy tobacco plants inoculated by rubbing with striped tomato plants developed mosaic, and a healthy tomato plant rubbed with leaves of mosaic tobacco contracted stripe.

Although this disease has been reported from a number of the states in the northeastern quarter of the country and from Kansas and the Pacific Coast, the only states reporting it this year were New York, Pennsylvania, and Washington. In New York an estimated loss of 0.5% to the greenhouse crop was reported. No loss was mentioned as occurring in the field. In Pennsylvania it was only noted in the greenhouse at State College where it was affecting 5% of the plants of the spring crop.

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4. Vanderpool, T. C. The stripe or streak of tomatoes in Quebec. Ann. Rept. Quebec Soc. Prot. Plants 16: 116-123. 1925.

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SWEET POTATO

STEMROT CAUSED BY FUSARIUM BATATATIS WOLL. AND F. HYPEROXYSPORUM WOLL.

As usual this disease was reported from the majority of the sweet potato producing states. Negative reports, however, were received from Louisiana and Texas. It is gratifying to note that the losses from this disease are gradually being reduced in some states at least, through the use of certified plants and field inspection. This fact was particularly mentioned by collaborators from Tennessee and Mississippi in 1924.

The disease is important locally in many sweet potato states but the most serious damage apparently occurred in the southeastern Iowa section, where it was extremely serious according to D. R. Porter. The disease was present in approximately 90% of the fields in that state killing the young plants, stunting the older ones, and causing a loss estimated at 25%.

Table 75. Estimated percentage loss due to stemrot, 1924.

Percentage reduction in yield	State	Percentage reduction in yield	State
25	Iowa	4	Maryland
15	New Jersey	2	North Carolina, Alabama, Arkansas
10	Mississippi		
8	Delaware	1	Arizona
7	Kansas	0.5	Georgia
5	Virginia		

Table 76. Dates of first appearance, 1924.

Date	Location	Date	Location
June 9	Gloucester Co., N.J.	July 5	Jackson Co., Miss.
June 10	Pima County, Ariz.	July	Muscatine Co., Iowa.
June 24	Sussex Co., Del.		

The following facts concerning varietal susceptibility were reported.

New Jersey: The White Yam and Red Brazil were not attacked by the disease and give much promise of the coming important commercial varieties in this state. (Poole)

Tennessee: Found chiefly on Nancy Hall because this is the most common variety, but also observed on six other varieties. (McClintock)

Alabama: Triumph very resistant. (Miles)

Literature:

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BLACKROT CAUSED BY SPHAERONEMA FIMBRIATUM (ELL. & HALS.) SACC.

Judging from the reports received from the majority of sweet potato states, blackrot was not more prevalent than usual and in fact seemed to be subnormal in prevalence. In Mississippi and Tennessee the reduction in amount of blackrot was attributed to the quarantine and seed and plant inspection service, while in Alabama and Louisiana it was mentioned that the dry season suppressed the disease. In New Jersey heavy loss occurred in certain isolated areas, being especially serious where potatoes were injured by wire worms or soilrot. In Tennessee the disease was serious where untreated or uncertified seed was used, especially in the western part of the state. The chief injury there is to the plants and to the potatoes at harvest time. In South Carolina it was noted especially in plant beds: in Mississippi it was general but not very serious anywhere. In Texas it was said to be very prevalent and in Arkansas it was important.

The following table of losses gives a better idea of the relative importance in the different states.

Table 77. Estimated percentage loss in 1924.

Percentage reduction in yield	State	Percentage reduction in yield	State
9	Iowa	1	Maryland, Alabama, Louisiana, Arizona
8	Tennessee, Texas		
5	Arkansas	0.5	Delaware, South Carolina, Kansas
3	Virginia, North Carolina	0.2	New Jersey
2	Georgia, Mississippi		

Concerning varietal susceptibility O. C. Boyd wrote that in south Georgia the Jersey potato and Nancy Hall were more susceptible than Porto Rico, and from Iowa D. R. Porter also reported that the Nancy Hall was more susceptible than Porto Rico and stated further that seed treatment was giving very fine results.

In Kansas also excellent results have been obtained from seed treatment for the control of blackrot. In 1922 about 20 growers tried it with substantial increases in yield. In 1923 potatoes for over 500 acres were treated with excellent results; increases in yield being obtained even in the absence of blackrot and the losses from blackrot in storage being reduced. According to E. A. Stokdyk the average yield from treated plots was 277.1 bushels per acre while the average from untreated plots was 208.5 bushels per acre, or an increase due to treatment of 68.6 bushels. Stokdyk estimates that in 1924 about two-thirds of the commercial acreage was treated.

SOILROT CAUSED BY CYSTOSPORA BATATA (ELL. & HALS.) ELLIOTT

During the past year Manns (2) has continued investigations on the cause of soilrot (pox) and has come to the conclusion that it is probably not due to Cystospora batata but rather to an undetermined Actinomycete. He produced soilrot artificially in the greenhouse, using sterilized soil to which ground sweet potato tissue containing lesions was added. Further work is in progress. In 1924, New Jersey, Delaware, and Maryland all reported 0.5% loss: Texas reported 1% and Mississippi, Louisiana, and Kansas each reported a trace.

Literature:

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3. Poole, R. F. The pox disease of sweet potatoes. Results of recent experimental control methods. Disease also called soilrot or ground rot. New Jersey Agr. 6: 6-7. Feb. 1924.

4. ———— The relation of soil moisture to the pox disease of sweet potatoes. (Abstract) Phytopath. 15: 48. Jan. 1925.

SCURF CAUSED BY MONILOCHAETES INFUSCANS ELL. & HALS.

Scurf, impairing the appearance of the potatoes and causing shrinking in storage, was reported as generally distributed, but of slight importance, from fourteen of the sweet potato states. The Department of Plant Pathology of New Jersey reported that experimental results have shown that the disease advances rapidly in September and October and that where digging was delayed until late October, the potatoes were more severely affected than those dug earlier in the month.

STORAGE ROTS

Table 78. Losses from storage rots, including soft rot caused by Rhizopus, as reported by collaborators, 1924.

Percentage reduction in yield	State	Percentage reduction in yield	State
25	Tennessee, Texas, Arkansas	5	South Carolina, Georgia, Arizona
15	Maryland	3	Kansas
13	Iowa	2	Louisiana
10	Alabama, Mississippi	1	New Mexico
6	North Carolina		

OTHER DISEASES

Albugo ipomoeae-panduranae (Schw.) Sw., white rust - New Jersey, Delaware, Mississippi, Arkansas, and Porto Rico reported white rust.

Cercospora sp., leafblotch - Collected in 1923 at Gainesville, Florida.

Corticium vagum Berk. & Curt., stemrot - More of this was reported from Delaware than usual, it being very prevalent on sprouting beds.

Diaporthe batatatis (Sacc. & Syd.) Harter & Field, dryrot - Reported by O. C. Boyd from south Georgia as of considerable importance, mostly as a storage rot but causing a stemrot in fields and beds, and causing a reduction in yield estimated at 2% for the state.

Diplodia tubericola (Ell. & Ev.) Taub., Java blackrot - Reported by O. C. Boyd as of considerable importance in south Georgia. Traces occurred in Texas according to Taubenhaus.

Fusarium oxysporum Schl., surface rot - Neal and Wallace of Mississippi reported this disease as probably general in the state and causing some damage as a storage rot.

Ozonium omnivorum Shear, rootrot - According to J. J. Taubenhaus this rootrot was prevalent in Texas causing from 10 to 50% loss in the black lands and averaging perhaps 4% for the state as a whole.

Plenodomus destruens Harter, footrot - Traces were reported from Maryland, Tennessee, and Kansas.

Phyllosticta batatas (Thuem.) Cke., leafspot - Reported only from Porto Rico by Mel T. Cook.

Pythium sp., rootlet rot - Reported by Harter (5) from various states.

Sclerotium bataticola Taub., charcoal rot - Texas, a trace: and reported for the first time from Iowa where it was very slight according to D. R. Porter.

Sclerotium rolfsii Sacc., stemrot - Reported by O. C. Boyd as of some importance in south Georgia.

Septoria bataticola Taub., leafspot - There was a slight outbreak of this disease during July in New Jersey, according to the Department of Plant Pathology, but only slight damage was caused.

Mosaic - More of the disease called mosaic has been reported in 1924 than ever before from South Carolina. A trace was observed August 14 in Florida. It was seen in the vicinity of Gainesville and reported from Oxford, but it was not as prevalent as in 1923. In Alabama it was observed in Lee and Mobile Counties, and reported from Cullman County; the loss was negligible, however. From Mississippi it was reported from 30 counties whereas in 1923 it was only observed in one county. This increase might be due to inspectors overlooking the disease last year. In Arkansas it was prevalent practically all over the state according to the Department of Plant Pathology. Inspectors of the State Plant Board estimated losses of 0.2% in Phillips County and 0.1% in the state. These reports were based on fields inspected for certification so that the amounts were probably higher on the ordinary stock.

Mottle necrosis is a disease reported on by L. L. Harter (4) at the Washington meeting. Harter is inclined to think that it is due to a species of Pythium which is constantly associated with the disease. Mottle necrosis was also reported from New Jersey by R. F. Poole as severe in the Vineland section and worse than last year. It caused a soft decay of the roots before harvest.

General references:

1. Adams, J. F. The use of sulphur as a fungicide and fertilizer for sweet potatoes. Phytopath. 14: 411-423. Sept. 1924.

2. Artschwager, Ernst. On the anatomy of the sweet potato root, with notes on internal breakdown. Jour. Agr. Res. 27: 157-166. 1924.

3. Cook, Melville T. The life history of Nectria ipomoea. Mycologia 15: 233-235. 1923.

4. Harter, L. L. Mottle-necrosis of sweet potatoes. (Abstract) Phytopath. 15: 45. Jan. 1925.

5. ———————— Pythium rootlet rot of sweet potatoes. Jour. Agr. Res. 29: 53-55. July 1924 (issued Jan. 1925).

6. Poole, R. F. Studies of sweet potato diseases. Ann. Rept. New Jersey Agr. Exp. Sta. 43: 554-560. 1921-1922 (1924).

7. ———————— Disease control important to sweet potato industry. New Jersey Agr. 6: 16. June 1924.

8. ———————— Selecting sweet potato seed is big step toward success. Healthy roots cut down losses. New Jersey Agr. 6: 13. Oct. 1924.

9. ———————— Sweet potatoes threatened by another serious disease. Has been found prevalent for three years in succession. New Jersey Agr. 7: 12. Feb. 1925.

10. Speaker, C. Efficient production of sweet potatoes and measures for disease control. Bienn. Rept. Kansas State Hort. Soc. 37: 111-112. 1924.

11. Stokdyk, E. A. Controlling sweet potato diseases. Rept. Iowa State Hort. Soc. 58: 119-122. 1924.

BEAN

ANTHRACNOSE CAUSED BY COLLETOTRICHUM LINDEMUTHIANUM (SACC. & MAGN.) BR. & CAV.

Anthracnose was of most importance in the North Atlantic and Great Lakes States, and in the majority of these states also it was said to have been more prevalent than during 1923. In the South and West the disease was of slight importance or entirely absent. No reports were received from states west of Colorado and New Mexico.

Table 79. Estimated reduction in yield due to anthracnose, 1924.

Percentage reduction in yield	State	Percentage reduction in yield	State
5	West Virginia, New Jersey, Virginia, Vermont, Michigan, Alabama, Ohio, New Mexico	1	New Hampshire, Mississippi, Wisconsin, South Dakota
		0.5	Delaware
1.5	New York, Maryland	trace	Georgia, Tennessee, Louisiana, Illinois, Minnesota, Iowa, Kansas

In Virginia it was particularly important in the Bird-eye bean sections of Wythe, Carroll, and Floyd Counties in the western part of the state. In Michigan the losses were especially high on canning varieties of snap beans; as high as 100% loss occurring in some fields of canning beans. In New York also the losses were confined largely to snap beans since the dry bean varieties now grown are resistant for the most part.

Table 80. Dates of first appearance, 1924.

Date	Place	Date	Place
April 19	Copiah Co., Miss.	July 20	Green Co., Mo.
May 4	Mitchell Co., Ga.	July 21	Passaic Co., N. J.
May 20	Sussex Co., Del.	Aug.	Ramsey Co., Minn.
June	Knox Co., Tenn.	Aug. 15	Strafford Co., N. H.
July 7	Morgan Co., Ill.	Aug. 20	Rusk Co., Wis.
July 12	Illinois	Aug. 26	San Juan Co., N. Mex.
July 15	Center Co., Pa.		

Extensive plantings of varieties of Robust in Michigan have reduced losses considerably according to the Division of Botany at the Experiment Station. They also report that Red Kidneys were injured severely during 1924.

It is interesting to note that resistant varieties of dry beans have replaced the susceptible ones in New York and that as a result anthracnose is becoming of minor importance to that crop.

BACTERIAL BLIGHT CAUSED BY BACTERIUM PHASEOLI EFS.

The important dry bean states of New York and Michigan experienced more trouble with this disease than usual in 1924. In New York it was much worse than during the previous year, being very destructive in many fields and causing a reduction in yield estimated at about 10% for the state. In Michigan it caused serious losses in nearly all fields. Many fields in counties north of Lansing were killed out during August. Other states where the disease was more destructive than last year were Georgia, Florida, Mississippi, Arkansas, Ohio, Illinois, Minnesota, and Iowa.

Table 81. Estimated losses caused by bacterial blight, 1924.

Percentage reduction in yield	States reporting
10	New York
5	Michigan
4	Virginia, Georgia
3	Alabama, Arkansas
2	Iowa, New Mexico
1.5	Maryland
1	Vermont, South Carolina, Ohio, Mississippi, Texas, Illinois, Minnesota
0.5	Delaware, Arizona
Trace	New Hampshire, West Virginia, Louisiana, Wisconsin, Idaho

In Ontario County, New York it was mentioned that blight was especially bad on beans planted early in the season.

Burkholder (1) has recently published on varietal tests covering a period of three years. His results demonstrate that some varieties possess a certain degree of resistance, and that the more resistant varieties are generally rather late in maturing. Collaborators in New York mention much damage to all varieties except Michigan Robust in Genesee County. From Georgia, O. C. Boyd reported that Kentucky Wonder seemed particularly susceptible but that all varieties were affected. In Arkansas the disease was very common on both pole and certain bunch varieties, and Kentucky Wonder was mentioned as especially susceptible. From Indiana, M. W. Gardner reported, "In a field plot of 61 varieties four escaped infection. These were Bountiful, Dwarf Horticultural, White Marrow, and Challenge Dwarf Wax. Two beans of other species also escaped infection, namely, Scarlet runner (P. coccineus) and White Dutch Runner (P. coccineus albus)," Gardner (2) has recently reported the occurrence of bacterial blight on the trailing wild bean, Strophostyles helvola. This plant is rather widely distributed in the East and in some places is a common weed; naturally it should be considered as undesirable in the vicinity of cultivated beans. Gardner says the identity of the organism was proven by cross inoculations.

Literature cited:

1. Burkholder, Walter H. Varietal susceptibility among beans to the bacterial blight. Phytopath. 14: 1-7. 1924.

2. Gardner, M. W. A native weed host for bacterial blight of bean. Phytopath. 14: 341. July 1924.

RUST CAUSED BY UROMYCES APPENDICULATUS (PERS.) LK.

Rust was reported as occurring in a majority of the eastern states from New York to Kansas and southward. In no state was it of any great importance nor did any state report more than 1% loss. It seemed to be more prevalent than usual in the southern part of Ohio, Indiana, and Illinois. Since the severity of this disease is often limited by its occurrence late in the season, the dates of earliest appearance may sometimes be significant. In 1924 they were as follows: April 20, Thomas County, Georgia; August 4, Pickens County, South Carolina; September 22, Ontario County, New York; September 23, Columbia County, Pennsylvania; and Burlington County, New Jersey; and September 27, Tate County, Mississippi.

In Arkansas it was mentioned as occurring especially on the pinto bean: in Kansas Strophyostyles pauciflora was mentioned as a host, and in Indiana, Gardner reported that field tests with 61 varieties confirmed the results of Fromme and Wingard (1) as to varietal susceptibility.

Literature cited:

1. Fromme, F. D., and S. A. Wingard. Varietal susceptibility of beans to rust. Jour. Agr. Res. 21: 385-404. June 15, 1921.

MOSAIC

Mosaic probably ranked third in importance of the bean diseases in 1924. Unlike anthracnose and bacterial blight it was important in the western states and less important in the eastern states. In New York the disease is becoming of less importance on account of the fact that most dry beans now grown are resistant; however, some of the snap bean varieties remain susceptible.

Table 82. Estimated reduction in yield of beans due to mosaic, 1924.

Percentage reduction in yield	States reporting
5	Michigan, Minnesota, Iowa, Idaho
2.5	Pennsylvania, Utah
2	New York, Washington
1	Vermont, New Jersey, Alabama
Trace	Maryland, Virginia, Georgia, Tennessee, Louisiana, Wisconsin, South Dakota, Kansas, New Mexico

In a plot of 61 varieties at Lafayette, Indiana, Gardner reports that 18 escaped mosaic infection. It was noted on White Dutch Runner (Phaseoli coccineus albus), and on Wardwells' Kidney Wax, the variety which escaped mosaic in 1921, 1922, and 1923. In Michigan it was especially prevalent on varieties other than Robust, ordinary field beans showing nearly 100% infection in some cases.

OTHER DISEASES

Bacterium flaccumfaciens Hedges, bacterial wilt - Reported as occurring frequently in Michigan by G. H. Coons and R. Nelson.

Cercospora cruenta Sacc., leafblotch - Reported from Georgia, Texas, and Illinois. According to O. C. Boyd of Georgia, the disease was worse than last year and caused less damage to snap beans than to the pole lima beans. The Illinois report is the first to the Plant Disease Survey from that state.

Corticium vagum Berk. & Curt., stemrot - Georgia, Florida, Alabama, Mississippi, Texas, Idaho, and Washington report damage from Rhizoctonia stemrot in 1924. According to Weber it was the worst disease of beans in Florida, being well distributed over the state. In the trucking fields about Birmingham, Alabama, beans were very severely affected, 50% of the vines being attacked in many cases. From other states it was not reported as very serious.

Erysiphe polygoni DC. - Pennsylvania, New Jersey, Florida, Texas, and Arizona reported powdery mildew. This is the first report to the Plant Disease Survey of this disease from New Jersey. It was said to be very prevalent in the other three states and 1% loss was estimated for Texas and Arizona.

Fusarium spp., rootrot - Maryland, Florida, New Mexico, Idaho, and Washington report trouble from rootrot caused by an undetermined species of Fusarium. Some of this may be the same as the dry rootrot mentioned below. In Idaho much more was noted than usual and it was very important in bean fields in the southern part of the state, causing an estimated loss of 2% for the entire state. It was necessary to reseed many fields in southern Idaho on account of this disease, according to Hungerford.

Fusarium martii phaseoli Burk., dry rootrot - Reported from New York as occurring in about the same or less amounts than last year and reducing the yield for the state by about 5%. According to Chupp the disease was confined to the older dry bean sections of western New York.

<u>Heterodera radicicola</u> (Greef) Muell., rootknot.- Prevalent in the sandy soils of the South and was reported by the majority of collaborators in southern states. Three percent loss was estimated for southern Georgia by O. C. Boyd and 1% loss was estimated for Texas by Taubenhaus.

<u>Isariopsis griseola</u> Sacc., leafblotch - Reported from South Carolina and Florida; being fairly common in both states.

<u>Ozonium omnivorum</u> Shear, rootrot - Prevalent in the black lands of Texas causing 3% loss for the state, according to Taubenhaus.

<u>Phyllosticta phaseolina</u> Sacc., leafspot - Reported as causing slight damage in South Carolina.

<u>Sclerotinia sclerotiorum</u> (Lib.) Mass., stemrot - Pennsylvania, West Virginia, and Florida report damage from this Sclerotinia. In West Virginia it was found only at elevations of 3000 feet where it was killing some of the vines in home gardens. In Florida it was reported as prevalent in bean fields, especially on low ground and where the rows were close together with a luxuriant growth of foliage.

<u>Sclerotium rolfsii</u> Sacc., stemrot - South Carolina, Georgia, Alabama Mississippi, and Louisiana all reported damage to beans from <u>Sclerotium rolfsii</u> Sacc. In South Carolina it was of minor importance; in Georgia it reduced the stand in many gardens and fields causing perhaps a 2% loss in the state, particularly in the southern portion. In Alabama it was very prevalent in the trucking region about Birmingham and was second in importance only to Rhizoctonia stemrot. In Mississippi it was serious in some gardens, and in Louisiana it was about as prevalent as usual, causing some loss.

<u>Thielavia basicola</u> (Berk. & Br.) Zopf, black rootrot - Reported from New York.

<u>Chlorosis</u> caused by too much lime was reported from Texas by Taubenhaus.

<u>Tipburn</u> (non-par.) was reported in considerable quantities from Genesee County, New York. Cool wet weather followed by high temperatures was thought to be responsible.

<u>General references:</u>

1. Appel, Otto. Krankheiten der ackerbohne. Deut. Landw. Presse. 51: 62-63. Feb. 1924.

2. Burkholder, W. H. The effect of varying soil moistures on healthy bean plants and on those infected by a root parasite. Ecology 5: 179-187. April 1924.

3. Leonard, L. T. Effect of moisture on a seed-borne bean disease. Jour. Agr. Res. 28: 489-497. May 1924.

4. Nacion, C. C. Study of Rhizoctonia blight of beans. Philipp. Agr. 12: 315-321. Jan. 1924.

5. Welles, C. G. Studies on a leafspot of Phaseolus aureus new to the Philippine Islands. Phytopath. 14: 351-358. Aug. 1924.

<u>LIMA BEAN</u>

Downy mildew caused by <u>Phytophthora phaseoli</u> Thax. was reported only from eastern Long Island, New York; Bustleton, Pennsylvania; and from New Jersey. In the latter state there was somewhat more than during 1923 according to W. H. Martin, but in general it was unimportant. The late season was fairly dry and unfavorable for mildew development.

Bacterial spot caused by Bacterium viridifaciens Tisdale and Williams (reported by M. W. Gardner as due to B. vignae Gardner and Kendrick). More of this disease than usual occurred in Indiana, according to Gardner.

Bacterial blight caused by Bacterium phaseoli EFS. was reported on lima bean by M. W. Gardner in Indiana. It was not as destructive on this host, however, as on the common bean (Phaseolus vulgaris).

Pod blight caused by Diaporthe phaseolorum (Cke. & Ell.) Sacc. was reported as occurring frequently in Delaware and as unimportant in Pennsylvania. An estimate of 0.2% loss was made for Delaware by J. F. Adams.

Leafspot caused by Isariopsis griseola Sacc. Reported as unimportant in South Carolina but found in a number of places in the state.

Mosaic (undet.) was reported from Pennsylvania, Florida, Mississippi, and Delaware. In Florida typical mosaic symptoms were observed in a field near Plant City. Nearby plants of tomato, pepper, and ragweed were also affected. From Mississippi, Neal and Wallace also reported mosaic as affecting 100% of the plants in one planting in Oktibbeha County.

Rust probably caused by Uromyces appendiculatus (Pers.) Lk. was reported from Pennsylvania by R. S. Kirby and C. R. Orton.

Literature on lima bean diseases:

1. Anderson, H. W. Notes on the Nematospora disease of lima beans. (Abstract) Phytopath. 14: 31. 1924.

ONION

ONION SMUT CAUSED BY UROCYSTIS CEPULAE FROST

Smut undoubtedly occurred throughout its normal range in the northern and eastern portions of the country during 1924, but it was reported to the Survey only from Connecticut, New York, Kentucky, Ohio, Wisconsin, Minnesota, and Iowa.

The following are some of the collaborators' reports concerning prevalence and severity.

Connecticut: One report only. This field had not been in onions for about 15 years. The disease was not bad but the owner will not plant again next year as it would be much worse. (Clinton)

New York: Worse than in the past two years due to the cold, wet, backward spring which prolonged the seedling period. Many fields in Wayne County plowed up in June.

The shifting of the crop to newer muck sections, use of more seed per acre, formaldehyde, and growing of onion sets where smut infested land is still employed for onion raising, have all contributed to minimizing losses from smut. So I would place it at 10% of total crop even though it has been an extra bad smut year. (A. G. Newhall)

Ohio: Of slight importance; disease well controlled in onion growing sections. (H. C. Young)

Wisconsin: Serious in a few fields where formaldehyde was not used; 50 to 75% loss in these cases. (J. C. Walker)

Minnesota: Of normal prevalence. Observed on only one farm. (Sect. Pl. Path.)

Iowa: Severe in southeastern Iowa near Davenport; 5% loss in Pleasant Valley. (D. Porter)

The following statements were given concerning control.

New York: So far formaldehyde and dry sulphur have proved the best fungicides for smut control. (A. G. Newhall)

Recommendation of P. J. Anderson that less water be used proved as effective as the old way of treatment. (E.L.Felix)

Wisconsin: Formaldehyde used in most cases with the usual satisfactory results. Application mostly made with two horse, six row seeder, with two 30 gallon barrels attached. (R. E. Vaughan)

Minnesota: Formaldehyde soil treatment gave excellent results in some of the onion fields near St. Paul. (Sect. Pl. Path.)

Literature:

1. Anderson, P. J. Susceptibility of species of Allium to onion smut. (Abstract) Phytopath. 14: 26. 1924.

2. ———— Controlling onion smut with kalimat. Phytopath. 14: 569-574. Dec. 1924.

DOWNY MILDEW CAUSED BY PERONOSPORA SCHLEIDENI UNG.

Connecticut, New York, Georgia, Louisiana, and Ohio reported downy mildew in 1924. G. P. Clinton stated that this was the first year he has found the mildew in Connecticut although it was reported in earlier years by Thaxter. It was noted at Westport, Connecticut, July 18, but the damage was minor. In New York the disease was worse than it has been for at least nine years, according to A. G. Newhall, being unusually widespread and appearing early due to the cool July with plenty of rain. The Department of Plant Pathology estimated 10% reduction in yield for the state on account of downy mildew. Only two fields of onion seedlings were observed to be affected by O. C. Boyd in south Georgia, early in January, 1924. The mildew was very destructive in those two fields, however. In Louisiana it was present but not troublesome according to Edgerton, and in Ohio some fields in the onion district were badly affected. An estimate of 1% loss is made for Ohio by H. C. Young.

Variable results were obtained from dusting and spraying in New York, excessive rains preventing effective application of Bordeaux in Genesee County. In Ohio at least one grower applied dust in an attempt to control the mildew.

OTHER DISEASES

Aspergillus niger Van Tiegh., black mold - Reported from Illinois and Texas.

Botrytis sp., graymold - In Indiana this was very destructive to green onions, affecting the lower part of the sheaths of the outer leaves. It is not certain whether or not this is B. allii attacking the onion tops and so it is reported separately. It was first observed May 13 in Cass County. In Wisconsin, J. C. Walker also reported very serious damage to white sets; 30 to 50% of the bulbs in every field examined being affected. A. G. Newhall reported considerable destruction of the outer leaves by Botrytis in Wayne County New York; and Heald and Dana (1) state that in Washington small plants 2 to 4 inches high were attacked by the fungus.

Botrytis allii Munn, neckrot - Neckrot of harvested onions was reported from Pennsylvania, Indiana, Wisconsin, Iowa, Idaho, and Washington.

Colletotrichum circinans (Berk.) Vogl., smudge - Reported on white onion from Indiana, Illinois, Wisconsin, and Kansas. From Indiana it was reported in seven cars of white onions grown in the northern part of the state. In Wisconsin it was very common but of relatively minor importance, causing perhaps 1% loss for the state as a whole. In Kansas it was observed for the first time by members of the Department of Plant Pathology and their report is the first to be received by the Plant Disease Survey from that state.

Fusarium sp., Fusarium bulbrot - Complaints of decay of onion bulbs have been received from Connecticut, Indiana, Wisconsin, Iowa, Idaho, and Washington. The injury occurred mostly on the harvested crop during transit to market.

Fusarium malli Taub., pinkroot - Reported from various places in New York but was less serious than during the past two or three seasons, due to cool weather and frequent rains. It occurred in Louisiana in about the usual amounts and was of considerable importance according to Edgerton. In Texas it was prevalent, causing a loss estimated at 1 to 2%. In Ohio it was quite prevalent in practically all of the onion sections, causing what the growers know as blight. In some places, especially one 200-acre tract, there was about 5 to 8% actual loss, another 1500 acre tract showed from 6 to 8% loss. There were spots in the fields where onions were nearly all destroyed.

From northeastern Iowa reports were received indicating slight damage from a Fusarium rootrot, whether or not this is identical with pinkroot has not been ascertained.

Macrosporium parasiticum Thum., mold - Reported from New York (never very important); Louisiana (about the same, considerable damage to seed crop); Porto Rico (severe - Cook); Illinois (a mold attributed to Alternaria sp. reported very slight in Fulton County).

Sclerotinia sp., crownrot - Reported for the first time on onion in California (2). This is the first report to the Plant Disease Survey of a Sclerotinia on onion.

Brittle. A new onion disease, temporarily designated as brittle, and thought to be associated with Fusarium spp., was reported to the Survey for the first time by A. G. Newhall of New York, June 30. The leaves are much coiled and both leaves and root tips are brittle and the latter swollen although not discolored. A Fusarium has been isolated from diseased leaves. Entire fields or only portions of them may be affected. It is fairly widespread in Monroe County according to Newhall.

Dodder was observed on onions in Genesee and Orleans Counties, New York, by E. L. Felix.

Smudge, of unknown cause, was noted in South Carolina this year and is under investigation.

Literature on other onion diseases:

Cited

1. Heald, F. D. and B. F. Dana. Notes on plant diseases in Washington - 1. Botrytis diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924.

2. Smith, E. H. Some diseases new to California. (Abstract) Phytopath. 14: 125. Feb. 1924.

Not cited

Campanile, G. Su di una nuova malattia dell'aglio dovuta ad "Helminthosporium allii" nov. sp. Nuovi Ann. Agr. Min. Econ. Naz. Italy 4: 87-106. Jan. 1924.

Sideris, C. P. Species of Fusarium isolated from onion roots. Phytopath. 14: 211-216. May 1924.

Taubenhaus, J. J. and F. W. Mally. The culture and diseases of the onion. New York, E. P. Dutton. 1924.

Teodoro, N. G. A study of a Macrosporium disease of onion. Philipp. Agr. Rev. 16: 233-275. 1923.

Walker, J. C. White rot of Allium in Europe and America. Phytopath. 14: 315-322. July 1924.

―――――― Further studies on the relation of onion scale pigmentation to disease resistance. Jour. Agr. Res. 29: 507-514. Nov. 1924.

DISEASES OF CRUCIFERS

CABBAGE

YELLOWS CAUSED BY FUSARIUM CONGLUTINANS WOLL.

Yellows occurred in at least 20 states from Long Island, New York, westward to Iowa, Colorado, and Texas, and southward to Georgia. The following 10 states reported that the disease had not been observed nor reported during the year: Connecticut, North Carolina, South Carolina, Louisiana, Michigan, Minnesota, North Dakota, South Dakota, Idaho, and Washington. A number of collaborators mention geographic distribution within their states as follows: New York, Long Island; New Jersey, southern portion; Maryland, Baltimore County especially; Virginia, general in Floyd, Wythe, and Smyth Counties; West Virginia, general but only occasionally seen in gardens and commercial fields; Tennessee, reported from West Tennessee and from market gardens in middle Tennessee; Georgia, two specimens from northern section of state; Alabama, not much in southern part but up to 50% infection in fields about Birmingham; Mississippi, only two reports from northern Mississippi; Arkansas; Ohio, Indiana and Illinois, general; Wisconsin, in southeastern Wisconsin; Iowa and Kansas, general.

Loss of the disease than last year was reported from New Jersey, Delaware, Indiana, Wisconsin, Iowa, and Kansas, and a number of reports attribute this fact to low temperatures. The increasing use of resistant varieties is also responsible for a reduction in losses from yellows, and was mentioned especially in the case of Wisconsin, where the disease is confined principally to the southeastern portion and is of relatively minor importance for the state as a whole. On the other hand certain states such as Tennessee and Ohio reported more than usual and more than last year. In Tennessee yellows is said to be increasing in severity annually and is being introduced on plants from outside the state. Undoubtedly the causal Fusarium is continuing to spread into new cabbage sections through shipments of diseased cabbage seedlings and accompanying infested soil.

Yellows continues to be the most serious cabbage disease. A glance at the accompanying table will show that the average state losses are high in some cases, and in certain local areas crops have practically been destroyed.

Table 83. Estimated loss from cabbage yellows, 1924.

Average percent loss	Maximum percentage infection in any one field	State
20	100	Iowa
12	90	Ohio
10	95	Kansas
8	30	Maryland
8	-	Texas
3	-	Alabama
2	75	New Jersey
0.5	-	New York, Delaware
Trace	25	West Virginia
Trace	-	Georgia, Mississippi, Wisconsin

Cabbage - Yellows

On July 15, C. E. Temple of Maryland reported that in one field of late cabbage just beginning to head, 30% of the plants were dead or dying from yellows. In the early crop in trucking sections a loss of nearly 20% was estimated for Maryland. In Nassau County, New York, practically all fields developed more or less of the disease and in some of them the loss was high. In Kansas, according to Stokdyk, yellows appeared late but ruined about 10% of the fields that had been in cabbage for two years and on badly infested soil as high as 78% of yellows developed.

Table 84. Dates of first appearance as reported by collaborators,1924.

Date	Location	Date	Location
May 6	Webster Co., Miss.	July 2	Floyd Co., Va.
June	Gibson Co., Tenn.	July 3	Gloucester Co., N. J.
June 1	Fulton & Cobb Cos.,Ga.	July 17	Mifflin Co., Pa.
June 4	Reno Co., Kans.	July 20	Racine Co., Wis.
July 1	Muscatine Co., Iowa		

Collaborators made the following statements concerning varietal susceptibility.

Maryland: Thirteen resistant varieties were tested in Baltimore County with good results. (Temple & Jehle)

Kentucky: Wisconsin-Allseason satisfactory on infested land. (Valleau)

Indiana: "Indiana Yellows Resistant" giving good satisfaction. This is a selection from Louisville Drum Head. (Gregory)

Wisconsin: Resistant strains grown almost exclusively on sick soil. (Vaughan)

Iowa: Iacop most resistant; Copenhagen very susceptible. (D.R.Porter)

Kansas: Selections of Copenhagen by Melhus and selections by Stokdyk showing good promise. (Stokdyk)

Literature:

Anon. Relation of environment to health and disease in plants. Wis. Agr. Exp. Sta. Bul. 362: 47-49. 1924.

Gregory, C. T. Disease resistant cabbage. Hoosier Hort. 6: 24-26. Feb. 1924.

Tisdale, Wm. B. Influence of soil temperature and soil moisture upon the Fusarium disease of cabbage seedlings. Jour. Agr. Res. 24: 56-86. 1923.

BLACKROT CAUSED BY BACTERIUM CAMPESTRE (PAM.) EFS.

The majority of states east of the 100th meridian reported blackrot in 1924. No reports were received from west of that line. In general the disease was relatively unimportant; however, in certain local and commercial areas the damage was high. For instance, in the Norfolk Section of Virginia blackrot was said to be very severe; in certain early cabbage sections of Alabama the loss was serious; and it was destructive in the commercial sections of northern Illinois, being present in about 70% of the fields of the state and causing a loss estimated at 3.5%. The following are the percentage estimates of losses as submitted by collaborators to the Plant Disease Survey: 5%, Alabama; 3.5%, Illinois; 2% Texas; 1% West Virginia, Minnesota, and Iowa.

The disease can be prevented by seed treatment with corrosive sublimate (1-1000 for 30 minutes) and because of the ease of this control measure it should be adopted more generally in those commercial sections where heavy losses from blackrot occur. It is satisfactory to learn that in New York a very large proportion of the cabbage seed is now treated before planting and that as a result blackrot is being almost wholly eradicated. The hot water treatment, which is equally effective against blackrot and more so against blackleg, has been used with good results in a number of states. The latter treatment, however, must be used with caution because of the possibility of injuring the seed. During the year directions for control have been published(1). The symptoms of blackrot and blackleg are given, together with methods and reasons for seed treatment.

Literature:

1. Walker, J. C. Cabbage-seed treatment. U. S. Dept. Agr. Circ. 311: 4. April 1924.

BLACKLEG CAUSED BY PHOMA LINGAM (TODE) DESMAZ.

Of the 30 states sending in report cards for this disease, 14 report its nonoccurrence and the remaining 16 report it as occurring for the most part in comparatively slight amounts. In some section, however, it was serious in seed beds and when plants from these beds were set out in the field, heavy losses often resulted. In the important Long Island section it was serious on the late, but not on the early, cabbage crop.

Concerning control the following statements have been received during the year:

New York: A few men treat with hot water (122°F. for 30 minutes). Two years ago, the hot-water method was recommended to farmers, but there was so much injury that the recommendation had to be withdrawn. It has been found that new seed may be heated to 122°F. for 30 minutes with very little loss of germination. Seed that is a year old will often germinate only about 70%, and still older seed may not grow at all after such drastic treatment. (Chupp, Extension Pathologist 2: 109. Oct. 1924)

As a result of the above experiencethe Department of Plant Pathology in New York is recommending the securing of disease free seed grown in fields where the disease is absent and treating this with corrosive sublimate to prevent blackrot, or if the hot water treatment is used, care is taken that the seed is not badly damaged by the treatment.

Indiana: This year seed of the Indiana Yellows Resistant cabbage was treated by the hot water method developed by Dr. J. C. Walker. This seed was thoroughly infested with blackleg and blackrot. It was used in all parts of the state, and in no case was there evidence of injury by the treatment. The disease was completely controlled. (Gregory, Extension Pathologist 2: 109. Oct. 1924)

Wisconsin: The demonstrations on cabbage seed treatment at Racine this year were very satisfactory. Twenty-five percent of blackleg had been common with several farmers during recent years; but this season, following seed treatment by the hot-water method devised by Dr. J. C. Walker, we could find only a trace of blackleg. The seed treatment, however, is not infallible in the control of blackleg, because one farmer planted treated seed in a location where infection from blackleg was carried over in the soil from a previously diseased crop. Plants taken from this seed bed will not yield more than one-tenth of a crop. (Vaughan, Extension Pathologist 2: 110. Oct. 1924)

Iowa: Seed treatment gave good control at Nichols. (Porter)

Literature:

1. Chupp, C. Cabbage-seed treatment in New York. U. S. Dept. Agr. Extension Pathologist (mimeogr.) 2: 109-110. Oct. 1924.

2. Gregory, C. T. Hot water treatment of cabbage seed used in Indiana. U. S. Dept. Agr. Extension Pathologist (mimeogr.) 2: 109. Oct. 1924.

3. Nissley, C. H. Use hot water to control black let disease. New Jersey Agr. 6: 2, 7. March 1924.

4. Vaughan, R. E. Hot water used in Wisconsin. U. S. Dept. Agr. Extension Pathologist (mimeogr.) 2: 110. Oct. 1924.

5. Walker, J. C. Cabbage seed treatment. U. S. Dept. Agr. Circ. 311: 1-4. 1924.

CLUBROOT CAUSED BY PLASMODIOPHORA BRASSICAE WOR.

The states reporting clubroot in 1924 were confined to New England, the Middle Atlantic States and those north of the Ohio and Missouri Rivers.

It was reported from the Puget Sound region of Washington. Fourteen states, mostly in the South, reported that it was not observed or did not occur.

Taken as a whole clubroot was not especially important, but in certain local areas it is often severe, thus in New York, although the disease was statewide, in 1924, it was most common in the Cortland Valley, and in Indiana and Illinois it seemed to be confined to two counties in the northern part of each state.

The outstanding report on clubroot is that from Wisconsin, where it was more widespread than it has been for years, causing complete loss in some instances. Collaborators in New York report more clubroot than the average and in Ontario County it was said to be more common than ever before. It is not unlikely that cool weather favored its development. For the most part the estimates of state losses were less than 1%.

In a recent bulletin, Gloyer and Glasgow (1) have reported apparent control of clubroot in a single experiment where a mercuric chloride solution 1-1280 was applied to plants in the seed bed.

Literature:

Cited

1. Gloyer, W. O., and H. Glasgow. Cabbage seedbed diseases and Delphinium root rots: their relation to certain methods of cabbage maggot control. New York (Geneva) Agr. Exp. Sta. Bul. 513: 1-38. Feb. 1924.

Not cited

Bremer, Hans. Zur frage der bodendesinfektion gegen kohlhernie. Nachrichtenbl. Deut. Pflanzenschutzd. 4: 16-17. March 1924.

———————— Wissenswertes aus der arbeit in- und ausländischer versuchsstationen und institute. 5. Die wirkung von bekämpfungsmitteln auf den erreger der kohlhernie. Deut. Obstb. Zeit. 70: 184-185. April 1924.

———————— Untersuchungen über Biologie und Bekämpfung des Erregers der Kohlhernie, Plasmodiophora brassicae Woronin. 2 Mitteilung. Kohlhernie und Bodenazidität. (Investigations on the biology and control of the causal organism of clubroot of cabbage, Plasmodiophora brassicae Woronin. Second Note. Clubroot and soil acidity.)--Land. Jahrb., 59: 673-685. May 1924.

———————— Die wirkung des kalks bei der kohlhernie bekämpfung. Nachrichtenbl. Deut. Pflanzenschutzd. 4: 73-74. 1924.

Darnell-Smith, G. P. To control clubroot of cabbage. Agr. Gaz, New South Wales 7: 488. 1924.

Mentions control in seed bed by sprinkling soil with corrosive sublimate (2 oz. to 2 gallons water).

Kindshover, T. Erfolgreiche bekämpfungsveruuche gegen die kropfkrankheit oder hernie der kohlgewachse. Mitt. Deut. Landw. Ges. 39: 259-260. April 1924.

Lindfors, T. Bidrag till kannedomen om klumprotsjukans bekampande. (Contribution of knowledge of the control of club-root) Kungl. Landtbr. Akad. Handl. och Tidskr., 63: 267-287. 1924.

Monteith, J. Relation of soil temperature and soil moisture to infection by Plasmodiophora brassicae. Jour. Agr. Res. 28: 549-562. May 1924.

See also references under stemrot.

STEMROT CAUSED BY CORTICIUM VAGUM BERK. & CURT.

In a recent publication Gloyer and Glasgow (3) have distinguished three types of injury due to Corticium vagum (Rhizoctonia), namely, damping-off, wiry tap root, and stem canker. All of these types of injury may be found in the seed bed on young cabbage plants. New York is the only state reporting this injury in 1924. From Ontario County, J. E. Connelly reported the damping-off and wiry root types of injury as causing considerable damage where corrosive sublimate was not applied to the seed beds.

Gloyer and Glasgow have also reported (1, 2, 3) that the mercuric chloride treatment that is used for the control of cabbage maggot, whereby two or three applications of the 1-1200 corrosive sublimate are made to the seedlings in the plant beds, has given successful control of these various types of Rhizoctonia injury.

Literature:

1. Glasgow, H., and W. O. Gloyer. The mercuric chloride treatment for cabbage maggot control in its relation to the development of seed bed diseases. Jour. Econ. Ent. 17: 95-101. 1924.

2. ———————————— Mercuric chloride as a preventive of certain damping-off fungi. Science n. s. 59: 338. 1924.

3. Gloyer, W. O., and Hugh Glasgow. Cabbage seedbed diseases and Delphinium root rots: Their relation to certain methods of cabbage maggot control. New York (Geneva) Agr. Exp. Sta. Bul. 513: 1-38. Feb. 1924.

OTHER DISEASES

Alternaria brassicae Berk. & Curt., black leafspot - New York, Pennsylvania, Delaware, Maryland, South Carolina, Georgia, Florida, Ohio, Indiana, and Wisconsin. In New York there was very much less than usual and Chupp suggests that this fact may be due to a temperature or possibly sunlight relation. The other states report it as prevalent in about normal amounts but in none of them was the damage very great or important.

Bacillus carotovorus Jones, softrot - This disease, serious to the harvested crop, and known on the market as slimy softrot, continued to cause heavy losses in transit. The Survey has the following records of the occurrence of this disease in the field.

Vermont: Infection and damage as usual, 1% to 2%. (Gilbert)

New York: Mostly on Long Island, trace in field cabbage, 3 to 5% in seed beds. (Chupp)

Pennsylvania: General throughout state, important on late cabbage. (Orton)

Maryland: About average, 0.5% damage. (Temple & Jehle)

Alabama: Caused slight loss in fields in southern part of state. (Miles)

Wisconsin: Less than last year or average year. Of minor importance. (Vaughan)

Iowa: Common in early fields in southeastern Iowa. (Porter)

Kansas: Few heads, scattered in fields. (Stokdyk)

Bacterium maculicolum McC., peppery leafspot - Two reports of this disease on cabbage were received by collaborator G. P. Clinton from Tolland and New Haven Counties, Connecticut. This disease has been reported to the Survey in past years from Connecticut, New York, Alabama, Louisiana, and Mississippi.

Cercospora bloxami Berk. & Br., leafspot - This leafspot was reported from Illinois for the first time in 1924. Tehon reported its occurrence in three counties in that state. It was practically of no economic importance, causing only slight spotting of a few leaves. The disease has been recorded previously from Florida and Texas.

Heterodera radicicola (Greef) Muell., rootknot - Alabama, Texas.

Internal blackspot, non-par., - Washington.

Peronospora parasitica (Pers.) D By., - downy mildew - Reported as follows:

New York: More than last year. Important in a few fields. Observed on almost mature heads as well as on young plants. (Chupp)

Maryland: Worse than usual in the Coastal Plain Section. Favored by wet weather. (Temple & Jehle)

Florida: Reported from many parts of the state, especially attacking young plants in the seed bed. (Weber)

Mississippi: Damage slight. (Miles)

Louisiana: Less. Some loss to young plants. (Edgerton)

Texas: Very prevalent on early cabbage, 10% loss. (Taubenhaus)

<u>Indiana:</u> More than usual but not serious; favored by wet season. (Gardner)

<u>Washington:</u> Reported from Puget Sound Region. (Heald)

<u>Pythium debaryanum</u> Hesse - Damping off of young plants attributed to this fungus, but with which Rhizoctonia might well have been associated, was reported from Pennsylvania, Iowa, South Dakota, and Washington.

<u>Sclerotinia sclerotiorum</u> (Lib.) Mass., watery softrot - This disease not only caused heavy losses in transit and storage as usual but was reported as follows from the field:

<u>New York:</u> Important on late harvested kraut cabbage; caused perhaps 1% reduction in yield. (Chupp)

<u>South Carolina:</u> Scattered plants found in all fields in Charleston section. No great damage at any one place, however. (Moore)

<u>Florida:</u> Some damage to cabbage in head while standing in field. Quite common during past year although rather rare previously. (Weber)

<u>Louisiana:</u> Not so much as usual. (Edgerton)

<u>Sclerotium rolfsii</u> Sacc., stemrot - South Carolina and Texas.

<u>Stem-end rot</u> (undet.) - Porter of Iowa reports this as a shipping trouble, some cars showing 20% of the heads infected.

<u>General references on cabbage diseases:</u>

Walker, J. C. Observations on the cultivation and diseases of cabbage and onions in Europe, 1922. Plant Dis. Reporter, Suppl. 32: 1-34. Feb. 1924.

———————— Resistant varieties and disease-free seed save cabbage industry. Wisconsin Hort. 14: 117-118. April 1924.

CAULIFLOWER

Blackrot caused by <u>Bacterium campestre</u> (Pam.) EFS. New York, Maryland, Virginia, Illinois, and Iowa are the states reporting blackrot on cauliflower in 1924. At the Washington Meeting, Clayton (2) reported on the mode of infection and method of spread of the blackrot organism, and in another recent publication (2) he has reported on its control by means of seed-treatment and seed-bed treatment. The hot water seed treatment (122°F 25-30 minutes) proved much more effective against the organism but also more injurious to the seed than corrosive sublimate. It is, therefore, not recommended for general and promiscuous use on a large scale. Three applications of corrosive sublimate 1-1000 to the soil in seed beds gave excellent blackrot control.

Blackleg caused by Phoma lingam (Tode) Desmaz. New York, Pennsylvania, and New Jersey. According to Clayton the disease was favored on Long Island by wet weather during the plant bed period, and isolated fields showed from 25 to 95% infection. The past two years, however, have not been favorable for seed infection on Long Island. Excellent results in controlling blackleg by seed treatment with hot water and also by the treatment of seed beds by corrosive sublimate (1-1000) have recently been reported by Clayton (2).

Clubroot caused by Plasmodiophora brassicae Wor. Destructive locally in New York, Pennsylvania, and Western Maryland according to collaborators. Recent experiments by Gloyer and Glasgow (3) have shown that the corrosive sublimate seed-bed treatment for maggots is effective against clubroot.

Black leafspot caused by Alternaria brassicae (Berk.) Sacc. New York - Not important. Florida - Common but of no importance. Illinois - Apparently no marked injury.

Peppery leafspot caused by Bacterium maculicolum McC. Connecticut, New York, and Florida report this leafspot. Several reports were received in Connecticut; it was quite serious in plant beds on Long Island, New York; and in numerous gardens about Quincy, Florida, it was said to be destructive. A brief account of this disease has recently been given by Clayton (1).

Downy mildew caused by Peronospora parasitica (Pers.) D By. More than last year in New York, unimportant however.

Stemrot caused by Corticium vagum Berk. & Curt. Reported from Delaware County, New York as a damping-off and from Erie County, New York as wiry tap root. It was also reported to the Survey from the state of Washington.

Whiptail, caused by unfavorable soil conditions, was prevalent on Long Island, New York, where it presented a serious problem. This disease has recently been described by Clayton (1) who reports that applications of lime caused a reduction in the amount of whiptail.

Literature:

1. Clayton, E. E. Investigations of cauliflower diseases on Long Island. New York State Sta. Bul. 506: 3-15. 1924.

2. ―――――――― Second progress report of blackrot (Pseudomonas campestris) investigations on Long Island; seed infection and seasonal development. (Abstract) Phytopath. 15: 48-49. Jan. 1925.

3. Gloyer, W. O., and Hugh Glasgow. Cabbage seedbed diseases and Delphinium rots: their relation to certain methods of cabbage maggot control. New York (Geneva) Agr. Exp. Sta. Bul. 513: 1-38. Feb. 1924.

4. Weimer, J. L. Alternaria leafspot and brownrot of cauliflower. Jour. Agr. Res. 29: 421-441. Nov. 1924. (Rec'd Jan. 1925) Alternaria brassicae

KALE

Blackrot, Bacterium campestre (Pam.) EFS. Unusually severe in Norfolk section of Virginia according to McWhorter.

Blackleg, Phoma lingam (Tode) Desmaz. Virginia.

Downy mildew, Peronospora parasitica (Pers.) D By. Virginia.

White rust, Albugo candida (Pers.) Kuntze. Collected on kale at Larkins, Florida, where this host was severely attacked, according to Weber.

Ringspot, Mycosphaerella brassicicola (Fr.) Lindau. Washington (new host according to Plant Disease Survey records.)

Powdery mildew (undet.) Reported from western Washington.

BRUSSELS SPROUTS

Blackrot, Bacterium campestre (Pam.) EFS. Reported from the Norfolk section of Virginia.

Downy mildew, Peronospora parasitica (Pers.) D By. Observed July 7 on Long Island, New York where it was plentiful in seed beds. Some growers used weak Bordeaux mixture as a spray for control.

CHINESE CABBAGE (PETSAI CABBAGE)

Drop, Sclerotinia sclerotiorum (Lib.) Mass. Recently reported from Massachusetts by W. H. Davis (1).

Nematode (undet.) The following report concerning a leaf disease of Chinese cabbage seedlings in Texas has been furnished by J. J. Taubenhaus.

> "During the winters of 1920 and 1921, Chinese cabbage seedlings were grown in the greenhouse at the Texas Agricultural Experiment Station for transplanting purposes in the field. The seed were sown about February and germination appeared to be normal. The seedlings apparently started out well, producing three or four secondary leaves, but within a short time after were found to lag, remaining stunted, shriveling and dying. Examination of the affected leaf tissue showed it to be filled with a leaf nematode which greatly resembled Aphelenchus olesistus Ritzema Bos. This organism is mentioned by Clinton as attacking leaves on begonias, ferns, and geraniums."

Mosaic (undet.) This disease was reported as being collected in the Philippine Islands, February 1923 by Ocfemia (3) and in Kunkel's recent publication (2) he reports the occurrence of intracellular bodies in the mosaic tissues of Chinese cabbage resembling those found in corn.

Literature cited:

1. Davis, W. H. Drop of Chinese cabbage and common cabbage. (Abstract) Phytopath. 15: 50. Jan. 1925.

2. Kunkel, L. O. Further studies on the intracellular bodies associated with certain mosaic diseases. Hawaiian Sugar Plant. Assoc. Exp. Sta. Bul. Bot. Ser. 3: 108-114. April 1924.

3. Ocfemia, G. O. Notes on some economic plant diseases new in the Philippine Islands. Philippine Agr. 13: 163-166. Sept. 1924.

KOHLRABI

Downy mildew, *Peronospora parasitica* (Pers.) D By. Local damage to plants in seed beds in Florida.

COLLARD

Blackrot, *Bacterium campestre* (Pam.) EFS. Reported as affecting collards in the Tidewater Section of Virginia by F. P. McWhorter, but the statement is made that collard is decidedly more resistant than kale or the other cabbage types.

RUTABAGA

Blackrot, *Bacterium campestre* (Pam.) EFS. Wisconsin. Of minor importance.

Downy mildew, *Peronospora parasitica* (Pers.) DeBary. Florida.

Mosaic. Indiana. Occurred in disease-garden alongside of a row of turnips. (Gardner)

MUSTARD

Downy mildew, *Peronospora parasitica* (Pers.) DeBary. Collected in Florida.

White rust, *Albugo candida* (Pers.) Kuntze. New York (statewide), and Florida (rather common).

TURNIP

Gray leafspot, *Alternaria herculea* (Ell. & Mart.) J. A. Elliott. Florida (Caused very little damage even though well scattered. Weber)

Leafspot, *Cercosporella albo-maculans* (Ell. & Ev.) Sacc. Georgia.

White rust, *Albugo candida* (Pers.) Kuntze. Texas (prevalent).

Powdery mildew, *Erysiphe polygoni* DC. Washington.

HORSERADISH

Gray leafspot, *Alternaria herculea* (Ell. & Mart.) J. A. Elliott. New Jersey (More than last year, abundant in some localities, particularly in central and southern Jersey).

Leafspot, Ramularia armoraciae Fckl. Illinois and Washington.

Leafspot, Cercospora armoraciae Sacc. Illinois (Most common disease).

White rust, Albugo candida (Pers.) Kuntze. Illinois and Colorado.

Nematode, presumably Heterodera radicicola (Greef) Muell. Illinois (Caused much damage in Adams County).

Mosaic (undet.) Illinois. "A condition very suggestive of mosaic was seen in Brown and Marshall Counties." (Tehon)

Rootrot (undet.) Poole (1) has recently reported losses from a rootrot of horseradish roots in storage pits. Losses were reduced when the roots were rolled in sulfur before pitting. The trouble is apparently due to a bacterium.

Literature cited:

1. Poole, R. F. Investigation of the horseradish rootrot. Ann Rept. New Jersey Agr. Exp. Sta. 43 (1921-22): 560-561. 1924.

RADISH

White rust, Albugo candida (Pers.) Kuntze. New York, Pennsylvania, Indiana, Wisconsin, and Colorado. Of slight importance only.

Blackrot, Bacterium campestre (Pam.) EFS. Traces observed in New York, Pennsylvania, and New Jersey.

Blackroot, Pythium aphanidermatum (Edson) Fitz. Observed as unimportant in Pickens County, South Carolina, but serious in home gardens in a number of places in Indiana. Especially destructive near Indianapolis in market gardens on the variety Cincinnati Market.

Clubroot, Plasmodiophora brassicae Wor. West Virginia. First report from that state.

Podrot, Phoma sp. Collected on the mature seed pods of white radish at Gainesville, Florida.

Softrot, Bacillus carotovorus L. R. Jones. A single collection from Tompkins County, New York.

DISEASES OF CUCURBITS

CANTALOUPE

LEAFBLIGHT CAUSED BY MACROSPORIUM CUCUMERINUM ELL. & ARTH.

Leafblight was probably the most important disease of cantaloupe in 1924. In Michigan the crop was a failure, largely due to this blight, and an estimate of 90% loss was made by the Division of Botany of the Michigan Agricultural Experiment Station. In Georgia also it was very serious, blighting the leaves early in the season and causing a reduction in yield for the state estimated at 40%. Other state losses are: Delaware 20%; Texas 10%; New Jersey and Maryland 8%; Indiana 4%. In the latter state it was said to have ruined the crops in Jackson and Morgan Counties.

From New Jersey the Department of Plant Pathology reported that on a plot sprayed five times with 3-4-50 Bordeaux mixture 2% of the leaves were dead on September 12, as compared with 50% for unsprayed plots and 30% for those dusted with copper-lime dust. Gardner and Gregory reported that one grower in Allen County, Indiana controlled the disease by two applications of Bordeaux mixture at 200 pounds pressure.

BACTERIAL WILT CAUSED BY BACILLUS TRACHEIPHILUS EFS.

Connecticut, New York, Delaware, Maryland, Georgia, Ohio, Illinois, Michigan, Iowa, and Arizona reported bacterial wilt. For the most part it was relatively unimportant, but it caused losses estimated at 15% for Iowa, where it was serious, 5% for Ohio and Illinois, and 2% for New York. In Illinois it was probably the outstanding cantaloupe disease of the season, being unusually severe and directly correlated with an unusual abundance of striped and twelve-spotted cucumber beetles.

ANTHRACNOSE, COLLETOTRICHUM LAGENARIUM (PASS.) ELL. & HALS.

Anthracnose was very important in Illinois and Iowa in 1924, according to collaborators, and was responsible for 5% and 6% losses in Georgia and Arizona respectively. Other states reporting the disease were New York, Maryland, South Carolina and Louisiana.

DOWNY MILDEW, PSEUDOPERONOSPORA CUBENSIS (BERK. & CURT.) ROSTEW.

Seven states along the Atlantic seaboard, Connecticut, New Jersey, Delaware, Maryland, Virginia, South Carolina, and Florida, reported downy mildew in 1924. It occurred, however, in much less amounts than last year and for the most part was not important. In Delaware and South Carolina the reduction in severity is attributed to late attack which of course was influenced by the weather.

Experiments in control of downy mildew of cantaloupe by dusting with copper arsenate to which lime and nicotine sulphate were added were reported from the Delaware Experiment Station (1). It was found that control could not be secured by this means under weather conditions favorable for the fungus. Heavy applications gave no greater control than a light and even distribution.

Literature cited: (See also references at end of cantaloupe section)

1. Manns, T. F. and J. F. Adams. Report of Department of Plant Pathology and Soil Bacteriology. Delaware Agr. Exp. Sta. Bul. 135: 25-46. 1924.

MOSAIC (UNDET.)

Connecticut, Indiana, Illinois, and Iowa reported cantaloupe mosaic. For the most part it was relatively unimportant, however, in Iowa it was said to be serious, causing a loss estimated at 5% for the state. One five-acre field in southern Iowa was totally ruined.

OTHER DISEASES

Bacterium lachrymans EFS. & Bryan, angular leafspot - Reported to the Survey for the first time on cantaloupe from Illinois and Iowa. In the latter state it was said to be severe around Muscatine but for the state as a whole it was very slight.

Cercospora cucurbitae Ell. & Ev., leafspot - Delaware (more than usual, practically of no importance. Adams)

Cladosporium cucumerinum Ell. & Arth., scab - Connecticut and New York. Much more than usual reported from the latter state.

Erysiphe polygoni DC., downy mildew - Florida and Texas. Reported as common.

Fusarium spp., causing wilt - Reported from Arizona.

Fusarium spp., causing fruitrot - Reported by one grower in Berrien County, Michigan, as being important and troublesome for several years.

Heterodera radicicola (Greef) Muell., rootknot - Prevalent in Georgia, Texas, and Arkansas, and reported from Washington and California.

Sclerotium rolfsii Sacc., stemrot - South Carolina (of little importance) and Texas (3% loss).

Yellow leaf (non-par.) - Prevalent on vines in Maryland before being sprayed or dusted, according to Jehle and Temple.

General references:

Adams, J. F. Dusting cantaloupes for the control of some diseases and insects. Univ. Delaware Ext. Serv. Circ. 14: 1-14. 1924.

Del Curto, J. M. Cantaloupes are worth fighting for. Valley Farm, & Citrus Grow. 2: 5, 20, 21. May 1924.

Jehle, R. A., and S. T. Potts. Dusting and spraying cantaloupes. Maryland Agr. Exp. Sta. Bul. 263: 169-180. April 1924.

Lyle, C. Controlling melon pests. Quart. Bul. State Plant Board Mississippi 4: 25-29. 1924.

Nissley, C. H. Insure your melon crop by spraying and dusting. New Jersey Agr. Exp. Sta. 6: 2-3. Jan. 1924.

CUCUMBER

BACTERIAL WILT CAUSED BY BACILLUS TRACHEIPHILUS EFS.

Sixteen states east of the Great Plains reported bacterial wilt in 1924. It was one of the major cucumber diseases in New York, Pennsylvania, West Virginia, Ohio, Indiana, Illinois, and Iowa. In most of these states also it was more prevalent than last year. In Illinois it was the outstanding disease of cucumber, as it was also with cantaloupe. Fields were observed where 50% of the plants were affected and the average loss for it was estimated at 10% by L. R. Tehon. Other estimates of losses were: Ohio 20%; Iowa 15%; Pennsylvania 5%; New York 4%.

ANGULAR LEAFSPOT CAUSED BY BACTERIUM LACHRYMANS EFS. & BRYAN

Angular leafspot was reported from New York, Delaware, South Carolina, Georgia, Florida, Indiana, Illinois, Wisconsin, and Iowa. Although it was more abundant than usual in the majority of these states, none of them reported a loss of more than 1%. The report from New York is of special interest as it is the first from the western part of the state, previous New York reports being from the Long Island section exclusively. In both Monroe and Livingston Counties, New York the disease did considerable damage. The report was accompanied by specimens.

In Florida, G. F. Weber estimates a loss of 5%, infection occurring early during cool weather but being checked as the temperature increased. From Wisconsin, where it was discovered in various parts of the central section of the state, it was reported for the first time in several years.

Good results from seed treatment with corrosive sublimate (1-1000, ten minutes) were reported by J. R. Springer (2). The U. S. Department does not recommend the ten minute treatment on account of delayed germination. According to W. W. Gilbert (1), a five minute treatment is effective and not detrimental to the seed, especially if the treatment is followed by fifteen minutes washing in running water.

Literature cited:

1. Gilbert, W. W. Cucumber seed treatment recommended in the United States Department of Agriculture. U. S. Dept. Agr. Office Coop. Ext. Work, Extension Pathologist (mimeogr.) 2: 111. Oct. 1924.

2. Springer, John R. Seed treatment and spray successful in Florida. U. S. Dept. Agr. Extension Pathologist (mimeogr.) 2: 111-113. Oct. 1924.

ANTHRACNOSE, COLLETOTRICHUM LAGENARIUM (PASS.) ELL. & HALS.

Anthracnose did not appear to be very destructive to the cucumber crop as a whole. Massachusetts, Maryland, West Virginia, Georgia, Florida, Indiana, Illinois, and Wisconsin reported it as prevalent in about normal amounts. Massachusetts and Indiana mention the fact that it was noted only in greenhouses. No state reported more than 0.5% loss.

MOSAIC (UNDET.)

Mosaic ranked among the most important of the cucumber troubles, being reported from a considerable number of eastern states and from New Mexico and Washington. The following losses were reported: Wisconsin 20%; New York 10-20%; Iowa 15%; Delaware 5%; Illinois 3%; and Pennsylvania 2%. On Long Island, New York, mosaic was epiphytotic and, according to Clayton, reduced the pickle crop by 75%. Quite a few growers abandoned cucumbers owing to the extremely severe losses from mosaic. In Indiana it was said to be a limiting factor in the pickle crop. Gregory found one greenhouse crop practically ruined. In Illinois much more than usual was reported and heavy local losses occurred according to Tehon. In Wisconsin it was widespread and very destructive, and as indicated by the 20% loss estimate, was the major disease of cucumbers in the state and presents a serious problem.

Reference:

Anon. Mosaic disease of cucumbers and tomatoes. Fruit Flow. & Veg. Trades Jour. 45: 533. May 10, 1924.

DOWNY MILDEW, PSEUDOPERONOSPORA CUBENSIS (BERK. & CURT.) ROSTEW.

States along the Atlantic Coast from Connecticut to Florida were the ones reporting downy mildew in 1924. In general the disease was of comparatively slight importance, but in south Georgia, O. C. Boyd reported it as prevalent, in many cases killing entire fields. It occurred late, however, usually after the crop was either harvested or discarded on account of low prices. In spite of that fact,an estimate of 10% reduction in yield was made for south Georgia. In Florida it was widespread in cucumber sections but not so severe as in 1923. The principal damage was done in south Florida while central and northern sections escaped. Collaborators in the states of Virginia and West Virginia mention finding the disease on late cucumbers in the fall.

OTHER DISEASES

<u>Cladosporium</u> <u>cucumerinum</u> Ell. & Arth., scab - New York, Pennsylvania, and Wisconsin. Much more than usual reported from all threestates. The disease is said to be relatively rare in Pennsylvania but in one field of one-half acre this year, 75% loss occurred.

Erysiphe cichoracearum DC., powdery mildew - Massachusetts, Georgia, Texas, and Indiana. In Massachusetts and Indiana it was noted in greenhouses only.

Fusarium niveum EFS., wilt - Ohio, 0.5% reduction in yield.

Heterodera radicicola (Groef) Muell., rootknot - New York (greenhouse, 4% loss). Mississippi, Texas (2% loss), Ohio (one of the most serious troubles with greenhouse cucumbers), Indiana (serious in greenhouses), and Washington.

Macrosporium cucumerinum Ell. & Ev., leafblight - Maryland, 2% loss; and south Georgia, 1% loss.

Phyllosticta cucurbitacearum Sacc., leafspot - Georgia.

Pythium sp. - Reported occurring as a cottony rot of North Carolina cucumbers on the market and also as a damping-off of young plants in South Carolina.

Sclerotinia sclerotiorum (Lib.) Mass., stemrot - New York and Washington.

Reference:

Garbowski L. Helminthosporium cucumerinum sp. n. nuisible aux Concombres. (Helminthosporium cucumerinum n. sp. injurious to cucumbers.) - Bull. Acad. Polonaise des Sciences & Lettres, Sér. B., Sci. Naturelles, 1923: 15-20. 1924.

WATERMELON

ANTHRACNOSE CAUSED BY COLLETOTRICHUM LAGENARIUM (PASS.) ELL. & HALS.

This was probably the most serious disease of watermelon in 1924, being important in New Jersey, South Carolina, Georgia, Indiana, Illinois, Iowa, and Arizona. Other states reporting it to the Survey were Florida, Mississippi, Ohio, and Kansas. The following losses were reported: South Georgia 25%; New Jersey and Iowa 15%; Maryland and South Carolina 10%; Arizona 7.5%; and Illinois 5%. In Kansas the Irish Gray melon showed some resistance when compared with Tom Watson.

Table 85. Yield of watermelons on dusted and sprayed plots in South Georgia, 1924 (C. C. Boyd).

Record on four pickings of mature melons weighting 18 pounds or more	Plat treatment				
	Spray 1	Spray 2	Dust 1	Dust 2	Check
Total number of melons per acre	590	627	534	642	217
Average weight of melons (Pounds)	27.8	27.9	26.4	26.0	29.6
Poxed melons (percentage)	25.9	20.2	20.6	18.7	71.0
Sunburned from premature defoliation %	0	0	0	0	50.0
Ill shaped melons, necks, etc., percent	15.7	18.2	21.0	18.0	25.4
Total percentage unmarketable	33.4	30.9	30.5	27.5	77.4
Number marketable melons per acre	393	433	371	465	50
Market value per acre ($)*	47.60	67.20	41.80	49.20	6.60
Net value per acre less cost of application	41.00	58.35	26.20	23.90	6.60

Spray (1) 4-4-50 Bordeaux, Spray (2) 4-4-50 plus Kayso at 2 pounds per 100 gallons.
Dust (1) Copper-lime dust 25-75, home mixed, Dust (2) 27-75 commercial (Skinner's).
* Based on net prices received by the Sowega Melon Growers Association for cars shipped on the dates of the four pickings.

Records were kept of the cost of spray and dust treatments and Mr. Boyd estimated that the total cost per acre including materials, labor, and mixing was as follows:

Spray 1 -	$6.60	Dust 1 -	$15.60
Spray 2 -	8.85	Dust 2 -	25.30

O. C. Boyd, stationed at Thomasville, Georgia, conducted spraying and dusting experiments for the control of watermelon anthracnose during 1924. Two spray mixtures and two dust mixtures were used, seven applications being made, the first on May 6 and the last July 16. The results of this work were reported at the annual meeting of the Southern Division of the American Phytopathological Society at Atlanta, Georgia, February 2 and 3, and are given in Table 85.

Literature:

Lyle, Clay. Watermelon anthracnose (Colletotrichum lagenarium)In Controlling melon pests. Quart. Bul. Mississippi State Plant Board 4: 29. April 1924.

FUSARIUM WILT, FUSARIUM NIVEUM EFS.

Atlantic and Gulf Coast States from New Jersey to Mississippi reported frequent cases of Fusarium wilt but for the most part it was not said to be of great importance in that region. However, in Texas, Arizona, and New Mexico it was very prevalent, causing losses estimated at 5% in Texas and 20% in New Mexico. Some areas are so badly infested in the latter state that commercial growing has been discontinued.

In the watermelon growing districts of Illinois and Iowa wilt was said to be a limiting factor in the production of a crop. In Illinois it was general in all melon districts causing a loss estimated at 15% for the state, while in Iowa a 1% loss probably occurred.

From Kentucky the following report was received:

> "Specimens of wilting vines have been received from Maysville, Kentucky, from the Charleston Bottoms where watermelons have been grown for at least the past five years on a commercial scale. The disease first appeared last year in small areas but is quite widely distributed this year and is reported to be ruining most of the melon patches.

"A fungus is readily found in the vascular tissues of wilting vines and the root shows the typical yellow, brown discoloration of the wilt." (Valleau)

OTHER DISEASES

Bacillus tracheiphilus EFS., bacterial wilt - Georgia, Florida, Texas, Iowa, New Mexico, and Arizona.

Cercospora citrullina Cke., leafspot - South Georgia, Texas, and Indiana.,

Diplodia sp., Diplodia rot - From Florida a stemrot of young vines due to Diplodia was reported. From Texas a stem-end rot of fruit was reported. In Arizona blossom-end rot, causing a loss estimated at 5%, and associated with Diplodia and other fungi, occurred, and in Maryland a stem-end rot of uncertain cause was reported by Temple and Jehle as causing a 1% loss.

Erysiphe cichoracearum DC., powdery mildew - Georgia.

Heterodera radicicola (Greef) Muell., rootknot - Georgia, Florida, Texas, and New Mexico. In the latter state it was of considerable importance, causing a loss estimated at 5%.

Macrosporium cucumerinum Ell. & Ev., leafspot - Georgia and Indiana.

Mycosphaerella citrullina (C. O. Smith) Gross., stemblight - More than last year in Florida according to Weber; reported also from Georgia.

Phyllosticta cucurbitacearum Sacc., leafspot - Collected at Maysville, Kentucky in August.

Pseudoperonospora cubensis (Berk. & Curt.) Rostew., downy mildew - Georgia, Florida, and California (1).

Sclerotium rolfsii Sacc., stemrot - Florida.

Bastard blossom was reported from Texas by J. J. Taubenhaus as follows:

> "In working with watermelon diseases in Texas, the writer has frequently noticed watermelon plants which appeared very peculiar in the sense that instead of producing normal male and female blossoms, these were found to proliferate and to form a large cluster of numerous deformed small flower buds. From afar, plants thus affected appear like rosette. Clinton found a similar condition on onions, The cause of this condition is as yet unknown."

Literature:

1. Smith, E. H. Some diseases new to California. (Abstract) Phytopath. 14: 125. Feb. 1924.

2. Stuckey, H. P. Important diseases of the watermelon. In Watermelons. Georgia Agr. Exp. Sta. Bul. 143: 125-131. Feb. 1924.

SQUASH

Bacterial wilt, Bacterium tracheiphilus EFS. Connecticut, moderate injury; New York, trace.

Bacterial leafspot, cause uncertain but possibly due to Bacterium lachrymans EFS. & Bryan was serious in at least two fields in south Georgia according to O. C. Boyd. It produced a characteristic spot of leaves and fruit and was first observed June 1, at Pavo, Georgia.

Downy mildew, Pseudoperonospora cubensis (Berk. & Curt.) Rostew. was collected in several different localities in Georgia but was not severe in any case.

Mosaic (undet.) Georgia, Texas, and Kansas reported traces of mosai

Storage rot, Botrytis cinerea Pers. Washington.

> "This was an active rot observed on fully mature squashes stored under rather dry conditions. The parasite gained entrance through the stem ends although the stem had been uninjured and the squashes had been handled very carefully when harvested and put into storage. The surface showed a water-soaked appearance, and a cut through the affected part displayed a rather soft, although not a wet, rot advancing on the interior a little ahead of the water-soaked area on the surface. The squash fruits deteriorated much more rapidly than when attacked by species of Alternaria or or Penicillium. This is another occurrence of Botrytis which has not been recorded in the literature available to the writers." (Heald & Dana) (1).

Powdery mildew, Erysiphe cichoracearum DC. Virginia and Georgia.

Brownrot, Choanephora cucurbitarum (Berk. & Rav.) Thax. Three repor from Connecticut.

Anthracnose, Colletotrichum lagenarium (Pass.) Ell. & Hals. Connecticut.

Fruitrot, Fusarium sp. Connecticut.

Fusarium wilt, Fusarium spp. Texas, prevalent.

Rootknot, Heterodera radicicola (Greef) Muell. Georgia, Texas, Washington.

Black mold, Rhizopus nigricans Ehr. Connecticut, Texas, and Washingt From Texas, J. J. Taubenhaus writes as follows:

> "In Texas, great losses frequently occur in squash fields due to a softrot of the fruit. Mature squashes suddenly turn soft and leaky within twelve to twenty-four hours and finally become covered with the fruiting fungus of Rhizopus nigricans Ehr. Under field conditions, it was noticed that infection usually begins at the place of the dead clinging corolla and from there the organism works into the fruit and causes it to rot. Moreover, soft rot is frequently found to follow injuries of the squash bug.
>
> "The causal fungus was readily isolated in pure culture and artificial inoculations carried out on mature squash fruit still clinging to the vine in the field. Successful inoculations were only obtained where the spores of the causal organism were introduced through a puncture. Under field conditions, perfect control was obtained by merely removing the dead corolla shortly after fertilization."

Literature:

1. Heald, F. D., and B. F. Dana. Notes on plant diseases in Washington 1. Botrytis Diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924.

PUMPKIN

Bacterial leafspot (undet.) was reported independently by collaborators from Indiana, and Illinois. These are the first reports to the Survey of a bacterial leafspot on pumpkin. In Indiana, Gardner reported that the spots were small, angular, blackened, and some showed white centers. When lesions were cut in water-mounts bacteria oozed out in abundance.

Mosaic (undet.) Peoria County, Indiana, September 10.

Powdery mildew, *Erysiphe cichoracearum* DC. Washington.

CELERY

BACTERIAL BLIGHT CAUSED BY BACTERIUM APII JAGGER

Bacterial blight was unusually prevalent in New York and Michigan during 1924. Cool, wet weather was apparently favorable for its development in those states. Foster and Weber (2) report that this disease has not been found in Florida.

In a recent publication Dye and Newhall of New York (1) have reported that copper fungicides, in the form of either sprays or dusts, are very effective in the control of this disease. Bordeaux mixture 5-5-50 and copper-lime dust 15-85 proved most efficient of several substances tried over a period of five years. Sulfur fungicides were not effective. Substantial increases in yield amounting from 60 to 130 crates an acre when five to seven applications were made were obtained both by dusting and spraying. Although the dust costs nearly twice as much as the Bordeaux mixture the cost of the material was partly offset by the decreased time and labor required to apply it.

Newhall (3) reported at the Washington meeting that dusting celery seedlings in the seed bed from two to four times with 20-80 copper-lime dust at about weekly intervals greatly reduced subsequent development of the disease. This measure together with spraying or dusting in the field should result in satisfactory control under average conditions.

Literature cited:

1. Dye, H. W., and A. G. Newhall. The control of bacterial blight of celery by spraying and dusting. New York (Cornell) Agr. Exp. Sta. Bul. 429: 1-30. June 1924.

2. Foster, A. C., and G. F. Weber. Celery diseases in Florida. Florida Agr. Exp. Sta. Bul. 173: 23-77. Dec. 1924.

3. Newhall, A. G. Dusting celery seedbeds to control blights. (Abstract) Phytopath. 15: 50. Jan. 1925.

EARLY BLIGHT CAUSED BY CERCOSPORA APII FRESENIUS

The Atlantic Coast States from Connecticut southward to Florida, the Great Lakes States, Missouri, and Colorado reported early blight in 1924. For the most part the disease was of only slight importance, however, in Florida it was abundant and severe, particularly early in the season. During the latter half of the growing season in Florida the disease was only slightly prevalent, apparently being reduced by the occurrence of low temperatures during December 1923 and the early months of 1924. Foster and Weber (1), in reporting on this disease, state that in careful spraying and dusting experiments conducted at Sanford the 4-4-50 Bordeaux mixture applied at the rate of 100 gallons per acre consistently gave better results than other sprays or dusts. They advise the application of Bordeaux in the seedbed as soon as the young leaves begin to develop and thereafter applications every week or ten days, depending on climatic conditions and the amount of blight. Copper-lime dust applied twice a week at the rate of 40 pounds per acre at each application gave about as good control as the Bordeaux mixture applied once a week. The cost of the dust was greater, however. To secure good control, the dust must be applied with a good power-driven duster when the plants are wet, and when little wind is blowing.

Klotz (2) has recently published the results of a technical study of the causal organism. Physiological studies, including relation of temperature and acidity to growth of the fungus were reported. High temperatures and factors lowering the vitality of the plants were found to be favorable for the disease. A study of infection of twelve different varieties of celery showed no varietal resistance, and control according to Klotz, is a matter of keeping the plants growing vigorously, that is, in soil of high fertility and good drainage and having an abundance of moisture, supplemented by spraying with Bordeaux mixture.

Literature cited:

1. Foster, A. C., and G. F. Weber. Celery diseases in Florida. Florida Agr. Exp. Sta. Bul. 173: 23-77. Dec. 1924.

2. Klotz, L. H. A study of the celery early blight fungus, Cercospora apii Fresen. Michigan Sta. Tech. Bul. 63: 1-34. 1923.

YELLOWS CAUSED BY FUSARIUM SP.

New York, Indiana, Michigan, and North Dakota reported yellows in 1924. Its presence in Florida was suspected, but A. C. Foster of the U. S.

Department of Agriculture reported that he did not find it in a survey of the Bradentown and Sanford sections. On March 8 he wrote as follows:

> "I made the trip to the Bradentown section this last Thursday and Friday. I thought it rather important that we determine definitely this season whether or not Fusarium yellows of celery was present in that section. There was nothing present that would even lead one to suspect the presence of the yellows disease. The whole trouble could easily be attributed to poor or hasty setting of young plants in the field, the roots being doubled up, the ends being exposed to the sun, which resulted in the stunting and yellowing of the plants. I have observed the same condition in the Sanford section many times."

In the states reporting yellows there seemed to be less of the trouble than usual. In Indiana, Gardner wrote that the low temperature checked it, and in Michigan, Nelson states that due to the cool wet season the disease was not serious. The mid-season crop at Kalamazoo, Michigan showed 5 to 10% of the plants of the yellow varieties infected but many of these outgrew the disease with the onset of cooler weather. On May 29, G. H. Coons wrote as follows:

> "Celery growers around Kalamazoo are trying Eberle's 'Wonderful' celery on yellows soil. Resistance of this variety to the Fusarium disease is unknown. The yellows-resistant seed has been released for trial on diseased soil on about 20 farms and has been sent to collaborators who have reported yellows in three or four states."

Recent literature:

Butler, L. F. Celery yellows. Phytopath. 14: 435. Sept. 1924.

Thomas, R. C. A Fusarium disease of celery. Month. Bul. Ohio Agr. Exp. Sta. 9: 88-90. May-June 1924.

LATE BLIGHT CAUSED BY SEPTORIA APII ROSTR.

Connecticut, New York, New Jersey, Pennsylvania, Florida, Porto Rico, Indiana, Michigan, and Colorado reported late blight in 1924. In most of these states the disease was more prevalent than usual and in New York and New Jersey 10% loss was estimated as due to it. In Pennsylvania from 5 to 6% loss was reported. In Florida, according to A. C. Foster, the cool weather of January, February, and March, which was unfavorable for the development of the early blight (Cercospora), favored the late blight with the result that it became destructive and widespread during March and April. It was decidedly more destructive than the early blight in the Sanford section in 1924.

FOOTROT CAUSED BY SCLEROTINIA SCLEROTIORUM (LIB.) MASS.

Collaborators in New York and Florida reported footrot in 1924. In the former state it was very common in storage houses and reduced the marketable value of the crops from 2 to 5%. In Florida it was probably the most destructive celery disease. Concerning it A. C. Foster of the U. S. Department of Agriculture and located at Sanford, Florida, reported as follows:

> "This disease has probably ranked first in damage to celery in this section this season, it being widespread in its appearance over the entire section, and appearing in December, a month earlier than usual. In several instances the losses ran as high as 60% of the crop, but in most cases the losses would probably be less than 2%. This disease also causes considerable decay in transit, and its severity in the fields has been reflected in the reports from the Market Inspectors from the place of consignment. The unusual severity of this disease is another instance of the favorable conditions produced as a result of the abnormally low temperatures during the three winter months."

OTHER DISEASES

Bacillus carotovorus Jones, slimy softrot. - New Jersey, Iowa, and Washington.

Blackheart (non-par.) - Appeared rather general throughout the Sanford section of Florida, but was not so destructive as in 1923. In California a considerable amount of blackheart was also reported.

Brown stem (undet.) - Rather prevalent in several instances in the Sanford section of Florida. According to Foster there is a browning of the stems beneath the epidermis.

Heterodera radicicola (Greef) Muell., rootknot - Florida and Missouri.

Hollow and pithy stems (undet.) - Caused considerable loss in the Sanford section of Florida, according to A. C. Foster.

Marl disease, associated with excess of lime in the soil - Was causing serious losses in the vicinity of Manchester, Michigan, and was reported from two other counties in the state. Plants were very brittle and the tissue of the stalks burst, turn brown, and slough away. One grower reported $3000 loss.

Mosaic (undet.) - New York, New Jersey, Florida, and Iowa. In all of these states the disease seems to be becoming somewhat more prevalent. In none of them, however, was more than a trace of injury reported.

Redroot (undet.) - Quite generally present both in seed beds and fields in the Sanford section of Florida. Of little consequence, however. (A.C.Foster

Recent literature:

Foster, A. C. and G. F. Weber. Celery diseases in Florida. Florida Agr. Exp. Sta. Bul. 173: 23-77. Dec. 1924.

Ogilvie, L. Notes on the diseases of celery found in Bermuda. Agr. Bul. Bermuda Dept. Agr. 3: 5-7. June 1924.

Poole, R. F. Celery mosaic. New Jersey Agr. Exp. Sta. Rept. 1922: 567-568. 1924.

DROP CAUSED BY SCLEROTINIA SCLEROTIORUM (LIB.) MASS.

Drop was the cause of much damage, due to losses both in the field, where it was one of the most important diseases of lettuce, and to the harvested crop. It was reported from New York and Ohio, southwestward along the Atlantic and Gulf Coasts to Louisiana. A report was also received from Arizona. In New York, Pennsylvania, and Maryland the reduction in yield was estimated at from 2 to 3% in each state. In Florida it was the most important disease of lettuce, causing as much damage as all other diseases combined, according to Weber. A. G. Newhall reported that it seems to have been on the increase in Wayne County, New York, during the past two years. He found about 10% affected plants.

DOWNY MILDEW CAUSED BY BREMIA LACTUCAE REGEL

New York, Delaware, Pennsylvania, Ohio, Illinois, Iowa, and Florida reported downy mildew. For the most part it was of only slight importance, although in Florida it was generally distributed and locally destructive. It was of some importance locally in Illinois also. In Iowa it was said to be serious only in greenhouses, as usual. It was much more common in the lettuce sections of New York this year than during 1923.

According to Chupp and Felix of New York, it occurred abundantly in the Elba muck district, but only slight losses were sustained. Big Boston and Unrivaled are among the less susceptible varieties. The New York (not Iceberg) mildewed badly, while May Queen and a French variety known as White Lille were especially free.

Concerning varietal resistance I. C. Jagger (1) has recently reported on tests with a large number of lettuce varieties, eight of which were found to be immune in both California and Florida. These varieties, which appear to be of European origin, are in general unsuited to American conditions. They have, therefore, been crossed with Los Angeles Market or New York with the result that all first generation plants were immune to mildew and second generation plants showed immunity in the ratio of approximately three to one.

Recent literature:

Cited

1. Jagger, Ivan C. Immunity to mildew (Bremia lactucae Reg.) and its inheritance in lettuce. (Abstract) Phytopath. 14: 122. 1924.

GRAYMOLD CAUSED BY BOTRYTIS SP.

New York, Pennsylvania, Virginia, Ohio, and Iowa reported moderate amounts of this disease. In New York there was more than last year and it became more important late in the season with the approach of cold weather. In

Pennsylvania it was only noted in severe form under glass, and in Ohio and Iowa it was for the most part a greenhouse disease.

Recent literature:

Heald, F. D., and B. F. Dana. Notes on plant diseases in Washington. Botrytis diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924.

BOTTOM ROT CAUSED BY CORTICIUM VAGUM BERK. & CURT.

Trouble from this disease was reported from Connecticut, New York, and Ohio. It caused very serious loss throughout Connecticut, especially during the month of July. In New York it was one of the most important lettuce diseases, causing a reduction in yield estimated at 10%, and in Ohio it was mentioned as being very serious in some greenhouses.

TIPBURN (NON-PAR.)

Connecticut: Bighead Boston showed burning of the inner leaves in fields in July. (Clinton)

New York: Nassau County. Serious on leaves which matured in the hot weather during July and August. (Tyler)

Wayne County. Severe on the first crop in July, but became less severe during the season. (Newhall)

Genesee and Orleans Counties. The first crop (July 4) escaped tipburn. The disease was at its height the last week of July. The average loss was about 15%. The variety Unrivaled was injured less than Big Boston. (Felix)

Monroe County. Tipburn showing up in the more mature lettuce and was found in as high as 70% of the heads in one field. (Newhall)

New Jersey: Due to the cold, wet spring tipburn was not as severe on the early as on the late crop. (Dept. Pl. Path.)

Virginia: Norfolk Section. Of little importance in fall crop. (McWhorter)

Idaho: Less than usual in importance. (Hungerford)

A. G. Newhall (1) has recently reported that slowing down the rate of growth of the plants by leaving potash out of the fertilizer and by deep pruning and cultivation at the proper time have reduced the amount of tipburn. Slow growing varieties have been found to be less subject to the disease than rapid growing ones.

Recent literature:

Cited

1. Newhall, A. G. Studies on the tipburn disease of lettuce. (Abstract)
   Phytopath. 15: 58. 1925.

RIO GRANDE DISEASE (UNDET.)

J. J. Taubenhaus of the Texas Experiment Station has recently furnished the following note in which he reports two new plants affected by this disease,

> "The Rio Grande disease of lettuce was first described by Carpenter on diseased lettuce from the Rio Grande Valley in Texas. Affected leaves appear ruffled, somewhat mottled, undersized, and in time exude numerous reddish, resinous drops. Diseased plants do not form normal heads but proliferate, each head producing countless numbers of adventitious shoots.
>
> "While studying this disease in the lettuce fields in the vicinity of Laredo, Webb County, Texas, the writer has found what appeared to be two new hosts subject to this trouble. The one is the carrot and the other a weed known to the Mexicans in that vicinity as borage plant, a species of Lactuca, probably L. canadensis which is greatly relished by Mexican burros. The symptoms of the Rio Grande disease on the borage plant were found to be identical with those of lettuce. On the carrots the symptoms were the same, except that there appeared to be no proliferation or production of adventitious shoots. Both infected borage and carrot plants were collected in the same beds where lettuce was badly affected with the Rio Grande disease.
>
> "Carpenter believes that alkali in the irrigation water from the Rio Grande River is probably conducive to this peculiar lettuce disease. This, however, remains to be proved."

Collaborators in Connecticut and New York report white heart and rabbit ear and those in the latter state indicate that it may be the same as the Rio Grande disease. In Wayne County, New York, Newhall reports that it is always worse on the first crop when insects are abundant. From 3 to 6% loss probably occurred in the Wayne County sections. From Genesee and Orleans Counties Felix reports that the trouble appeared the latter part of July and gradually increased until an average of 2% loss occurred. As high as 50% of the plants in some fields were affected.

From the Tidewater Section of Virginia, where considerable damage is being caused by lettuce diseases, F. P. McWhorter of the Virginia Truck Experiment Station reports a trouble which he is tentatively calling "Newport News Rosette," and which he says resembles the Rio Grande disease to some extent.

BACTERIAL DISEASES

A considerable number of bacterial diseases of lettuce continue to be reported. For the most part the exact identity of these has not been established. Some progress, however, has been made in distinguishing them during the past year as will be noted in the following reports:

Bacterial wilt caused by Bacterium vitians Brown

According to E. L. Felix this disease was found in the Elba district of New York, where it occurred in amounts ranging from 2 to 10%. Although the disease occurred all summer, infection took place chiefly during the cooler and earlier part of the season. Material sent to Miss Brown in the Department of Agriculture, Washington, D. C., and to the Ohio Agricultural Experiment Station was diagnosed as being caused by Bacterium vitians and Aplanobacter rhizoctonia respectively, thus indicating that these two diseases may be the same.

Felix reports that the disease occurred on newly cleared land and that he has strong evidence that it may be seed borne. Concerning the common name of the disease he reports as follows:

> "Miss Brown did not give the disease caused by Bacterium vitians a common name, but since it is a vascular disease resulting in typical wilt symptoms, I have called it 'bacterial wilt.' It is a vascular disease of both leaf and head lettuce, being more severe on the latter. There is no rosette appearance in diseased head lettuce as there is in leaf lettuce, but a pronounced wilting. In the heat of the day affected leaf lettuce becomes flaccid. These are the reasons I used the term 'bacterial wilt' rather than 'bacterial rosette.'"

This disease was also reported with specimens from New Mexico by R. F. Crawford as being very severe on a 600-acre plantation at Los Vegas where it occurred during the latter part of August and early in September.

Bacterial rot (undet.)

In Connecticut, one grower lost 60 to 75% in a planting of Big Boston. The edges of the outer leaves were affected and the interior was often completely decayed. Such heads might look all right but be rotten within. A similar decay was reported from Wayne County, New York, by A. G. Newhall. A soft rot of leaves and often of the entire head were also severe locally in south Georgia, according to Boyd, who estimated the reduction in yield in that part of the state at 5%. Slight amounts of the disease were also noted in Arizona.

Bacterial leafspot (undet.)

Maryland: The lettuce grown last fall was rather severely attacked by a bacterial disease, which began by attacking the lower leaves first, then the next ones above, and so on. In some cases the entire plant was so badly diseased that it was unfit for consumption. The financial loss in specific cases was between five and ten percent. (Temple)

Bacterial stem girdle (undet.)

What appears to be a new disease of lettuce, causing girdling and a stem and rootrot, occurred in a few fields of the Genesee County section of New York, according to E. L. Felix. In some cases 10% infection occurred.

Bacterial slime disease (undet.)

Reported from California by R. E. and Elizabeth H. Smith (1). This disease causes serious losses in the Imperial Valley of California and in shipments from that section. Los Angeles is the most susceptible with Big Boston and Iceberg less so. The causal organism or organisms have not been determined definitely but may be the same as some of those already described.

Recent literature:

1. Mehta, Maneck M., and Emily M. Bevridge. Studies in bacteriosis XII. B. pyocyaneus as a cause of disease in lettuce and the identity of B. marginale with this organism. Ann. Appl. Biol. 11: 318-323. Oct. 1924.

2. Paine, Sydney J., and J. M. Branfoot. Studies in bacteriosis XII. A bacterial disease of lettuce. Ann. Appl. Biol. 11: 312-317. Oct. 1924.

3. Smith, Ralph E., and Elizabeth H. Smith. Bacterial slime disease of lettuce. (Abstract) Phytopath. 14: 122. 1924.

MOSAIC (CAUSE UNDET.)

In New York mosaic was fairly important. In Wayne County it took about 40% of the lettuce crop, according to Newhall and in the Genesee County section it averaged about 3%. In the latter section it has not been found on the variety "New York", according to Felix. In Pennsylvania only a trace was observed, although in one field it was important, and it is probably present throughout the state, according to Beach and Kirby. F. P. McWhorter reported the disease from the Norfolk section of Virginia. In Florida it occurred in the Sanford section and a high percentage was noted by Weber in one Florida field. In New Mexico it caused stunting of a large number of plant, according to R. F. Crawford.

OTHER DISEASES

Cercospora sp., leafspot - Indiana.

Heterodera radicicola (Greef) Muell., rootknot - Georgia and Ohio.

Macrosporium cladosporioides Desm., - Florida. Observed in two fields where it was bad. (Weber)

Ozonium omnivorum Shear, rootrot - Texas.

Pythium sp., damping-off - New York. Found only occasionally throughout the season. (Newhall)

Septoria consimilis Ell. & Mart., leafspot - New York, New Jersey, Pennsylvania, Delaware, Virginia, and Illinois.

Rabbit ear (undet.) - See Rio Grande Disease.

Red stem (non-par.) - Present in both spring and fall lettuce in the Norfolk section of Virginia. (McWhorter)

Sclerotinia minor Jagger, drop - Virginia. Abundant in Newport News section. (McWhorter).

Reference:

Anon. Lettuce disease in Imperial Valley. Amer. Flor. 62: 638-639. April 1924.

PEAS

ROOTROT

In 1924 root rots of peas were prevalent and destructive especially in the older pea growing sections and in fields that have been repeatedly planted with that crop. The following statements from collaborators and others give an idea of the prevalence and severity in various states.

Massachusetts: Causes more damage than all other pea diseases combined. (Osmun)

New York: Nassau County. Very common this season. Complaints received from various sources. It was the most serious disease of peas this year. Twenty-five percent loss was not uncommon. (Tyler)

Genesee and Orleans Counties. High percentage of infection in all pea fields. (Felix)

Monroe County. On June 25, Charles Chupp visited 15 fields totaling 60 acres in Monroe County. In 7 fields a trace of rootrot was found and in one of the 7 the infection was about 1%. In the remaining 8 fields no trace of the disease was observed.

Livingston County. A survey of pea fields in the vicinity of Mt. Morris was made by Doctor Chupp. The only field where rootrot was observed in any appreciable amount was in a section where peas have been grown for a considerable number of years. About 80 acres were inspected in Livingston County.

Erie County. Doctor Chupp visited 12 widely separated fields totaling 30 acres about the time when the peas were ready for harvest. Only traces of rootrot were observed. In one field, however, where peas had been growing continuously for some time there was much loss on account of the disease.

New Jersey: Yields much better than last year in spite of severe rootrot infection. Crop in canning section in Cumberland County best for many years even where rootrot was present. In Camden and Burlington Counties a few fields were a practical failure but the crop was good on many severely infected soils. Worlds Record and Suttons Ideal, the two best varieties out of 40 tested on rootrot soil in 1922, gave excellent yields on rootrot soil this year. Continuous spring rains encouraged rootrot infection but enabled plants to mature a fair crop in spite of the disease. (Dept. Pl. Path.)

Delaware: Generally distributed in commercial fields of Kent and Sussex Counties. It appears to be more prevalent in fields that show neglect of proper feeding and inoculation. An estimate of 1% reduction in yield for the state is made. (Adams)

Maryland: A rather extensive survey has been made this year of the peas grown for canning purposes in Maryland. This survey was conducted in part by each of the following: Jehle, Drechsler, Haskell, Norton, and Temple. It is interesting to note that in some fields practically 100% of the plants are affected, whereas, in other fields the percentage of infection falls as low as about 5%. No fields examined have been entirely free from the disease. The losses incurred from rootrot depend largely upon weather conditions - the drier the weather for the two weeks preceding harvesting, the greater the loss, other things being equal. In other years, fields have been found so badly affected that they were not harvested. Estimated reduction in yield for the state 8%. (Temple)

South Georgia: Considerable damage in the seedling stage. Two percent reduction in yield. (Boyd)

Wisconsin: More than last year or the average year. Of major importance. Causing an estimated reduction in yield for Wisconsin of 8%. This estimate is based on a survey of 688 plantings comprising 5,416 acres. It was noted especially in the central portion of the state and was absent only in a few new localities. (Vaughan)

Utah: In Morgan County, one of the older pea growing areas, rootrot was found generally distributed. In one day's survey in this district, three fields were encountered which showed practically 100% infection. In these it was difficult to find a single healthy plant. Other fields ranged in percent as follows: 15%, 20%, 16%, 30%, 26%, 40%, 52%, 60%. Four other fields studied exhibited only an occasional diseased plant. The majority of the specimens collected during the survey in Morgan County showed what appeared to be a species of Aphanomyces. Drought and late frosts greatly complicated the disease situation and rendered estimates of loss difficult. Independent of other

> sources of yield decrease, however, I feel safe to place the loss in Morgan County due to rootrot at from 13 to 15%. But few fields in Cache Valley showed the rootrot present and in these only an occasional diseased plant was found. This favorable condition is probably related to the newness of the district in pea production. On the other hand, the apparent absence of disease might be associated with the late date on which the survey was made. A few fields showing the Aphanomyces type of rootrot were found in Davis and Weber Counties. No definite estimate of the loss was possible for these areas. (Richards)

In view of the recent work of Drechsler and of Jones (1, 2, and 3) there seems to be little doubt but that the most important primary cause of rootrot is the fungus _Aphanomyces euteiches_ Drechsler. This fungus has now been found in material from New York, Pennsylvania, New Jersey, Delaware, Maryland, Wisconsin, Ohio, Indiana, Illinois, Michigan, Montana, Idaho, Utah, and California. In an examination of fields in Maryland, Delaware, and New Jersey, Drechsler (1) found that in one-fourth of the fields visited not a single plant could be located that was not affected with this parasite. In approximately one-half of the fields he inspected the parasite could be found in more moderate quantity, frequently being present in severe form only in wet situations. In only one-fourth of the fields visited was this form of rootrot either entirely absent or present in a very small quantity. Concerning the losses from the disease and the relation of severity to weather conditions, Drechsler (1) states that the fungus was much more prevalent than usual owing to the wet weather in the early part of the growing season, particularly during May. Fortunately, however, June was also wet and the pea plants, even though with decayed roots, made a fair growth and crop. With a dry June the losses would doubtless have been great.

Other organisms reported as associated with, and causing rootrot of peas in 1924 are _Fusarium martii pisi_ Jones, _Pythium_ spp., _Corticium vagum_ Berk. & Curt., _Thielavia basicola_ (Berk. & Br.) Zopf, and _Phoma_ sp. Some of these reports follow:

Fusarium martii pisi Jones

Drechsler (1) reported that the fungus occurred rather widely in 1924 but at the same time quite sparingly. He isolated it from material collected at the Arlington Farm, Virginia. _Fusarium_ sp. was reported as causing rootrot in Pennsylvania, Alabama, Mississippi, and Colorado.

Corticium vagum Berk. & Curt.

Connecticut, New Jersey, Texas, Iowa, and Washington reported this fungus associated with rootrot, and Drechsler (1) in his isolation studies found it occurring rather commonly but mostly as a secondary rather than a primary parasite. Occasionally, to be sure, lesions of the type characteristic of Rhizoctonia were found in the field.

Pythium spp.

From six to eight distinct species of Pythium were isolated by

Drechsler (1) from pea roots. They appeared to be found more abundantly in secondary rather than in directly parasitic relationship.

Thielavia basicola (Berk. & Br.) Zopf

Reported from Connecticut and New York. One field of peas in Wayne County, New York was reported a total loss on account of Thielavia.

Recent literature:

Cited

1. Drechsler, Charles. Rootrot of peas in the Middle Atlantic States in 1924. Phytopath. 15: 110-114. Feb. 1925.

2. Jones, Fred Reuel. Rootrot of peas in the United States. Rept. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 203-204. 1924.

3. ——————— Soil-inhabiting fungi upon the pea plant and their relation to disease. Phytopath. 15: 59. Jan. 1925.

BLIGHT CAUSED BY MYCOSPHAERELLA PINODES BERK. & BLOX.

New England, New York, New Jersey, Delaware, Maryland, Georgia, Illinois, Wisconsin, and Iowa reported blight. In New Jersey and Delaware only was it reported more prevalent than usual and in the former state only very slight pod injury but considerable damage from leafspot was reported. One percent loss was estimated for the state of Iowa, while only traces were recorded for the other states.

BACTERIAL BLIGHT CAUSED BY BACTERIUM PISI (SACKETT) EFS.

Special attention was paid to this disease by a number of collaborators during 1924, due to the request of the Plant Disease Survey for information and specimens. As a result Bacterium pisi was isolated from material received from collaborators in New York, Delaware, New Jersey, Maryland, South Carolina, Florida, Illinois, and Wisconsin. For the most part the disease was not considered very destructive in these states. However, investigations by Miss Helen Fox, G. H. Martin, and W. D. Moore indicate that the disease was of great importance in South Carolina. The following quotation from a letter from Mr. Moore, dated May 9, indicates the extent of the damage.

> "I have just completed a tour of the southern section of the state, and have found that the sugar pea disease (B. pisi) is very severe on every field examined in that section. I have found but one field in this state that did not show the trouble to a marked degree. I am not in a position to state just what the damage is, but it is safe to say that the loss has been well

> above 75%. The growers in this section are very much discouraged over the outlook for the future, and unless we can find some remedial measures, this crop will go out of existence for us."

Although it is possible that other diseases, particularly rootrots were influential in damaging the South Carolina crop, still it is apparent that bacterial blight itself was serious.

OTHER DISEASES

Erysiphe polygoni DC., powdery mildew - Massachusetts, Alabama, Illinois, and Washington.

Mosaic (undet.) - A mosaic-like disease causing mottling, yellowing and deforming of leaves and stunting of plants was noted in Maryland and New Jersey during the year. Collaborators in New Jersey state that it is apparently becoming of importance, especially on the varieties Little Marvel and Horsford. Much less was noted on Alaska, Thomas Laxton, and others. As high as 10% infected plants were observed in Little Marvel.

Peronospora trifoliorum D By., downy mildew - A second downy mildew on peas, reported for the first time to the Plant Disease Survey, was found near Madison, Wisconsin, June 10 by F. R. Jones and M. B. Linford. Dr. Jones made the determination and reported that the fungus was the same as that occurring on sweet clover.

Peronospora viciae (Berk.) D By., downy mildew - New York, Wisconsin, and Iowa report traces with no particular damage. An undetermined Peronospora, probably P. viciae, was reported from south Georgia.

Septoria pisi West., leafspot - Delaware, Illinois, Michigan, and Wisconsin reported traces of leafspot. No particular damage was recorded.

Septoria flagellifera Ell. & Ev., leafspot - A second Septoria on peas has been distinguished from material collected in Wisconsin during July by M. B. Linford. This is the first report to the Plant Disease Survey of this fungus on peas from any state.

Recent literature:

Buchheim, A. Uromyces pisi (Pers.) Winter. Centralbl. für Bakt. Abt. 2, 60, 22-24: 534-536. 1924.

Moore, W. D. The root and stemrot of the pea. Ann. Rept. New Jersey Agr. Exp. Sta. 43: 572-573. 1924.

Stone, R. E. Preliminary investigations on the rootrot and blight of canning peas. Scient. Agr. 4: 239-241. April 1924.

COTTON

WILT CAUSED BY FUSARIUM VASINFECTUM ATK.

Greater damage from wilt than usual was reported from Alabama, Mississippi, and Louisiana, attributed by collaborators in some of these states to dry weather. The estimated losses are shown in the following table.

Table 86. Estimated percentage loss from cotton wilt, 1924.

Percentage loss:	States reporting
6	Arkansas
5	Mississippi
4	Alabama
3	Louisiana
2	North Carolina, South Carolina, Georgia
1	Virginia, Texas, Arizona

In South Carolina reports were received from certain new localities in the Piedmont Section indicating that the disease is continuing to spread there. Since wilt is more prevalent on the light sandy soils it may be of interest to know the percentages of infested fields in several states as reported by collaborators. North Carolina, wilt present in 7% of the fields; South Carolina, 5%; Georgia, 10%; Mississippi, 60%; Arkansas,50%;

From southern Georgia, O. C. Boyd reports the following varieties resistant: Lewis 63, Tri-Cook, Dixie-Triumph, and Covington-Toole.

Recent literature:

Dastur, J. F. A preliminary account of the investigation of cotton wilt in Central Provinces and Berar. Agr. Jour. India 19: 251-260. May 1924.

Gaudron, J. La disminución de la resistencia del algodón Tangüis al "cotton wilt". La Vida Agr. 1: 425-428. July 1924.

Kottur, G. L. Notes on cotton wilt in the southern Maratha country. Agr. Jour. India 19: 155-159. March 1924.

Shearer, E. Cotton wilt. In experimental work on cotton, 1922. Ann. Rept. Cotton Res. Bd. Min. Agr. Egypt 3: 37-40. 1924.

ANTHRACNOSE CAUSED BY GLOMERELLA GOSSYPII (SOUTHWORTH) EDG.

In general there seemed to be less anthracnose than usual, this fact being partly due to dry weather in the Gulf States. The estimated losses are given in table 87.

The disease was not noted in southern Illinois.

H. W. Barre (1) reported that the sulphuric acid treatment of cotton seed materially reduced infection in the case of anthracnose in South Carolina and that the treatment is being recommended for general practice. In 1924 the difference in favor of treated seed was 150 pounds of seed cotton per acre.

Table 87. Estimated percentage loss from anthracnose, 1924.

Percentage loss	States reporting
4	Georgia
3	Virginia, Mississippi
2	North Carolina
1.5	Alabama
1	Texas
Trace	South Carolina, Louisiana, Arkansas

Recent literature cited:

1. Barre, H. W. Sulphuric acid treatment in South Carolina. U. S. Dept. Agr. Extension Pathologist (mimeogr.) 2: 110. Oct. 1924.

ANGULAR LEAFSPOT CAUSED BY BACTERIUM MALVACEARUM EFS.

While more angular leafspot occurred than in 1923 in Illinois and New Mexico, less of it was noted in South Carolina, Alabama, Louisiana, Arkansas, and Arizona. In general it was a minor disease, although in two states, at least 5% damage was estimated.

Table 88. Estimated percentage loss from angular leafspot, 1924.

Percentage loss	States reporting
5	Georgia, Texas
3	Arizona
2.5	Arkansas
1	Virginia, North Carolina, New Mexico
0.5	Alabama
Trace	South Carolina, Mississippi, Louisiana, Illinois

Table 89. Dates of earliest appearance of angular leafspot, 1924.

Date	Place	State
May	Baton Rouge	Louisiana
May 8		Arizona
June 16	Thomas County	Georgia
July	Knoxville	Tennessee
July 7	Oconee County	South Carolina
July 7	Union County	Mississippi
Sept. 6	Deming	New Mexico

As in the case of anthracnose, H. W. Barre (1) reports effective results from the sulphuric acid treatment of the seed. Not only is the seed disinfected but a more vigorous growth is obtained. Treated seed sends up plants from 5 to 7 days earlier than untreated seed and a higher yield results.

Recent literature:

Cited

1. Barre, H. W. Sulphuric acid treatment in South Carolina. U. S. Dept. Agr. Office Coop. Ext. Work, Extension Pathologist (mimeogr.) 2: 110. Oct. 1924.

ROOTKNOT CAUSED BY HETERODERA RADICICOLA (GREEF) MUELL.

This was one of the less important troubles although it was serious locally and was complicated as usual by being commonly associated with plants affected with Fusarium wilt. Rootknot occurred in all cotton states but estimates of loss are available only from those in table 90.

Table 90. Estimated percentage loss from rootknot, 1924.

Percentage loss	States
3	New Mexico
2	North Carolina, Arkansas
1	Texas
Trace	Virginia, Alabama, Mississippi, Georgia, Arizona

BLIGHT CAUSED BY ASCOCHYTA GOSSYPII SYD.

This disease, hitherto reported only from Arkansas, appeared during 1924 in conspicuous and destructive amounts in parts of Virginia, North Carolina, and South Carolina. In a paper given before the Southern Division of the American Phytopathological Society at Atlanta, Georgia, February 1925, S. G. Lehman reported on the situation in North Carolina and presented climatalogical data correlating the outbreak with unusual moisture and temperature conditions. It is not unlikely that the fungus has been present in these states prior to 1924 and that the unusual and peculiarly favorable weather of the year was responsible for its appearance. The first part of the season was cold and wet and it was during this time that the disease assumed serious aspects. However, a change to dry and warmer weather resulted in the checking and final disappearance of the disease. In Virginia it was found in the southern counties of Brunswick and Greenville. In North Carolina it occurred in at least 33 counties scattered through the eastern and southern parts of the state. July 8 was the date on which the first specimens were received both from Virginia and South Carolina, and it was early in July that complaints began coming into the North Carolina Experiment Station from various parts of that state.

In a letter dated July 21, H. R. Rosen of Arkansas submitted some unpublished data of the late Dr. J. A. Elliott as follows:

> "Doctor Elliott found what he considered the same disease as on cotton on the following two species: Hibiscus lasiocarpos and H. militaris. Furthermore, he was able to produce the disease by artificial inoculations of the cotton fungus onto H. militaris."

OTHER DISEASES

Alternaria sp., leafspot - Florida, Mississippi, Tennessee, and Arkansas reported more or less Alternaria leafspot. Collaborators in the two latter states mention its association with plants suffering from potash hunger.

Cercospora althaeina Sacc., leafspot - This fungus was reported to the Plant Disease Survey for the first time. It occurred in southern Illinois and was reported by L. R. Tehon. It is distinct from Cercospora gossypina Cke. (Mycosphaerella gossypina (Cke.) Earle).

Corticium vagum Berk. & Curt., soreshin - This disease, in conjunction with angular leafspot ~~and anthracnose~~, took an exceedingly heavy toll of seedlings in some of the Florida cotton sections. It was reported also from Louisiana, Texas, and New Mexico. In the latter state it was the cause of considerable damage according to R. F. Crawford.

H. R. Rosen (1) has recently reported successful results in the control of damping-off of seedlings on an experimental scale by the application of 0.25% solution of Uspulun to the soil at the rate of one gallon per square foot.

Literature cited:

1. Rosen, H. R. The control of damping off of cotton seedlings by the use of Uspulun. Science 60: 384. Oct. 1924.

Literature not cited:

Shearer, E. Soreshin. In experimental work on cotton 1922. Ann. Rept. Cotton Res. Bd. Min. Agr. Egypt 3: 27-37. 1924.

Lint stain - In South Carolina, during a period of wet weather at time of boll opening, various fungi attacked the lint causing it to become stained and reduced the quality. The loss did not appear to be great, however.

Malnutrition (non-par.) - Tennessee and Louisiana. In the latter state the dry season probably favored the trouble, according to Edgerton.

Mycosphaerella gossypina (Cke.) Earle, leafspot - Illinois, Florida, and Texas. In the former state it was more abundant that the angular leafspot.

Ozonium omnivorum Shear, rootrot - Texas, New Mexico, and Arizona reported rootrot. In Texas where it caused a loss of 5%, it was quite prevalent late in the season and was reported especially from the eastern half of the state. In New Mexico it was very prevalent in the Mesilla and Pecos Valleys. Some fields showed as high as 25% and the average damage for the state was placed at 5%. In Arizona, where it was considered the most serious cotton disease, the loss was placed at 8%.

Phyllosticta gossypina Ell. & Mart., leafspot - Florida and Illinois reported traces.

Puccinia hibisciata (Schw.) Kellerm., rust - Texas, prevalent in the Rio Grande Valley. Arizona, common in Santa Cruz Valley; specimens received.

Ramularia areola Atk., frosty mildew - Florida (first report from state).

Root disease (undet.) - Was very important locally in Mississippi and reported as follows by Mississippi collaborators:

> "Throughout the past season we have received several reports and specimens of cotton showing an arrested condition of the root system. Some of the plants have been of normal size and appearance with the exception of the root systems, which were very abnormal. Some of the plants have no tap root at all but have sent out long lateral roots. Others have short blunt roots which appear to have sloughed off and calloused over. We have been unable to find any disease present and have not determined the cause of this condition. Specimens submitted to J. J. Taubenhaus and B. M. Duggar, but their findings are negative for a disease-producing organism." (Neal and Wallace)

Wilt (undet.) - A blight or wilt of unknown cause was reported as causing very severe local damage in South Carolina. The disease is under investigation.

Reference:

Templeton, J. The effects of heat treatment of cotton seed on its germination and on the subsequent growth and development of the plants. Bul. Techn. & Sci. Serv. Min. Agr. Egypt 48: 1-9. 1924.

TOBACCO

WILDFIRE CAUSED BY BACTERIUM TABACUM WOLF & FOSTER

Massachusetts: Reported in a few seed beds from which it was transferred to the field. Dry weather has checked development of the disease and at present there is little trouble in evidence. (Osmun)

Connecticut: Less than usual so far in fields due to drought of July-August. Only have records of two cases in fields so far and neither of these serious. Summer too dry for serious injury even when present in fields. (Clinton)

New York: More than in 1923. In inspections made at different times of the year by Thomas and Wiant in Chemung County the following percentages of plants were found affected: 25, 100, 100, 32, 25, 4, 6, 8, 13, 2, 14, 100, 78, 91, 11, 19, 20, 29, 0, 0, 11. One field was found in Stuben County that showed 100% infection. It was so bad that the farmer considered plowing up the field. (Chupp)

Pennsylvania: Started in as a severe infection in seed beds but was checked by dry weather at transplanting. Not important. (Orton)

Maryland: Unusually severe in seed beds in Maryland this year. It was especially severe in the portion of the state where Anne Arundel, Calvert, and Prince Georges Counties meet and at least half of the beds in this region were affected. Although the disease has now reached all of the tobacco growing regions of the state, the proportion of diseased beds decreased with the distance from this center. The disease was found for the first time in St. Mary's County this year. The disease was checked more or less in all beds which were sprayed at intervals of a week to ten days with Bordeaux mixture or similar preparations. The success which the growers met in checking the disease depended upon the thoroughness and frequency of the applications. (Jehle)

Kentucky: Only about ten cases observed, several of these could be traced to certain lots of diseased seed. It is quite evidently being reduced rapidly in the state due, we believe, to the fact that the disease is so striking that most growers will not save seed from infected fields. (Valleau)

South Carolina: Found in two counties in localized areas. One field badly damaged. (W. D. Moore)

Georgia: Worse than last year; minor in some fields to 100% loss in others, depending upon seed source. The disease was scattered throughout the southern counties. (Boyd)

Florida: Gadsden County - There was much less seed bed infection this year than last and consequently less injury in the field. All beds which were steamed and seed treated were free from the disease. Second hand Connecticut cloth was steamed. (Tisdale)

Indiana: Serious in Spencer County and collected in Jefferson and Scott Counties. These are the first authentic reports for the state according to C. T. Gregory.

Wisconsin: Heavy damage in some cases, that is, almost total loss:

> possibly only up to 20% crop damage; season has been favorable for development; much more damage would have resulted had the tobacco crop been normal in growth. Only 50% of the crop in sight owing to other causes. (James Johnson, Sept. 1)

Anderson (2) and also Johnson (Wisconsin Agr. Exp. Sta. Bul. 362: 56-57. 1924) have reported overwintering of tobacco wildfire bacteria. Anderson's experiments show that the organism is not killed by the temperatures of Massachusettswinters but remains alive and virulent in diseased leaves hanging in sheds or fields, in dry fragments of diseased pods, on boards, sash, and in various other situations where they do not come into competition with other organisms. Johnson confirms this work and in addition points out that the refuse of other hosts may be a source of infection.

Johnson, Slagg, and Murwin (3) have reported a large number of other hosts belonging to several different families, for the wildfire organism.

Recent literature:

1. Anon. Recommendations for the control of wildfire. Connecticut Agr. Exp. Sta. Tobacco Sub-Sta. Bul. 4: 1-3. 1924.

2. Anderson, P. J. Overwintering of tobacco wildfire bacteria in New England. Phytopath. 14: 132-139. 1924.

3. Johnson, J., C. M. Slagg, and H. F. Murwin. Host plants of Bacterium tabacum. Phytopath. 14: 175-180. 1924.

4. Moore, E. S. Wildfire of tobacco in South Africa and control measures. Jour. Dept. Agr. South Africa 9: 211-215. Sept. 1924.

5. Thomas, H. E. Tobacco wildfire and tobacco seed treatment. Phytopath. 14: 181-187. 1924.

6. Valleau, W. D. The infection of tobacco plant beds by spitting. Science n. s. 59: 337-338. 1924.

BLACKFIRE CAUSED BY BACTERIUM ANGULATUM FROMME & MURRAY

Connecticut, Kentucky, Georgia, Florida, Indiana, and Wisconsin reported blackfire in 1924. Clinton states that successful reproduction of the disease by inoculation has not yet been obtained in Connecticut and, therefore, the exact cause of the angular leafspot in that state is somewhat doubtful although the symptoms are typical. In Kentucky it was of considerable importance and threatened complete destruction of the dark tobacco crop, however, at cutting time most fields appeared to be nearly free on account of the stripping off of the lower infected leaves. According to Valleau, seed treatment and sanitary practices were valueless in control in Kentucky as far as tests in the fields at the Experiment Station were concerned. Four percent loss was estimated for the state.

In the Gadsden County section of north Florida according to W. B. Tisdale, blackfire was more prevalent than in 1923. No infected seed beds were observed but some fields showed severe infection while others set with plants from the same beds were disease free.

In Indiana, blackfire was more widespread than the wildfire, and in Wisconsin, general infection occurred on fully three-fourths of the infested farms. Regarding it James Johnson says,

> "On account of its general distribution it is doing much more damage than wildfire. This is the first official recognition of the disease in Wisconsin. It has no doubt existed for a long time. We have difficulty in getting artificial infection with the organism. Season has been cool and wet with frequent storms."

Recent literature:

Valleau, W. D. The infection of tobacco plant beds by spitting. Science n. s. 59: 337-338. 1924.

BLACK ROOTROT CAUSED BY THIELAVIA BASICOLA (BERK. & BR.) ZOPF

New York, Kentucky, Florida, Ohio, Indiana, and Wisconsin reported this disease. According to Valleau it was worse than usual in Kentucky and the loss was considerable, largely because of low temperatures which prevailed. In Florida it was of minor importance. From Wisconsin, James Johnson reported:

> "Heavy damage from this disease general throughout the state. One half of a crop in sight, one-half of this loss may be attributed to black rootrot. Cold season favorable. Disease resistant strains showing up well."

MOSAIC (UNDET.)

Connecticut: About the usual amount, four reports. (Clinton)

Florida: Gadsden County - Only a few fields showed mosaic and in most cases then only on the sucker leaves. (Tisdale)

New York: Important in some fields. (Chupp)

Kentucky: About as usual, an average of 14% of plants infected. So far we have obtained no beneficial effects from the eradication of solanaceous weeds from the plant beds. Mosaic burn of burley was quite prevalent and was mistaken for wildfire. (Valleau)

Ohio: About the usual amount, 3 to 5% infection. (H. C. Young)

Indiana: Widespread and noted in most all fields, always more prevalent on second growth. In two cases 50% infection was found. In one of these the plants had grown in a tomato plant bed and in the other the weed carriers were noted in the bed. (Gregory)

Wisconsin: While the development of mosaic was marked in the few fields, it was strikingly less common that last year. (James Johnson)

Porto Rico: Common but not serious. (Cook)

An important contribution to the mosaic problem is that of James Johnson (2) who has infected tobacco plants with extracts from both mosaic and apparently healthy potato foliage. A mosaic symptom different from that of tobacco mosaic was obtained. A third symptom was obtained by a combination of tobacco and potato mosaic extracts on tobacco.

Kunkel (3) has found intracellular bodies in mosaic tissue of tobacco leaves resembling those formerly found on corn and Hippeastrum.

Recent literature:

1. Goldstein, B. Cytological study of living cells of tobacco plants affected with mosaic disease. Bull. Torrey Bot. Club 51: 261-273. June 1924.

2. Johnson, James. A virus from potato transmissible to tobacco. (Abstract) Phytopath. 15: 46-47. Jan. 1925.

3. Kunkel, L. O. Further studies on the intracellular bodies associated with certain mosaic diseases. Hawaiian Sugar Plant. Assoc. Exp. Sta. Bul. Bot. Ser. 3: 108-114. April 1924.

4. Olitsky, P. K. Experiments on the cultivation of the active agent of mosaic disease of tobacco and tomato. Science n. s. 60: 593-594. Dec. 1924.

5. ——————— Experiments on the cultivation of the active agent of mosaic disease in tobacco and tomato plants. Jour. Exper. Medicine 41: 129-136. Jan. 1925.

6. Scherffius, W. H. Tobacco mosaic. Some interesting experiments on a supposed disease in Turkish tobacco. Agr. Jour. Dept. Agr. Union South Africa 8: 33-34. 1924.

OTHER DISEASES

Bacterium solanacearum EFS., bacterial wilt - Destructive in vicinity of Amsterdam, Georgia, according to B. B. Higgins.

Brown rootrot (undet.) - Connecticut and Wisconsin. In Connecticut one report of serious injury was received. In this case the grower was forced to give up that field for tobacco. Has been spreading in the field for some years. (Clinton)

In Wisconsin, James Johnson reports brown rootrot as very general in 1924 and causing almost as much damage as did black rootrot. It has not yet been proved to be the same as the Connecticut field disease.

Cercospora nicotianae Ell. & Ev., frogeye - Kentucky, South Carolina, Georgia, Florida, Porto Rico, and Indiana report frogeye. In the latter state it was the most widespread of the tobacco diseases. On the whole, however, it was relatively unimportant.

Fusarium sp., rootrot - Valleau of Kentucky reports that tobacco in many of their sections was very irregular in size and in many fields in the Burley Section growth was considerably retarded. The root system of affected plants nearly always showed severe injury, most of the new rootlets being dead and replaced by others, giving a somewhat bushy appearance to the root system. It was decidedly more prevalent than usual.

Heterodera radicicola (Greef) Muell., rootknot - Rather common in the Florida tobacco section and caused considerable injury in some fields. Common, especially on bright and cigar wrapper tobacco according to Tisdale.

Macrosporium tabacinum Ell. & Ev., white speck - Ohio.

Phyllosticta sp., leafspot - Porto Rico.

Phytophthora sp., - Causing disease in the seed bed was reported from Porto Rico.

Phytophthora nicotianae (Speg.) Van Breda de Haan, black shank - Reported by Tisdale from the Gadsden County, Florida section as follows: "Appeared in many new localities of the county and caused total loss of Connecticut round tip tobacco, even in cases where no signs of the disease were noted last year. Approximately 10 to 20% loss estimated for the county."

Ringspot (undet.) - Present in most fields of burley in Kentucky but not of much importance according to Valleau.

Frenching (undet.) - Several quite severe cases noted by Valleau in Kentucky.

Recent literature:

1. Anon. Krankheiten an tabaksämlingen. Deut. Landw. Presse. 51: 285-286. June 21, 1924.

2. D'Angremond, A. De veldschimmel (Oidium spec.) in de Vorstenlanden. (The field fungus (Oidium sp.) in the Vorstenland.) - Proefstat. Vorstenlandsche Tabak, Meded. 49: 7-25. 1924. (English summary)

3. Eyles, F. Some diseases of tobacco in Rhodesia. Rhod. Agr. Jour. 21: 747-749. Dec. 1924.

4. Hoffmann. Krankheiten an Tabaksämlingen. (Diseases of tobacco seedlings) - Deutsche Landw. Presse, 51: 285-286. 1924.

5. Johnson, J. Tobacco diseases and their control. U. S. Dept. Agr. Bul. 1256: 56. Oct. 13, 1924.

6. Palm. B. T., and S. C. J. Jochems. Andreaea deliensis n. gen., n. sp., de groote stapelschimmel van de Deli-Tabak. (Andreaea deliensis n. gen., n. sp., the large stack fungus of Deli Tobacco.) - Deli Proefstat. Medan-Sumatra Bul. 19: 20 pp. 1923. (English summary)

7. Palm, B. T., and S. C. J. Jochems. Invloed van petch tjina (Leucaena glauca) op de stengelverbranding van Tabak. (The influence of petch tjina (Leucaena glauca) on stem rot of tobacco) Vlugsch. Deli Proefstat. te Medan (Sumatra), 24: 4 pp. 1924.

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SUGAR CANE

MOSAIC - (UNDET.)

Mosaic was reported to the Plant Disease Survey from Georgia, Florida, Mississippi, and Louisiana. In all of these states more of the disease occurred than last year, and the indications are that it is continuing to increase in prevalence. The following facts concerning the disease were reported by the Florida State Plant Board.

> "This disease has been found in cane fields in a number of West Florida counties. Efforts at eradication and to minimize the damage caused by the disease proved ineffective, mainly because of the indifference or inactivity of cane planters. It was difficult for them to realize that this disease, unless controlled, would occasion serious losses. Consequently farmers failed to cooperate in the project of eradication and declined to adopt the recommendations with respect to cultural practices to avoid loss. The result has been that the disease has become very firmly established in the earlier affected areas and the farmers are now appreciating the wisdom of the advice they refused to accept.
>
> "The spread of the disease, despite the adoption of quarantine precautions, has been steadily progressive and was expected. With the close of the present biennium 16 counties in North and West Florida are included in the quarantine rule of the Board which prohibits shipment of sugar cane from areas in which the mosaic disease has been found. It is believed that the utilization of this precaution will retard the rapid spread of the disease. In the meantime cane growers can be preparing for the inevitable invasion by securing and propagating varieties of sugar cane which are immune or highly resistant to the disease. The Board has endeavored to assist in this by planting in cooperation with the Agricultural Experiment Station a variety of cane, Cayana 10, which is resistant to the mosaic disease. During the fall of 1923, 35 carloads of seed cane of this variety were distributed free of cost to farmers in North and West Florida. The distribution was made mainly through the County Agricultural Agents. It is our hope that by this means adequate planting stock will be made available." (Florida State Plant Board, Quart. Bul. 9: 77-78. Jan. 1925.)

From Mississippi D. C. Neal reported:

> "There has been a widespread infection in the southern counties as usual but we do not have any estimate as to the amount of damage done. One field was reported to have a 25% infection. Mosaic was reported from the Counties of Kemper, Newton, Lauderdale, and Washington for the first time. It has not been found further north than the above mentioned counties."

In Louisiana, where serious deterioration occurred on account of disease, including mosaic, C. W. Edgerton reported from 5 to 10% reduction in yield from that disease. In a recent publication (3) he has pointed out that the loss from mosaic is very much of a question and a difficult thing to estimate or to make a satisfactory test of. However, he thinks it is doubtful if the disease produces a loss greater than 10% in Louisiana under present conditions and with the varieties that are now being grown. He points out that according to his observations, infected cane does not deteriorate progressively from year to year and calls attention to the comparatively light losses in the eastern part of the state where the disease has been established for a number of years, and to the heavier losses in the western part of the state where mosaic has more recently become prevalent. However, F. S. Earle (Australian Sugar Journal 16: 615-660. Dec. 5, 1924) thinks that the importance of cane mosaic in Louisiana is being underestimated and that it is the chief cause of decreased yields in the state.

Brandes (1) has recently reported on field inspections in three sugar cane districts of Louisiana during the years 1919 to 1920. The figures show considerably more mosaic in 1920 than in 1919, and a much smaller number of mosaic-free fields. In the same publication he compared the weights of canes from healthy and diseased plants of five varieties and found that diseased canes were from 10 to 38% lighter in weight than healthy ones.

Concerning losses in Hawaii the following figures for 1920 and 1921 have recently become available (5).

> "The losses estimated for the two crops harvested in 1920 and 1921 are as follows: For the Island of Kauai, 565 tons of sugar; for the Island of Oahu, 2,483 tons of sugar; for the Island of Hawaii, 3,298 tons of sugar; and for the Island of Maui, 11,724 tons of sugar. The loss on the four islands amounted to 18,071 tons, or an average yearly loss of a little over 9,000 tons. While no survey has been made to determine the amount of mosaic in the crops now growing, it is believed that the situation is much better than in 1920. This improvement is largely due to a decrease in the areas in Lahaina, Demerara 117, Striped Tip and Yellow Tip, and to increased planting of the more resistant varieties Demarara 1135 and Hawaii 109."

Concerning the cause of mosaic we are still in the dark. However, Kunkel (4) has recently found bodies in the diseased cane leaves similar to those he described as associated with corn and Hippeastrum. Cook (2) has also reported similar bodies in diseased canes.

From Porto Rico, Mel T. Cook reports that the disease is being controlled by the use of resistant varieties and by roguing.

Recent literature:

The following references do not constitute a complete bibliography of cane mosaic for 1924, but some of the most important, and those applying particularly to the United States, have been selected.

Cited

1. Brandes, E. W. Mosaic's role in limiting Louisiana yields. Effects of disease amply proven by data. Agricultural department active in search for new cane varieties. Facts about Sugar 18: 610-611. June 28, 1924.
2. Cook, Mel T. Studies on the cytology of sugar cane mosaic. (Abstract) Phytopath. 15: 45. 1925.
3. Edgerton, C. W., W. G. Taggart, and E. C. Tims. The sugar cane disease situation in 1923 and 1924. Louisiana Agr. Exp. Sta. Bul. 191: 1-44. Dec. 1924.
4. Kunkel, L. O. Further studies on the intracellular bodies associated with certain mosaic diseases. Hawaiian Sugar Plant. Assoc. Exp. Sta. Bul. Bot. Ser. 3: 108-114. April 1924.
5. ———— Studies on the mosaic of sugar cane. Hawaiian Sugar Plant. Assoc. Exp. Sta. Bul. Bot. Ser. 3: 115-167. April 1924.

Not cited

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Anon. Mosaic disease in Natal. Important communications from world's experts. South African Sugar Jour. 8: 269-271. 1924.

Anon. Mosaic disease of sugar cane. Trinidad's efforts to eradicate it. West India Comm. Circ. 39: 381. Sept. 25, 1924.

Barber, C. A. Experimental agriculture in Jamaica. The campaign against mosaic. Intern. Sugar Jour. 26: 474-476. Sept. 1924.

———— The present position as regards mosaic in Cuba. Intern. Sugar Jour. 26: 469-473. Sept. 1924.

Calvino, M. Doce puntos relacionados con el mosaico de la Cana y el modo de combatirlo. (Twelve points relating to the mosaic of sugar cane and the means of combating it.) Rev. Agr. Com. y Trab. (Cuba) 12: 6-7. 1924.

Cook, M. T. The control of sugar cane mosaic. Methods successfully applied by cane growers in Porto Rico from researches made by Experiment Station. Facts about Sugar. 20: 67-68. Jan. 17, 1925.

Cross, W. E. The problem of sugar cane yields in Louisiana. Head of Tucuman station discusses further his reasons for attributing low yields to mosaic disease. Facts about Sugar 19: 181, 184-185. Aug. 23, 1924.

———— La importancia de la enfermedad del mosaico en Louisiana y las posibilidades de exito de las 'Canas de Java' en ese pais. (The importance of mosaic diseases in Louisiana and the prospect of success of 'Java Sugar-canes' in that country.) Rev. Indus. y Agric. de Tucuman, 15: 1-2, 22-28. 1924.

Earle, F. S. Sugar cane mosaic and sugar cane chlorosis. Superficial resemblance often a cause of confusion. How to distinguish chlorosis from mosaic. Facts about Sugar 19: 372. Oct. 18, 1924.

Edgerton, C. W. Selecting for resistance to the sugar cane mosaic. (Abstract) Phytopath. 15: 45-46. 1925.

———— and W. G. Taggart. Tolerance and resistance to the sugar cane mosaic. Jour. Agr. Res. 29: 501-506. Nov. 15, 1924.

Pritchett, G. H. Points from cane affected with mosaic disease versus points from healthy cane at Hacienda Soledad owned by Mr. Jose Yusay. Sugar News 5: 243-247. May 1924.

Redpath, W. H. A planter's experience with mosaic disease and the planting of Uba cane. Jour. Jamaica Agr. Soc. 29: 18-21. Jan. 1925.

Rosenfeld, Arthur H. A beneficial aspect of the sugar cane mosaic disease. Internat. Sugar Jour. 26: 191-195. 1924.

———— The cause of mosaic disease of sugar cane. A step toward the solution of this mystery. Internat. Sugar Jour. 26: 535-536. Oct. 1924.

Storey, H. H. Diseases of sugar-cane of the mosaic type in South Africa. Part I. True mosaic, mottling, or yellow stripe disease. - Jour. Dept. Agr. South Africa 9: 108-117. 1924.

United Fruit Company. Agricultural Research Department. The mosaic disease of sugar cane in 1923.

Veve, R. A. Overcoming the mosaic disease at Fajardo. A Porto Rican experience in dealing successfully with the disease by use of the roguing system. Facts about Sugar 18: 468. May 17, 1924.

REDROT CAUSED BY COLLETOTRICHUM FALCATUM WENT.

Redrot was common in Mississippi, Louisiana and Porto Rico. In the Gulf States it was particularly serious early in the season, reducing germination of the seed cane and impairing the stand. From 5 to 10% reduction in yield was estimated by Edgerton for Louisiana, largely on account of poor stands. Concerning the Louisiana situation Edgerton (1) writes as follows:

> "In the season of 1923, the redrot infection was as high as it has been seen in Louisiana. The very wet season combined with the heavy borer infestation made conditions ideal for the spread of the disease. Examinations made at the mills at grinding time showed this disease in great abundance. This very heavy redrot infestation was one of the causes of the very low sucrose content of the juice in 1923.
>
> "This very heavy redrot infection was also partly responsible for the very poor stands obtained in the spring of 1924. Trips were made over a greater portion of the sugar belt during the early part of the season. Hundreds of the old seed stalks which failed to germinate were dug up and examined. The percentage of these

stalks showing typical redrot was very large, apparently 75% or more. Furthermore, on digging up the old stubbles that failed to grow, the same condition was found. These were just as severely infected with the redrot as were the planted stalks. As it has been demonstrated that redrot will cause just such a decrease in germination, the presence of such a heavy infection explains very largely the poor, thin stands of 1924.

"Notwithstanding the fact that the spring started with a very heavy redrot infection, there was very little spread of the disease in growing cane during the season of 1924. This is easily accounted for by the very dry season which prevented the development and spread of the redrot fungus and by the light borer infestation during the early summer months. Consequently at the end of the season there was very little redrot. The very high sucrose analyses that were obtained at the mills would not have been possible with a heavy redrot infection."

Recent literature:

Cited

1. Edgerton, C. W. The sugar cane disease situation in 1923 and 1924. Louisiana Agr. Exp. Sta. Bul. 191: 16-17. Dec. 1924.

Not cited:

Shepherd, E. F. Les maladies de la canne à sucre à Maurice L. 'Redrot'. Rev. Agr. Ile Maurice 13: 59-61. Jan.-Feb. 1924.

ROOTROT CAUSED BY VARIOUS FUNGI

The complicated rootrot troubles of sugar cane were reported particularly from Louisiana and Porto Rico. Some of the organisms which have been reported as causing rootrots are Marasmius sacchari Wakker, Pythium sp., Rhizoctonia spp., and snails. Concerning the latter Rands (1) has recently reported that snails injure the roots and predispose the plants to rootrot. Thielavia paradoxa (Berk. & Br.) Zopf and Himantia stellifera Johnston were also reported by Cook from Porto Rico as causing rootrot.

Recent literature:

Cited

1. Rands, R. D. Snails as predisposing agents of sugar cane "root disease" in Louisiana. Jour. Agr. Res. 28: 969-970. 1924.

Not cited

Small, W. A Rhizoctonia causing root disease in Uganda. Trans. Brit. Mycol. Soc. 9: 152-166. 1924.

OTHER DISEASES

Bacterium vascularum EFS., gumming disease.- Reported by Cook from Porto Rico as severe in a few localities. Resistant strains are giving good results.

Cercospora vaginae Krueger, red spot of leaf sheath - Porto Rico. Common.

Cytospora sacchari Butler - Porto Rico. Occasional.

Helminthosporium sacchari, Butler, eye leafspot - Mississippi and Porto Rico. In Porto Rico it was severe, especially on the variety D 109.

Leptosphaeria sacchari Van Breda de Haan, ringspot - Florida and Porto Rico. Common.

Melanconium sacchari Mass., - Florida and Porto Rico.

Phyllosticta sp., probably *Phyllosticta sacchari* Speg., leafspot - Was reported to the Survey from Porto Rico and for the first time from southern Georgia. In Georgia it was noted as serious in only two or three fields near Pavo. One field showed 100% plants affected with many leaves dying somewhat prematurely. In Porto Rico the disease was said to be widespread.

Plasmodiophora vascularum Matz, - Locally severe in parts of Porto Rico on the variety D 109 according to Cook.

Recent literature on other diseases:

The following references do not constitute a complete bibliography of other cane diseases for 1924, but some of the most important and those applying to the United States have been selected.

Anon. La enfermedad del sereh en Java. Industr. Azucarera 29: 114-116, 245-247. Mar.-Apr. 1924.

Anon. Menace of streak disease. Need for selected plant cane. South African Sugar Jour. 8: 549. 1924.

Agee, H. P. Resistance to disease and adverse conditions by hardy sugar cane types. Louisiana Plant. 72: 75-76. Jan. 26, 1924.

Barber, C. A. Researches on the sereh disease in Java. Intern. Sugar Jour. 26: 18-21. Jan. 1924.

———— Sugar cane diseases in Australia and their control. Intern. Sugar Jour. 26: 522-528. Oct. 1924.

Brandes, E. W. Important sugar cane diseases not present in the United States. *In* the reference book of the sugar industry of the world. 2: 79-81. July 1924.

———— Sugar plant investigations. Work of the Government's office in Plant Industry Bureau at Washington described. Facts about Sugar 18: 230. March 8, 1924.

Ceresa, G. El tratamiento de los trozos de cana con agua caliente. Chaparra Agr. 1: 11-13. June 1924.

Cook, M. T. Helminthosporium leafspot of sugar cane in Porto Rico (Preliminary paper). Jour. Dept. Agr. Porto Rico 8: 5-10. Oct. 1924.

Cottrell-Dormer, W. Diseases and pests of sugar cane. Austral. Sugar Jour. 16: 379-380. Sept. 5, 1924.

———— Cane diseases in Lower Burdekin areas. Austral. Sugar Jour. 16: 231, 233, 234. July 1924.

Cottrell-Dormer, W. Sugar pests and diseases in the Mackay district. Queensl. Agr. Jour. 21: 363-368, 428-434. May-June 1924.

——— Sugar cane disease in the south. Austral. Sugar Jour. 16: 596-597, 604-605. 1924.

Cross, W. E. Present needs in cane disease control. Intern. Sugar Jour. 27: 26-31. Jan. 1925.

Edgerton, C. W. The sugar cane disease situation in Louisiana. In the reference book of the sugar industry of the world 2: 82-83. July 1924.

Fawcett, G. L. La enfermedad de las raices en la cana de azucar. Hacienda 19: 174-175. June 1924.

Kunkel, L. O. Histological and cytological studies on the Fiji disease of sugar cane. Hawaiian Sugar Plant. Assoc. Exp. Sta. Bul. Bot. Ser. 3: 99-107. April 1924.

Lee, H. A. Present needs in cane disease control. Intern. Sugar Jour. 26: 543-545. Oct. 1924.

——— and W. C. Jennings. Bacterial red stripe disease of tip canes. Hawaiian Sugar Plant. Assoc. Exp. Sta. Circ. 42: 1-4. April 1924.

Lyon, H. L. Cane pathology. In Rep. Comm. in Charge Exp. Sta. Proc. Hawaiian Sugar Plant. Assoc. 43: 18-22. 1924.

North, D. S., and H. A. Lee. Java gum disease of sugar cane identical to leaf scald of Australia. Phytopath. 14: 587. Dec. 1924.

Shepherd, E. F. S. Le charbon de la canne a sucre. Rev. Agr. Ile Maurice 14: 107-108. Mar.-Apr. 1924.

——— La maladie de la pointe dans la canne a sucre. Rev. Agr. Ile Maurice 15: 146-147. May-June 1924.

——— Les maladies de la canne a sucre a Maurice. I. 'Red rot'. (Diseases of the Sugar-cane in Mauritius. I. 'Red rot'.) Rev. Agr. de l'Ile Maurice, 13: 59-61. 1924.

——— La maladie de la gomme. (The gumming disease.) - Rev. Agr. de l'Ile Maurice, 16: 207-208. 1924.

Storey, H. H. Streak disease in Uba cane. Louisiana Plant. 73: 268-270. Oct. 4, 1924.

——— The influence of streak disease upon the yield of Uba Cane. South African Sugar Jour. 8: 519-522. 1924.

SUGAR BEET

Only a very few collaborators sent in reports on the diseases of the sugar beet during 1924 and neither are any reports at hand from pathologists working particularly on the disease of this crop. These summaries, therefore, will have to be based largely on published results.

CURLY TOP (UNDET.)

R. F. Crawford of New Mexico reported more curly top than usual with considerable damage, estimated at about 15% of the crop. It occurred particularly in Dona Ana County. C. W. Hungerford of Idaho makes the statement that it is important every year but seemed to be less severe in 1924 than in 1923. The reduction in yield for Idaho was placed at 6%.

A recent development of significance in the curly top problem has been the production of the disease by direct artificial inoculation. This was reported by H. H. P. Severin (3 & 4) and also by Carsner and Stahl (1). Severin inoculated the expressed juice from the leaves and roots of diseased beets into the crown of healthy beets and produced typical curly leaf symptoms in 9 out of 100 beets inoculated. When noninfective beet leaf hoppers were allowed to feed on the inoculated beets after curly leaf developed they transmitted the disease to healthy beets. Severin reported that the causative agent, whatever it may be, is generally distributed throughout the foliage and root. That Bacillus morulans is the cause of curly top is improbable, according to Severin, since attempts to produce curly leaf by contaminating the mouth parts of noninfective leaf hoppers with cultures of B. morulans were unsuccessful. Other experiments were run to determine the rapidity of distribution of the infective principle. The rapidity with which it traverses the beet leaf seems rather remarkable. Severin found that the shortest time required for it to travel through a beet petiole seven inches long was one-half hour at a mean temperature of 103.5° F.

Carsner and Stahl (1 & 2) have reported progress in the selection of curly top resistant strains. They have obtained some evidence pointing toward the possibility that the passage of the infective agent through the resistant plant Chenopodium murale may attenuate or modify it in some way.

Recent literature:

1. Carsner, Eubanks, and C. F. Stahl. Progress report on curly-top of sugar beet. (Abstract) Phytopath. 14: 122-123. 1924.

2. ——— Studies on curly-top disease of sugar beet. Jour. Agr. Res. 28: 297-320. April 26, 1924.

3. Severin, H. H. P. Curly leaf transmission experiments. (Abstract) Phytopath. 14: 123. 1924.

4. ——— Curly leaf transmission experiments. Phytopath. 14: 80-93. 1924.

NEMATODE, HETERODERA SCHACHTII SCHMIDT

During the past year Rensch (1 & 2) has reported on a method of nematode eradication which makes use of certain preparations, the names of which are not given, applied to the soil before the beets are planted. These preparations have an effect similar to that of the excretions from beet roots in that they stimulate the emergence of nemas which, after emergence, die from lack of a proper host. In this respect these preparations to some extent resemble chicory which is known to have a similar secretion from its roots but which is not a suitable host for the nemas.

Recent literature:

1. Rensch, B. Control of sugar beet nematode. New method successfully used in German experiments utilizes attractive effect of certain plant secretions. Facts About Sugar. 19: 132-133. Aug. 9, 1924.

2. ―――――― Eine neue methode zur bekämpfung der rübennematoden. Mitt. Deut. Landw. Ges. 39: 412-414. May 31, 1924.

ROOTROTS CAUSED BY PHOMA BETAE (OUD.) FRANK AND RHIZOCTONIA SP.

Ohio, Michigan, Wisconsin, Iowa, Montana, and Idaho reported trouble from these rootrots. Concerning the situation in Michigan, G. H. Coons reported as follows:

> "Sugar beets in Michigan suffer chiefly from rootrots caused by the complex, as yet not surely distinguishable in the field, Rhizoctonia, Pythium, Phoma, Aphanomyces, etc. These parasites cause poor stands and rotting of the half-grown beets. The latter is a 'hand-over' from infection in the seedling stage. The present season showed about 5% loss in stand, and 10% loss in beets half to full grown, chiefly from Phoma and Rhizoctonia. Determining relative importance between these organisms is not possible with present knowledge and in absence of adequate culture work on specimens. The rather extensive development of Phoma rot is somewhat unusual for Michigan. The Rhizoctonia rot took the form of rots of the feeding roots, leading to stunting of the beets, rather than the typical canker form with cracking of tops. Average yield was low - 7 tons per acre - but this was compensated by very high sugar - 18 to 20%. We believe the figure, 15%, conservative as to actual loss for the state. Without the compensation of high sugar, the loss would have been, on the strict tonnage, more nearly twice this figure."

Caroline Rumbold (3) has shown that treatment of the seed with formaldehyde vapor and steam is effective in increasing the tonnage of beets in the irrigated sections of the West. This effect is possibly due to elimination of seed borne Phoma betae and other fungi. The sugar beet seed balls are exposed for twenty minutes to a mixture of formaldehyde vapor and steem with a temperature of 140° F. (60° C). The seed are not injured and have been found to be viable four years after treatment.

Recent literature:

1. Coons, G. H. Root diseases of the sugar beet. Their causes and prevention. Conditions favorable to parasites that produce damping off. Facts About Sugar 18: 251-253. March 15, 1924.

2. Müller, H. C., E. Molz, and K. Muller. Ueber die Bekämpfung des Wurzelbrandes der Ruben durch Saatgutbeize. (The control of root rot of beets by seed disinfection) Deutsche Landw. Presse 51: 62. 1924.

3. Rumbold, Caroline. Sugar beet seed disinfection with formaldehyde vapor and steam. Facts about Sugar 18: 322-324, 352-354. April 1924.

OTHER DISEASES

Actinomyces scabies (Thax.) Güssow, scab - Idaho, unimportant.

Bacterium tumefaciens EFS. & Town., crowngall - Iowa, very slight.

Cercospora beticola Sacc., leafspot - Less than in 1923 was reported from Michigan and Iowa, but more than usual was estimated for Wisconsin. One percent loss was estimated for the latter state.

Recent literature:

Gabotto, L. La Cercospora beticola nel 1924. Il Coltivatore 71: 108-112. Feb. 1925.

Schenck, Erna. Ueber das Auftreten einer Hypochnusart auf Zuckerrübe. (The occurrence of a species of Hypochnum on sugar beet.) - Centralbl. fur Bakt., Ab. 2, 61: 11-18, 317-322. 1924.

MISCELLANEOUS VEGETABLES

JERUSALEM ARTICHOKE

Bacterium sp., bacterial rot - Considerable damage to tubers in experimental plot at Gainesville, Florida. (Weber)

Sclerotium rolfsii Sacc., stemrot - Florida, attacked plant stalks near surface of the soil, quickly girdling and killing them. Not important. (Weber)

ASPARAGUS

Botrytis sp., blight - Illinois.

Cercospora caulicola Wint., leafspot - Florida, not common but severe infection where found. (Weber)

Cercospora sp. - Causing leaf and stem spot was reported from California (2).

Fusarium sp., stemrot - Reported from Pennsylvania causing tips to die back soon after they pushed through the soil. Found in New Jersey where it was reported as causing the plants to become stunted and die; from Illinois it was reported as causing lesions on the branches.

Leopard spot (undet.) - South Carolina, minor importance.

Puccinia asparagi DC., rust - 1924 was apparently favorable for the development of rust. In Connecticut, New Jersey, and Delaware it was said to be quite severe, at least in some fields. In the latter state the heaviest infection for the past four years was observed. The disease was reported from 13 widely scattered states, from Connecticut to North Dakota and New Mexico.

Recent literature:

1. Schermerhorn, L. G. New varieties of asparagus. Rust resistant strains are promising. New Jersey State Hort. Soc. News 5: 82. March 1924.

2. Smith, E. H. Some diseases new to California. (Abstract). Phytopath. 14: 125. Feb. 1924.

BEET

Actinomyces scabies (Thax.) Gus., scab - New Jersey, Ohio, Wisconsin, and North Dakota. Unimportant in all cases.

Cercospora beticola Sacc., leafspot - Reported from a large number of the eastern states. In general it was of slight importance although in local sections it caused some damage.

Heterodera radicicola (Greef) Muell., rootknot - Georgia, Florida, Texas, Washington.

Phoma betae (Oud.) Frank, rootrot and leafspot - Illinois and Washington. Seen only as a leafspot in Illinois. First report from that state.

Sclerotium rolfsii Sacc., stemrot - Florida.

Uromyces betae (Pers.) Lév., rust - In 1924 this disease was found for the first time in Oregon. The only other states that have reported the disease to date are Colorado and California. H. P. Barss wrote as follows on September 20:

> "Serious attack found in this small garden (Lincoln County) on table beet and Swiss Chard but not on a curly variety of Chard. First record from Oregon. Not observed last year. Not noticed in other gardens in Newport. Seed secured from local grocer, source unknown. Season driest on record. Has not been reported to Experiment Station from any other locality."

CARROT

Alternaria radicina Meier, Drechs., & Reddy, blackrot - New York, important in storage houses.

Bacillus carotovorus L. R. Jones, softrot - New York, Illinois and Colorado. Said to be causing actual field losses in Illinois.

Botrytis sp. - Graymold was reported by Heald and Dana (Trans. Amer. Microsp. Soc. 43: 136-144. July 1924) as having been found in storage cellars in Whitman County, Washington.

Cercospora apii carotae Pass., leafspot.- Serious in Indiana as a leaf and stem blight in market gardens.

Heterodera radicicola (Greef) Muell., rootknot - Florida.

Macrosporium carotae Ell. & Langlois, leafblight - Always important on Long Island, N. Y., according to Chupp; also reported from southern New Jersey, Florida, and Porto Rico.

Mosaic (undet.) - Michigan, 80% found in certain seed stocks grown at the college, it was taking the form of witches' broom production. (Coons)

Rhizoctonia sp., stemrot - New York, Florida, and Kansas. In Florida several instances of serious damage to roots were noted.

Rio Grande disease (undet.) - Texas (see lettuce).

Sclerotinia intermedia Ramsey, rootrot - This fungus was isolated from roots of carrot in February 1921 on material collected in the Chicago market and was named by Ramsey (1).

White heart or rabbit ear - New York. A minor disease of carrot similar to the white heart or rabbit ear (Rio Grande disease) of lettuce. Occurred in the Elba Muck district of New York but did little injury. (Felix & Chupp)

Literature:

1. Ramsey, G. B. Sclerotinia intermedia n. sp. A cause of decay of salsify and carrots. Phytopath. 14: 323-327. July 1924.

EGGPLANT

Alternaria solani (Ell. & Mart.) Jones & Grout, leafspot - Pennsylvania, Delaware, Florida.

Ascochyta lycopersici Brun., leafspot - Illinois.

Bacterium solanacearum EFS., bacterial wilt - Georgia, Florida, and Porto Rico; causing considerable local damage. In Florida certain fields were observed where 10% of the plants were killed before the fruit set.

Botrytis sp., wilt - Washington.

Diplodia sp., fruitspot - Florida.

Mosaic (undet.) - Florida.

Phomopsis vexans (Sacc. & Syd.) Harter, leafspot and fruitrot - New Jersey, Delaware, Maryland, Georgia, Florida, Indiana, Illinois, Iowa, Missouri, and Porto Rico. In New Jersey, Long Purple was much more resistant than Black Beauty and transmission by means of seed was again demonstrated. In other states it was of considerable importance locally.

Verticillium alboatrum Reinke & Berth., wilt - New Jersey, Delaware, and Pennsylvania. The New Jersey Department of Plant Pathology reports that Verticillium alboatrum was isolated from eggplant, okra, chrysanthemum, rose, and peach, and inoculated into eggplants through punctures below ground, producing typical eggplant wilt in every case. A culture of the fungus isolated and verified by C. W. Carpenter, formerly with the Bureau of Plant Industry, and Verticillium isolated by G. F. Gravatt from sugar maple, also produced the disease.

Literature:

1. Cook, M. T. A bacterial wilt of eggplants (Preliminary paper). Jour. Dept. Agr. Porto Rico 8: 15-16. Oct. 1924.

2. ——— Two new bacterial diseases. (Abstract) Phytopath. 15: 55. Jan. 1925. (Wilts of eggplant and cosmos)

GLOBE ARTICHOKE (CYNARA)

A serious disease caused by a species of Oidium was observed in 1923 in Algeria and reported in 1924 (1). The crop was reduced from 150,000 to 35,000 heads. This powdery mildew is not known to occur in the United States.

A rot induced by a Botrytis of the cinerea type, causing serious losses of shipments of globe artichoke buds from California, has recently been described by Link and Bailey (2).

Literature:

1. Anon. Maladies de l'Artichaut. (Diseases of the Artichoke.) La Vie Agric. et Rurale 24: 392. 1924.

2. Link, G. K. K., and A. A. Bailey. Botrytis rot of the globe artichoke. Jour. Agr. Res. 29: 85-92. July 15, 1924.

OKRA

Fusarium vasinfectum Atk., wilt - Georgia (2% loss), Texas (1% loss).

Heterodera radicicola (Greef) Muell., rootknot - Georgia, Mississippi, and Texas.

Ozonium omnivorum Shear, rootrot - Texas.

Phyllosticta sp., leafspot - Illinois.

Rhizoctonia sp., rootrot - Texas.

Verticillium alboatrum Reinke & Berth., wilt - New York and New Jersey. In the latter state this disease was very important and more was present then last year. On account of it the growing of okra has been discontinued in some sections. An estimate of 40% reduction in yield of the crop for the state was made by W. H. Martin.

PARSLEY

Cercospora sp., leafspot - New Jersey.
Septoria petroselini Desm. - New Jersey.

PARSNIP

Cercospora apii pastinacae Farl., leafspot - Indiana, Illinois and Missouri.

Ramularia pastinacae (Karst.) Lindr. & Vester., leafspot - New York, common but not destructive.

Yellows (undet.) - South Dakota.

PEANUT

Cercospora personata (Berk. & Curt.) Ell. & Ev., leafspot - North Carolina, South Carolina, Georgia, Florida, and Louisiana. General for the most part, not serious.

Cladosporium sp., leafmold - Florida.
Ozonium omnivorum Shear, rootrot - Texas.
Rhizoctonia sp., damping off - Florida, common.
Sclerotium rolfsii Sacc., stemrot - Florida, common; Texas, prevalent.

Literature:

1. Anon. Rosette disease in peanuts. Jour. Dept. Agr. South Africa, 8: 9. Jan. 1924.

2. Hartley, Carl. Varietal tests of peanut (Arachis hypogaea) for wilt resistance. (Abstract) Phytopath. 15: 55. Jan. 1925.

3. Maublanc, Andre. Les maladies de l'arachide. Agron. Colon. 10: 1-12. Jan. 1924.

4. Seumatu, N. Ueber eine Botrytiskrankheit der Erdnuss (Arachis hypogaea L.). (A Botrytis disease of the ground nut (Arachis hypogaea L.).) - Japanese Jour. of Botany 2: 35-37. 1924.

PEPPER

Bacterium solanacearum EFS., bacterial wilt - Texas.

Bacterium vesicatorium Doidge, blackspot - Florida. Found in 1923 to be very severe in a field near Gainesville. Not common. (Weber)

Botrytis sp., graymold rot - Connecticut, Virginia.

Cercospora capsici Heald & Wolf, leafspot - Georgia, Florida (often severe), Texas (trace), and Porto Rico (severe).

Fusarium sp. Fusarium wilt of Chile pepper was serious in parts of New Mexico and Arizona.

Glomerella piperata (Ell. & Ev.) Spauld. & Schrenk, anthracnose - Georgia, Mississippi, Porto Rico, and Philippine Island. From the Philippine Islands G. O. Ocfemia (Philippine Agr. 13: 163-166. Sept. 1924) reports as follows:

> "First collected June 2, 1924, after the first hard rains following the dry season of this year. At the time the specimens were collected actual counts of diseased fruits showed that from 50 to 75% of the crop was infected and was absolutely useless."

Heterodera radicicola (Greef) Muell., rootknot - New Mexico.

Macrosporium sp., fruitrot - Illinois, Wisconsin.

Mosaic (undet.) - New Jersey, Florida, and Indiana. In Florida it was the most severe disease of peppers.

Ozonium omnivorum Shear, rootrot - Texas.

Sclerotium rolfsii Sacc., blight - Georgia, Mississippi, Louisiana, and Philippine Islands.

Sclerotinia sclerotiorum (Lib.) Mass., twig blight - Florida. Caused killing of plants in one field at least, by attacking tips of branches and gradually killing them back. (Weber)

Literature:

1. Higgins, B. B. The blossom-end rot of pepper. (Abstract) Phytopath. 15: 50. Jan. 1925.

2. Trotter, A. "Cancrene pedale" del peperome e melanzana nella campanis (Capsicum annuum e Solanum melongena) Riv. Patol, Veg. 14: 125-130. Aug. 1924.

RHUBARB

Ascochyta rhei Ell. & Ev., leafspot - Connecticut, New Jersey, Delaware, and South Dakota.

Phyllosticta sp., crownrot - Pennsylvania, slight ~~but spreading~~ in 1924. Indiana, severe in Vanderburg County.

Phyllosticta straminella Bres., leafspot. New York, very common on Long Island. Pennsylvania.

Literature:

Millard, W. A. Crown rot of Rhubarb. Univ. Leeds and Yorkshire Council for Agric. Educ. Bul. 134: 28 pp. 1924.

SALSIFY

Albugo tragopogonis (Pers.) Gray, white rust - New York, Colorado, and Washington.

Erysiphe cichoracearum DC., powdery mildew. Washington.

Sclerotinia intermedia Ramsey, rootrot - Found by Ramsey (1) occurring on decayed roots of salsify on the Chicago market in 1920.

Literature:

1. Ramsey, G. B. Sclerotinia intermedia n. sp. A cause of decay of salsify and carrots. Phytopath. 14: 323-327. July 1924.

SPINACH

Cercospora flagelliformis Atk., leafspot - Georgia. First report from that state.

Colletotrichum spinaciae Ell. & Hals., anthracnose - Texas.

Fusarium sp., rootrot.- New York.

Mosaic (undet.) - New York, New Jersey.

Peronospora effusa (Grev.) Ces., downy mildew - Connecticut, New York, New Jersey, Virginia, Texas, and New Mexico. The following reports are of interest.

New York: Wayne County - Spinach mildew has been found only on the variety King of Denmark and the indications are that it came in with the seed. No mildew has been found on any wild host on the muck. (Newhall, June 9)

Peronospora effusa has been found in abundance on Chenopodium album in and around fields of Spinacia oleracea but did not seem to spread to the latter. The reverse has also been noted indicating the distinctness of these mildews. (Newhall, July 14)

New Jersey: In portion of one field where manure was applied in fall, the trouble was slight - where manure applied just before planting the disease was much more abundant. (Dept. Pl. Path.)

Phyllosticta chenopodii Sacc., leafspot - Delaware.

Literature:

1. Geise, F. W. The development of blight resistant spinach. Rept. Maryland Agr. Soc. and Maryland Farm Bur. Feb. 8: 351-357. 1924.

2. Schoevers, T. A. C. X-organisms in diseased spinach roots. Rept. Intern. Conf. Phytopath. & Econ. Entom. Holland 1923: 116. 1923.

NEW ZEALAND SPINACH (TETRAGONIA)

Cercospora sp., leafspot. Caused spotting of older leaves in parts of Florida and was also reported from Indiana.

SWISS CHARD

Bacterial canker (undet.) - J. J. Taubenhaus of Texas has furnished the following note concerning this disease which heretofore has not been reported to the Plant Disease Survey.

> "Swiss chard (Beta species) is a variety of beet which produces large edible foliage. It is extensively grown in Texas as a truck or garden crop during the winter and spring months. The leaves are sold in bunches and consumed the same way as spinach. This plant is often affected by a stalk canker which seems to be new. The trouble is characterized by dark, sunken, scattered spots which may be found at the base of the leaf stalk or anywhere on the fleshy petiole. Frequently these cankers work deeply into the tissue thereby causing the leaf stalk to fall over and to break. Occasionally infection extends throughout the entire length of the midrib causing the leaf to die prematurely.
>
> "Cultures of the diseased material were made and a bacterial organism repeatedly isolated which greatly resembled the one described by Brown and Jamieson as Pseudomonas aptatum Brown and Jamieson. This organism was found by them to be pathogenic to beets, nasturtiums, beans, lettuce, pepper, and eggplants. The general gross characteristics of the Pseudomonas as isolated from the Swiss Chard were found to be as follows: Aerobic, smooth, white colonies on beef agar plates with the substratum changing to yellowish green. Alkaline reaction in litmus milk. Liquefies gelatin and has no diastasic action on potato starch; stains with all basic analin dyes and is gram negative; tolerates considerable acid. The rods are short, motile, with bipolar flagella. There are no spores or capsules formed and involution forms are rare. No inoculations were made with the Swiss chard organism on either the beet or nasturtium. However, inoculations carried out with the Swiss chard organism on healthy Swiss chard stalks reproduced the disease."

Cercospora beticola Sacc., leafspot. - Pennsylvania, Delaware, Texas, Indiana, Illinois, and Colorado.

THE PLANT DISEASE REPORTER

Issued By

The Office of Plant Disease Survey
and
Pathological Collections

Supplement 42

Diseases of Forest and Shade Trees, Ornamental and Miscellaneous Plants in the United States in 1924

September 15, 1925

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

PLANT DISEASE SURVEY

1924

List of collaborators of the Plant Disease Survey who have made the principal contribution to the 1924 annual summary.

It should be understood that many other collaborators and pathologists have assisted in gathering data within the States but the following list includes those who actually furnished state reports to the Washington office.

Arkansas	Dept. Pl. Path. V. H. Young
Colorado	C. D. Learn
Connecticut	G. P. Clinton E. M. Stoddard
Delaware	J. F. Adams
Florida	G. F. Weber
Georgia	O. C. Boyd
Illinois	L. R. Tehon
Indiana	M. W. Gardner T. C. Yuncker
Iowa	I. E. Melhus H. S. Conard
Kansas	R. F. White
Kentucky	W. D. Valleau
Louisiana	C. W. Edgerton
Maryland	J. B. S. Norton
Massachusetts	W. H. Davis
Michigan	G. H. Coons Ray Nelson
Minnesota	Sect. Pl. Path.
Mississippi	D. C. Neal H. D. Barker J. M. Wallace
Missouri	W. E. Maneval
Montana	W. N. Christopher
New Jersey	Sect. Pl. Path. W. H. Martin
New Mexico	R. F. Crawford
New York	Charles Chupp
North Dakota	Wanda Weniger
Ohio	H. C. Young Freda Detmers
Pennsylvania	C. R. Orton R. S. Kirby W. A. McCubbin L. O. Overholtz H. W. Thurston
South Carolina	C. A. Ludwig
South Dakota	E. J. Petry A. T. Evans
Texas	J. J. Taubenhaus
Vermont	A. H. Gilbert B. F. Lutman
Virginia	F. D. Fromme
Washington	Dept. Pl. Path. Arthur Frank
Wisconsin	R. E. Vaughan

DISEASES OF FOREST AND SHADE TREES, ORNAMENTAL AND MISCELLANEOUS PLANTS IN THE UNITED STATES IN 1924

Plant Disease Reporter
Supplement 42

July 15, 1925

Prepared by
G. Hamilton Martin

CONTENTS

Foreword

This summary of the diseases of forest and shade trees, ornamental and miscellaneous plants in the United States in 1924 follows the same general plan as those of the preceding years. The sources upon which the information is based are as follows: (1) collaborators, (2) specialists in the Office of Forest Pathology, (3) articles in botanical journals, and (4) special reporters.

Many reports of new occurrences were received for 1924 both for states and for the United States. In the accompanying summary these first occurrences have been noted by symbols before each individual report. Many occurrences are given which have been obtained from literature, from the herbarium of Pathological Collections, or from past records of the Plant Disease Survey. Quite a number of diseases have been omitted due to their unimportance or the fact that they have been reported in other years. It is not the object of this summary to enumerate all of the diseases that have been reported during the year, but to give facts concerning only some of the more important ones. "Standardized Plant Names" has been used as the source for the names of the hosts.

Where specimens are not indicated the report is based on the authority of the person cited. The date given is that of its earliest reported appearance in 1924. Reports from British Columbia are given on account of the probable occurrence of the disease being also in Washington and Idaho.

The following symbols are used: * indicates a specimen in Pathological Collections; + preceding disease indicates the first report of the disease to the Plant Disease Survey; + preceding state indicates the first report from the state to the Plant Disease Survey; P.r. indicates prior reports of the disease to the Plant Disease Survey.

References have been given and in some instances brief abstracts made of recent articles which may be of service to those who do not have access to all the botanical journals. A list of collaborators is given on the first page. The names of the special reporters are as follows:

Boyce, J. C.
Cook, Mel. T.
Dietz, H. F.
Emigh, Dr.
Gravatt, A. E.
Gravatt, G. F.
Graves, Arthur
Guba, E. F.
Hahn, G. G.
Hanson, Albert
Hildebrandt, Mr.
Hunt, W. R.
Jenkins, Anna E.
Johnston, C. O.
Martin, J. F.
Matteson, Julius
McClintock, Mr.
McDonnell, Mr.
Miles, G. F.
Muenscher, W. C.
Newhall, A. G.
Nolla, J. A. B.
Paxton, Glenn E.
Weiss, Freeman
Welch, D. S.
Wright, B.

STATUS OF WHITE PINE BLISTER RUST CONTROL IN THE U. S. IN 1924

(Prepared by J. F. Martin, Office of Blister Rust Control)

This destructive disease of five-needled pines (white pines) is present in the New England States, New York, New Jersey, Pennsylvania, Michigan, Wisconsin, Minnesota, and Washington. In Canada it occurs in the provinces of British Columbia, Ontario, Quebec, New Brunswick, Nova Scotia, and Prince Edward Island. The results of scouting show that the European or cultivated black currant (Ribes nigrum) is one of the most important factors in the long distance spread and local establishment of this disease. Gradually the important white pine states are declaring it a public nuisance and prohibiting its further cultivation. The U. S. Department of Agriculture also recognizes this species as a distinct menace to the white pine timber supply of the country and is opposed to its growth in the United States.

Progress of control in the East

The control campaign in New England and New York has made good progress since its inception in 1922. Public interest and cooperation in the work has been very satisfactory as shown by the following tables:

Table 91. Cooperating communities and individuals.

New England and New York	1922	1923	1924
No. of communities cooperating	59	122	148
No. of individuals cooperating	971	1968	3059

Table 92. Acreage eradicated and currants and gooseberries destroyed.

New England and New York	1922	1923	1924
No. acres eradicated of currants and gooseberries	476,621	892,639	*1,008,042
No. currants and gooseberries destroyed (wild and cultivated)	4,865,875	8,024,991	9,540,129

*See Table 92.

In the White Mountain National Forest an additional 4,944 acres were eradicated of 151,489 currants and gooseberries in cooperation with the Forest Service.

There has been no marked change in the blister rust situation in New Jersey, Pennsylvania, Michigan, Wisconsin and Minnesota. The rust is present in these states in much less abundance than in New England and northeastern New York. This appears to be largely due to (1) fewer original introductions of diseased host plants and (2) the period of establishment of the rust being affected by less favorable field conditions.

Progress of control in the West.

In the West a blister rust control program covering a period of 10 years has been undertaken in cooperation with the states concerned. Scouting during the past year showed no spread of the rust southward of the limits of the infected area as determined in 1923. This probably was due primarily to dry weather conditions that prevailed in the northwest and to the extensive eradication of cultivated black currants. Additional pine infections were found in western Washington indicating that the rust is beginning to establish itself on the native pine host in this region.

Cultivated black currants (Ribes nigrum) have been systematically located and eradicated in western Montana, Idaho, Washington, Oregon and northern California and part of this region is now being reexamined for any plantings that may have been overlooked. Field data show that these plants become infected at great distances from diseased pines and establish new centers of infection from which the rust spreads locally to other currants and gooseberries and to white pines.

Effective quarantines are being maintained to prevent the spread of the rust into disease-free regions through the shipment of infected host plants. These quarantines are enforced by the Federal Horticultural Board, the inspection work being done by trained inspectors of the Bureau of Plant Industry. During 1924 30 violations by nurseries and 51 by private individuals ignorant of the quarantines were located. The number of violations by nurserymen has been reduced from 193 in 1921 to 30 in 1924. Meanwhile experimental work in developing and applying control practices is being carried forward as rapidly as possible. The results obtained have been favorable and indicate protective measures can be worked out and applied at costs which will make control practical under western forest conditions.

CEDAR BLIGHT CAUSED BY *PHOMOPSIS JUNIPEROVORA* HAHN
(Prepared by Glenn Gardner Hahn, Office of Investigations in Forest Pathology)

Cedar blight was first observed by F. C. Stewart as a destructive disease of young red cedar trees caused by a Phoma in a nursery at Kent, Iowa, 1896-7. (Phytopathology 8: 33-34. July 1918). At that time specimens were sent to B. M. Duggar (1897) who obtained the Phoma in pure culture but did not proceed further with the investigation. The destructiveness of this blight organism as a virulent parasite of young red cedar trees was later observed by G. G. Hedgcock (1903-4) when he surveyed heavy infections in nursery seedling stock at Albert Lea, Minnesota; Charles City and Shenandoah, Iowa; and Missouri. He reports one nursery in Iowa as being practically wiped out with the disease. In 1915-16 R. G. Pierce observed the cedar blight as an important disease causing large damage in nurseries at Cedar Bluff and North Bend, Nebraska; Hays, Kansas; Dundee and Glenview, Illinois; and Charles City, Iowa. He states that one nursery in Nebraska growing a million seedlings of eastern red cedar was practically wiped out by the blight. C. Hartley and the writer investigated the disease at nurseries in Illinois (1916-17) isolating and proving a causal parasite which was assigned tentatively to the genus Phoma. (Jour. Agric. Res. 10: 533-539. Sept. 1917). This Phoma was a little later definitely identified and described as *Phomopsis juniperovora* n. sp. Hahn. (Phytopathology 10: 249-253. Apr. 1920).

Where the blight has been under observation it has proven a most important parasitic disease. Certain of the horticultural cedar varieties are particularly susceptible. In behavior the blight is typical. The smaller twigs first show up brown and dead. The disease may move downward into the older parts causing cankers to form which may completely girdle or kill only one side of the stem. Where girdling occurs all the parts beyond die. Cedar blight may be the cause of serious loss in coniferous nursery seedling beds. The blight and cankers may also appear as a destructive disease in older stock both in nurseries and in ornamental plantings. Plants affected with the blight are often not recognized as diseased and consequently have been widely distributed.

The seriousness of the cedar blight is further increased by the fact that *Juniperus virginiana* and the horticultural varieties of Juniperus are not the only cedar group attacked by the parasite. *Cupressus*, *Thuja*, *Retinospora*, *Cryptomeria* are also subject to the disease. The blight and canker have been produced artificially by the writer on *Larix decidua* (European Larch) and *Pseudotsuga douglasii* (California type). *Phomopsis* spp. closely agreeing morphologically with *P. juniperovora* have been also identified by the writer as infecting naturally *Taxus baccata fastigiata*, *Cephalotaxus drupaceae*, *Taxodium distichum*, and *Pseudotsuga douglasii* (California type) with the Phomopsis from Juniperus. These Phomopsis species are for the present regarded as strains of *P. juniperovora*.

A Phomopsis has been investigated in Transvaal, South Africa, as causing a serious blight in 1919 among nursery grown seedlings of *Cupressus arizonica*, *C. macrocarpa* and *C. torulosa* (So. African Jour. Sci. 15: 613-617. July 1919). This parasite is regarded as possibly identical with *P. juniperovora*.

Suggestions for the control of cedar blight are given in the paper on a nursery blight of cedars referred to above. Spraying with an adhesive Bordeaux spray designed to keep the seedling and transplant growth completely l continually covered throughout the growing season, the initial spraying ing performed very early in the spring to prevent the blight from gaining a othold in the seedling beds, seems to be the most likely means of control. asons of exceptional rainfall when excessive moisture is present are con- ucive to the spread of the disease. Methods of cutting down an undue isture supply are therefore of benefit. Cankers should be pruned out of rge trees to prevent the further spread of the parasite.

No systematic survey to determine the geographical distribution of dar blight has been made, but from a study of the specimens mentioned below d from reports it is definitely known to extend in certain states along the lantic Seaboard from New York to Florida; throughout the Middle West from uthern Minnesota to Alabama; and it is not known farther west than eastern braska and Kansas.

Diagnoses of the disease has been made from specimens of the fungus on ffected stems and leaves received from the following states:

Alabama - Young native red cedar reported badly infected, October 10, 1924. Specimens not personally examined by the writer.

District of Columbia - Infected ornamental planting of *Juniperus chinensis* var. *procumbens*, and *J. sabina*, May 3, 1920. Collections made by G. G. Hahn. Infected ornamental planting of *J. chinensis* var. *procumbens*, August 6, 1924. Collections by G. G. Hedgcock and G. G. Hahn. Infected *J. sabina* var. *tamariscifolia*, August 10, 1924. Collections made by G. G. Hahn. Infected ornamental trees, U. S. Department of Agriculture grounds, of *Taxus baccata fastigiata* and *Cephalotaxus dripaceae*, May 1925. Collections made by G. G. Hedgcock and G. G. Hahn. Infected ornamental tree, *Taxus baccata fastigiata*, May 13, 1925. Collection made by G. G. Hahn and G. F. Gravatt. Infected tree, *Taxodium distichum*, June 10, 1925. Collections made by G. G. Hahn and M. Mitchell.

Illinois - Dundee, Glenview, 1916, 1917. Collections by R. G. Pierce, C. Hartley, and G. G. Hahn. Dundee, October 20, 1924. Loss 100 percent in red cedar seedling beds. Heavy loss among transplants.

Iowa - Charles City, 1916. Collections by R. G. Pierce. Shenandoah, November 7, 1924. Loss 60-80 percent in red cedar trees 2-1/2 feet high. *Thuja occidentalis* also affected.

Kansas - Manhattan, Kansas Experiment Station, March 22, 1917. Collections by L. E. Melchers and C. A. Scott. Blight destroyed entire beds of *J. virginiana* seedlings. The blight was reported serious and specimens collected by C. A. Scott in 1915. Manhattan, July 17, 1924. Collections by A. H. Holder.

Kentucky - Lexington, Louisville, August 27, 1924. Collections by H. Garman. Blight very destructive.

Maryland - Berlin, July 20, 1925. Collections by G. G. Hahn. Cankers found on four and five year old transplant stock. Bell, June 8, 1925. Collections by G. F. Gravatt. Seedling *Cupressus arizonica* infected.

Missouri - St. Joseph, June 26, 1925. Blight affects *J. virginiana* and its varieties to such an extent that unless controlled, their growing must be discontinued.

Nebraska - Cedar Bluff and North Bend, July 23, 1917. Collections by F. F. Weinard. Fremot, October 8, 1924. Blight seriously affecting Platte River type of *J. virginiana*.

New York - Lynbrook, Westbury, Long Island, 1915, reported by R. G. Pierce. Specimens not personally examined by writer. Niskayuna, August 4, 1923. Three year old transplants of red cedar from North, West, and South all infected with blight.

North Carolina - Greensboro, September 1924. Collected on *Juniperus virginiana*, *Cupressus arizonica*, *C. sempervirens* var. *pryamidalis*, *C. macrocarpa*, *C. benthami*, *C. lawsoniana*, *Thuja orientalis*, *T. plicata*, *Retinospora obtusa*, *Cryptomeria japonica*, by G. G. Hahn. Heavy losses to the extent of 500,000 seedlings occurred in the seedling beds of *Cupressus sempervirnes* (Italian cypress), *C. arizonica* (Arizona cypress) and *C. macrocarpa* (Monterey cypress), and 200,000 *Cryptomeria japonica* seedlings. Greensboro, June 15, 1925. Collections made of diseased *Cupressus sempervirens*, *J. communis*, and *Pseudotsuga taxifolia* (California type) by G. G. Hahn. About 75 percent loss in seedling beds of Douglas fir. These seedlings (three years old) still continue to blight and die.

Ohio - Yellow Springs, 1919. Specimen submitted for diagnosis by A. E. Jenkins. Blight serious in two year old red cedar. Painesville, October 1924. Infected transplant nursery stock of red cedar.

Pennsylvania - Philadelphia, August 1916. Collections made by J. F. Collins. Pennsylvania State College, June 2, 1922. Collection made by L. O. Overholts. Specimen submitted by A. E. Jenkins. On blighted Thuja trees. Dresher, July 19, 1923. Collections made by G. G. Hahn. Total loss of red cedar and *J. sabina* transplant stock. West Chester, June 14, 1924. Collections made by G. G. Hahn. Badly infected red cedar transplant stock. *Retinospora plumosa* also affected.

Tennessee - McMinnville, July 18, 1923. Collections made by G. G. Hahn of plants at Dresher, Pennsylvania, shipped from the above source. On transplant red cedar stock.

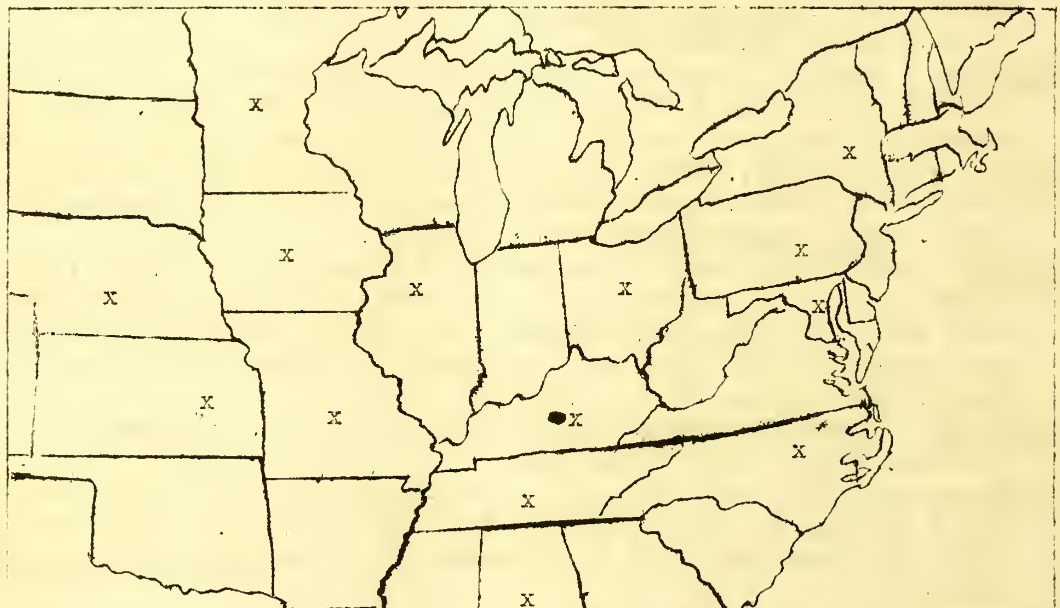

Fig. 9. Distribution of *Phomopsis juniperovora* Hahn. in the U. S. (Map prepared by G. G. Hahn)

CHESTNUT BLIGHT CAUSED BY ENDOTHIA PARASITICA (MURR.) AND.

(Prepared by A. F. Gravatt, Office of Investigations in Forest Pathology)

During the summer and fall of 1924, D. V. Baxter, G. F. Gravatt, R. P. Marshall and R. A. Studhalter of the Office of Forest Pathology made a general inspection of the Southern Appalachians for chestnut blight. The following table shows the amount of blight in 200 important counties within the commercial range of chestnut in the Southern Appalachians. Very detailed inspection would probably show that the blight is present in all of the important chestnut growing counties of the Southern Appalachians.

Table 93. Summary of the chestnut blight survey of the Southern Appalachians in 1924.

Degree of Blight	Number of Counties Inspected							
	Ga.	Ky.*	N.C.	S.C.	Tenn.	Va.	W.Va.	Total
No Infection	5	12	0	1	11	0	4	33
Less than 1%	4	10	10	0	19	7	13	63
1-9%	4	0	6	2	1	5	7	25
10-29%	1	0	6	0	1	4	15	27
30-79%	1	0	2	1	0	7	7	18
80-100%	0	0	0	0	0	25	9	34
Total	15	22	24	4	32	48	55	200

*But partially covered at close of season.

There are two very unusual advance infections in the South. The first one centers along the boundary between North and South Carolina, covering most of the chestnut growth in Greenville County, S. C. and Henderson and Polk Counties, N. C. This infection will soon be simply a part of the main diseased area as the blight is rapidly spreading along the eastern slopes of the Blue Ridge Mountains in North Carolina. The other large advance infection is located principally in Union and Fannin Counties in Georgia and in Polk County in Tennessee. Many thousands of acres of chestnut are heavily infected, indicating that the blight must have been present in that section for many years.

In the states north of the Potomac the blight has continued its steady progress. Even in Maine where the chestnut is represented by only a few scattered individual trees the blight has also spread to the most isolated trees known. Reports from Ontario state that it is steadily spreading in the Niagara peninsula.

Search for resistant American chestnut has resulted in the finding of only a few trees which are not at all promising. Many people are cooperating by reporting surviving trees of both the American chestnut and planted foreign species. These trees are examined as field work permits and the most promising are propagated that their resistance to blight may be further tested.

DISEASES OF CONIFERS

ARBORVITAE, AMERICAN (Thuja occidentalis)
  Drought injury
    Connecticut - one special injury resulting from drought this year, and probably of last year's effect too, which caused comment, was the browning and premature dropping off of the older leaves back on the branches of arborvitae trees over the state. (Clinton)

ARBORVITAE, GIANT (Thuja plicata)
  Keithia thujina E. J. Durand (Leaf blight)
    Idaho - above Upper Priest Lake, Boundary County, July 28. (Boyce)
    +Oregon - Rhododendron, Clackamas County, May 29. (Boyce)
    Abundant on small trees. (Boyce). P.r.: Ida., *Wash.

ARBORVITAE, PARSONS (Thuja orientalis compacta)
  +Diplodia sp. (Dieback).
    Florida - caused considerable damage to ornamental plantings in Jacksonville; widespread; generally not considered severe. (Weber)

CEDAR, DEODAR (Cedrus deodara)
  Trametes pini (Brot.) Fr. (Honeycomb rot)
    Singh, S. The liability of deodar to the attack of Trametes pini (Brot.) Fr., in Lolab, Kashmir. Indian For. 50: 361-365. 1924.

Key

* = specimen in Pathological Collections.
\+ preceding disease = first report of the disease to the Plant Disease Survey.
\+ preceding state = first report from the state to the Plant Disease Survey.
P.r. = prior reports of the disease to the Plant Disease Survey.

CEDAR, CALIFORNIA INCENSE (Libocedrus decurrens)
Gymnosporangium blasdaleanum (Diet. & Holw.) Kern (Rust)
Oregon - near Sutherlin, Douglas County, May 13. (Boyce)
Frequent. (Boyce). P.r.: *Calif., *Oreg.

CEDAR, RED (Juniperus virginiana)
Gymnosporangium juniperi-virginianae Schw. (Rust)
+Michigan - reported from Alma, Detroit and Washtenaw Counties. (Coons)

CEDAR (Juniperus sp.)
Gymnosporangium germinale (Schw.) Kern (Rust)
New York - of slight importance; local; Orange County, May. (Welch)
P.r.: *Ala., Conn., D. C., Ind., Iowa, Ky., *Md., *Mass., *Miss., N. J., *N. Y., *N. Car., Ohio, *Penn., S. Car., Tenn., Va.

CYPRESS, NOOTKA (Chamaecyparis nootkatensis)
Gymnosporangium nootkatensis (Trel.) Arth. (Rust)
+Oregon - Government Camp, Clackamas County, May 28. (Boyce)
Sparse on small trees. (Boyce). P.r.: Wash.

Fir, Cascade (Abies amabilis)
+Echinodontium tinctorium Ell. & Ev. (Brown stringy rot)
Washington - occasional on living trees; Red Mountain, Skamania County, August 13. (Boyce)

FIR, BALSAM (Abies balsamea)
Stereum sanguinolentum (Alb. & Schw.) Fr.
Faull, J. H. and Irene Mounce. Stereum sanguinolentum as the cause of 'sapin rouge' or red heartrot of Balsam. (Abstract) Phytopath. 14: 349-350.-1924. In Canada 50% or more of affected stems may be discarded as unmerchantable. The rot extends throughout the length of the trunk down to breast height. The fungus fruits abundantly on dead trees and slash. It is possible that living trees with this fungus may be utilized for newspaper pulp.

FIR, GREAT SILVER (Abies grandis)
Uredinopsis mirabilis (Pk.) Magn. (U. copelandi Syd.) (Leaf blister rust)
+Montana - Troy, Lincoln County, July 25. (Boyce)
Idaho - above Upper Priest Lake, Boundary County, July 28. (Boyce)
Abundant on saplings killing many of the current season's needles. (Boyce). P.r.; Ida., Oreg., *Wash.

FIR, ALPINE (Abies lasiocarpa)
Calyptospora columnaris (Alb. & Schw.) Kuehn (Leaf blister rust)
Montana - killed some of the season's needles; West Yellowstone, Gallatin County, September 9. (Boyce). P.r.: *Colo., *Mont., *Oreg., *Wyo.

FIR, NOBLE (Abies nobilis)
Echinodontium tinctorium Ell. & Ev. (Brown stringy rot)
+Oregon - occasional on living trees; Government Camp, Clackamas County, July 16. (Boyce)

FIR, SILVER (Abies pectinata)
Rehmiellopsis bohemica Bubak. (Phoma bohemica Bubak. & Kabat) (Leaf blight)

Wilson, M. and J. McDonald. A new disease of the silver firs in Scotland. Trans. R. Scott. Arbor. Soc. 38: 114-118. 1924.
Bubak, Natur. Zeitsch f. Forst-u. Londw., 8: 313. 1910.

FIR (Abies sp.)
Peridermium pycnogrande Bell, Peridermium pycnoconspicuum Bell, Uredinopsis polypodophila Bell.
Bell, H. P. Fern rust of Abies. Bot. Gaz. 77: 1-31. 1924.

FIR, DOUGLAS (Pseudotsuga douglasii)
Polyporus schweinitzii Fr.
Boyce, J. S. An unusual infection of Polyporus schweinitzii Fr. Phytopath. 14: 588. 1924.
Poria incrassata (Berk. & Curt.) Burt. (Rot)
Zeller, S. M. Decay of Douglas fir due to Poria incrassata. (Abstract) Phytopath. 14: 119. 1924.
Wood decay
Schmitz, Henry. Studies in wood decay. IV. The effect of sodium carbonate, bicarbonate, sulphate, and chlorid on the rate of decay of Douglas fir sawdust induced by Lenzites saepiaria Fr. with special reference to the effect of alkaline soils on the rate of decay of wood in contact with them. Amer. Jour. Bot. 11: 108-121. 1924.

HEMLOCK, CANADA (Tsuga canadensis)
+Armillaria mella (Vahl) Quel. (Rootrot)
Pennsylvania - Chartercak, Huntingdon County, October 23. (Overholts)
+Asterina nuda Pk.
New York - Poughkeepsie, Dutchess County, June 6. (Guba)
+Cenangium balsameum var. abietinum Pk. (Canker)
Pennsylvania - Stone Valley, Huntingdon County, November 15. (Overholts)
Albication - physiological
New York - unimportant; local; St. Lawrence County, September 12. (Welch)

HEMLOCK, WESTERN (Tsuga heterophylla)
Dimerosporium tsugae Dearn. (Sooty mold)
Washington - unimportant; Government Mineral Springs, Skamania County, August 23. (Boyce). P.r.: Wash., Oreg.
Uredo holwayi Arth. (Rust)
+Idaho - abundant; caused considerable premature needle cast on small trees; Upper Priest Lake, Boundary County, July 28. (Boyce)
P.r.: Mont.

HEMLOCK, MOUNTAIN (Tsuga mertensiana)
+Trametes pini (Brot.) Fr. (Honeycomb rot)
Oregon - occasional; Government Camp, Clackamas County, May 28. (Boyce)

JUNIPER, COMMON (Juniperus communis)
Gymnosporangium juniperinum (L.) C. Martius (Rust)
+Washington - causes galls on the twigs; Red Mountain, Skamania County, August 12. (Boyce). P.r.: Colo., Iowa, Utah.

JUNIPER, COLORADO (Juniperus scopulorum)
Gymnosporangium juvenescens Kern (Rust)
+Idaho - found on the twigs; Upper Priest Lake, Bonner County, August 2. (Boyce)
P.r.: *Colo., *Mont., *N. Mex., *Utah.

JUNIPER - See also Cedar, Red.

LARCH, WESTERN (Larix occidentalis)
Hypodermella laricis Tubeuf (Leafcast)
British Columbia - Kelowna, August 30. (Boyce)
Idaho - near Lake View, Bonner County, June 2; above Upper Priest Lake, Boundary County, July 31. (Boyce)
Epidemic in stands of young larch, particularly in northern Idaho. (Boyce). P.r.: *Ida., Mont., *Oreg.
Melampsora bigelowii Thuem. (Rust)
+Montana - frequent on the current season's needles of small trees, damage resulting; Sylvanite, Lincoln County, July 24. (Boyce)
P.r.: *Ida.

PINE, JACK (Pinus banksiana)
Cronartium cerebrum (Pk.) Hedgc. & Long (Oak rust)
Minnesota - common on young pines; Bemidji, Beltrami County, (Sect. Pl. Path.). P.r.: Conn., Mich., Minn.

PINE, SHORE (Pinus contorta)
Coleosporium solidaginis (Schw.) Thuem. (Rust)
Montana - Sylvanite, Lincoln County, July 24. (Boyce)
Washington - Red Mountain, Skamania County, August 14. (Boyce)
+Oregon - Government Camp, Clackamas County, May 27. (Boyce)
P.r.: Colo., *Mont., Wash.
Cronartium filamentosum (Pk.) Hedgc. & Long (Pine gall rust)
Washington - killing a few small trees; Red Mountain, Skamania County, August 14. (Boyce). P.r.: Ida., Oreg., Wash.
Cronartium harknessii (Moore) Meinecke (Western pine gall rust)
+Montana - Sylvanite, Lincoln County, July 24. (Boyce)
Idaho - Coolin, Bonner County, July 27; Priest River, Bonner County, July 25. (Boyce)
Washington - Red Mountain, Skamania County, August 14. (Boyce)
Oregon - Summit Ranger Station, Clackamas County, July 17; Rhododendron, Clackamas County, May 29; Government Camp, Clackamas County, May 28. (Boyce)
Was common on small trees causing witches brooms and killing branches. (Boyce). P.r.: Calif., *Ida., *Oreg., *Wash., *British Columbia.
Cronartium pyriforme (Pk.) Hedgc. & Long (Rust)
+Vermont - infections on older trees (5-10 years) have been found in the experimental nursery of the Vermont Experiment Station. The Sweet Fern (Myrica asplenifolia) is very abundant in the region surrounding this nursery. The chief damage is in the case of the seedling trees of Scotch Pine which will be removed in the effort to control the disease. (Gilbert).
P.r.: *Ida., Mont.
+Hypodermella sp. (Leafcast)
Wyoming - over a small area in the Yellowstone National Park. (Boyce)

Montana - epidemic over an extensive area in the Jefferson National Forest. (Boyce)

PINE, SWISS MOUNTAIN (Pinus montana)
Melin, Elias. Zur kenntnis der mykorrhizapilze von Pinus montana Mill. Bot. Not. 1924 (1): 69-92. 1924.

PINE, WESTERN WHITE (Pinus monticola)
Cronartium ribicola Fischer - See Status White Pine Blister Rust page 314.
+Hypoderma lineare Pk. (Needle cast)
Idaho - Above Upper Priest Lake, Boundary County, July 28. (Boyce)
Washington - Red Mountain, Skamania County, August 15. (Boyce)
Oregon - Government Camp Clackamas County, May 26. (Boyce)
Occasional on saplings; only slightly injurious. (Boyce)
+Hypodermella sulcigena (Lk.) Tub. (Needle cast)
British Columbia - rare, Daisy Lake, October 8. (Boyce)

PINE, LODGEPOLE (Pinus murrayana)
Coleosporium solidaginis (Schw.) Thuem. (C. montanum Arth. & Kern) (Rust)
+Wyoming - Camp Roosvelt, Yellowstone Park, July 5. (Conard).
P.r.: Wash.
+Cronartium pyriforme (Pk.) Hedgc. & Long (Rust)
Wyoming - Camp Roosevelt, Yellowstone Park, July 1. (Conard)

PINE, AUSTRIAN (Pinus nigra)
+Cronartium comptoniae Arth. (Sweetfern rust)
Connecticut - Woodmount, May 27. (Clinton & Stoddard)

PINE, LONGLEAF (Pinus palustris)
Coleosporium delicatulum (Arth. & Kern) Hedgc. & Long (Rust)
+Florida - the cones of the host have become completely covered with the fungus, the cones on the top of the tall pines look more like oranges, because the bright color of the rust, than like cones; generally well distributed. (Weber). P.r.: Ga., Miss., S. Car.

PINE, WESTERN YELLOW (Pinus ponderosa)
Cenangium abietis (Pers.) Rehm (Twig blight)
Long, W. H. The self pruning of Western Yellow Pine. Phytopath. 14: 336-337. 1924. New Mexico and Arizona; P.r.: Mont.
Cronartium pyriforme (Pk.) Hedgc. & Long (Rust)
+Vermont - infections on older trees (5-10 years) have been found in the experimental nursery of the Vermont Experiment Station. The Sweet Fern (Myrica asplenifolia) is very abundant in the region surrounding the nursery; the chief damage is in the case of the seedling trees of Scotch Pine which will be removed in the effort to control the disease. (Gilbert)
Washington - Squillchuck Creek, near Wenatchee, Douglas County, May. (Boyce)
Oregon - Dufur, Wasco County, June 11. (Boyce)
Kills trees in the seedling and sapling stage; locally severe. (Boyce)
P.r.: Calif., Ida., *Mont., Oreg., Wash.
Hypoderma deformans Weir (Leafcast)
British Columbia - Kelowna, August 30. (Boyce)

Idaho - Payette Lakes, Valley County, July 6; Priest River, Bonner County, July 25. (Boyce)
Epidemic over a large area. (Boyce). P.r.: *Ida., *Wash.

PINE, MONTEREY (Pinus radiata)
Sapstain
Yeates, J. S. Sapstain in timber of Pinus radiata (insignis) New Zeal. Jour. Sci. & Techn. 7: 248-252. 1924.

PINE, RED (Pinus rosinosa)
+Cronartium pyriforme (Pk.) Hedgc. & Long. (Rust)
Vermont - slight infections in the state nursery near Burlington. (Gilbert)
Spray injury
Connecticut - young tender bases of the leaves of seedling pines injured. (Clinton)
Sun scorch
Connecticut - (Clinton & Stoddard)

PINE, PITCH (Pinus rigida)
+Armillaria mellea (Vahl.) Quel. (Rootrot)
Pennsylvania - Charteroak, Huntingdon County, October 17. (Overholts)
Cronartium comptoniae Arth. (Sweetfern rust)
+Pennsylvania - Caldwell, Clinton County, July 22. (Orton & Thurston)
P.r.: Mass., N. H., N. Y., Vt.

PINE, WHITE (Pinus strobus)
+Armillaria mellea (Vahl.) Quel. (Rootrot)
Pennsylvania - Charteroak, Huntingdon County, October 17-18. (Overholts)
Cronartium ribicola Fischer - See Status White Pine Blister Rust page 314.
+Cytospora sp.
Pennsylvania - fruiting abundantly on tree recently killed by ants; Charteroak, Huntingdon County, October 18. (Overholts)
Cronartium ribicola Fischer (White Pine Blister Rust) - See page 314.
+Hypoderma lineare Pk. (Needle cast)
Pennsylvania - causes considerable defoliation on young trees; very prevalent in Huntingdon and Clinton Counties, May 3. (Overholts)
Phoma sp. (Basal canker)
+New York - local, Rockland, May 7. (Welch). P.r.: Conn.
Septobasidium pinicola Snell (Bark canker)
Pennsylvania - rare; Laurel Run, Huntingdon County, October 18. (Overholts). P.r.: *N. H., *Pa.
Trametes pini (Brot.) Fr. (Honeycomb rot)
+Pennsylvania - Stone Valley, Huntingdon County, November 15. (Overholts)
P.r.: Mo., N. H.
General diseases
Metcalf, Haven. Less serious diseases of white pine. Bul. Green Sect. U. S. Golf Assoc. 4: 147-148. 1924.

PINE, SCOTCH (Pinus sylvestris)
+Cronartium cerebrum (Pk.) Hedgc. & Long (Oak rust)
Pennsylvania - Laurel Run, Huntingdon County, December 6. (Overholts)
Cronartium comptoniae Arth. (Sweetfern rust)
+Connecticut - Mt. Carmel, May 27. (Clinton & Stoddard)
P.r.: N. Y., Ohio.

Cronartium pyriforme (Pk.) Hedgc. & Long (Rust)
+Vermont - occurred in considerable abundance in the state nursery near Burlington. (Gilbert). P.r.: Conn.
Cytospora pinastri Fr. (Needle blight)
+Pennsylvania - on the needles; Laurel Run, Huntingdon County, December 6. (Overholts). P.r.: *Me.

PINE, SCRUB (Pinus virginiana)
Cronartium cerebrum (Pk.) Hedgc. & Long (Oak rust)
+Ohio - Portsmouth. (Detmers)

PINE, LOBLOLLY (Pinus taeda)
Septoria acicola (Thuem.) Sacc. (Cryptosporium acicolum Thuem.) (Leafspot)
+Louisiana - Bogalusa, Washington, January 7. (Detmers). P.r.:,*Fla.
Cronartium comptoniae Arth. (Sweetfern rust)
New Jersey - found on seedlings one foot high, Burlington, May 9. (Martin). P.r.: Ga.

PINE (Pinus sp.)
Cronartium fusiforme (Pk.) Hedgc. & Long (Rust)
Mississippi - important locally; prevalent in south Mississippi. Jackson County, April 10. (Neal)
+Sphaeropsis pinastri (Lev.) Sacc.? (Abnormal cone or Terminal bud)
Colorado - Fort Collins, Larimer County, June 9. (Learn)
Trametes spp.
Durand, J. P. Le Trametes du Pin. (The Trametes of the Pine.) Rev. Eaux et Forets 62: 59-61. 1924.
Root nodules
Yeates, J. S. The root nodules of New Zealand Pines. New Zealand Jour. Sci. & Tech. 7: 121-124. 1924.

YEW, PACIFIC (Taxus brevifolia)
+Fomes hartigii Allescbr. (Heartrot)
Oregon - not common on living trees; Wendling, Lane County, July 17. (Boyce)

DISEASES OF HARDWOODS

ACACIA, SWEET (Acacia farnesiana)
Aecidium sp. (Rust)
Florida - caused some damage to the foliage; not prevalent; Oneco. (Weber)

ALMOND, FLOWERING (Prunus glandulosa)
+Sclerotinia cinerea (Bon.) Schroet. (Brownrot)
Pennsylvania - five percent of the twigs infected on one bush; State College, June 12. (Thurston)

ALDER, EUROPEAN (Alnus glutinosa)
Monilia foliicola Woronichin (Leafblight)

Siemaszko, W. Pleśń liściowa, Monilia foliicola Woronichin, w świetle spostrzezeń i badań biologicznych. (The leafblight, Monilia foliicola Woronichin, in the light of biological observations and investigations). Reprinted from Acta Soc. Bot. Poloniae 2 (2): 18. 1924. (English summary).

ALDER, HAZEL (Alnus rugosa)
+Gnomoniella tubiformis (Tode) Sacc. (Leptothyrium alneum (Lev.) Sacc.) (Blackspot)
Pennsylvania - rare; Charteroak, Huntingdon County, September 12. (Overholts)

ALDER (Alnus sp.)
+Stereum purpureum Pers. (Silver leaf)
*Washington - (Dept. Pl. Path.)

ASH, WHITE (Fraxinus americana)
Cercospora fraxinites Ell. & Ev. (Leafspot)
+Florida - caused considerable damage in several instances resulting in partial defoliation. (Weber). P.r.: *Tex.
Puccinia fraxinata (Lk.) Arth. (Rust)
+Florida - attacked the seed covering and petiole, deforming them and causing premature dropping. (Weber)

ASH (Fraxinus sp.)
Gloeosporium aridum Ell. & Holw. (Anthracnose)
+Pennsylvania - Gettysburg, Adams County, June 5. (Kirby)
P.r.: Conn., Mass., Mich., Ohio, Va., Wis.
Puccinia fraxinata (Lk.) Arth. (Rust)
+Texas - (Taubenhaus)
+South Dakota - general. (Evans)

ASH, MOUNTAIN (Sorbus americana decora Sarg.)
+Bacillus amylovorus (Burr.) Trev. (Fireblight)
Minnesota - unimportant; Ramsey, August 1. (Sect. Pl. Path.)
+Gymnosporangium juniperinum (L.) C. Martius (Rust)
Washington - abundant; Red Mountain, Skamania County, August 14. (Boyce)

BEECH, AMERICAN (Fagus americana)
+Gloeosporium fagi americana Ell. & Ev. (Anthracnose)
Connecticut - not serious; apparently new to state; Wallingford, June 16. (Clinton)

BEECH (Fagus sp.)
Weather injury (Scald or Sunburn)
Pennsylvania - injury persisted throughout season; in late May and early June. (Orton)

BIRCH, WATER (Betula fontinalis)
Septoria sp. (Leafspot)
Oregon - occasional; Government Camp, Clackamas County, July 18. (Boyce)

BIRCH, SWEET (Betula lenta)
Septoria microsperma Pk. (Leafspot)
+Pennsylvania - appears late in the season; Center, Huntingdon and Mifflin Counties, September 17. (Overholts). P.r.: *W. Va.

BIRCH, RIVER (Betula nigra)
Gloeosporium betularum Ell. & Mart. (Leafspot)
Pennsylvania - prevalent; Montour County, September 28. (Orton)
P.r.: *D. C., Ill., Ind., *Mass., Pa., *Wis.
+Nectria ditissima Tul. (European canker)
Pennsylvania - Beaver Meadows, Carbon County, October 9. (Overholts)

BIRCH (Betula sp.)
Melanconium betulinum Schm. & Kze. (Twig blight)
Pennsylvania - seems to be doing considerable damage in killing back twigs; Butler County, June 23. (Wright). P.r.: *Iowa, *Ohio.

BUCKEYE, TEXAS (Aesculus arguta)
+Aecidium aesculi Ell. & Kell. (Rust)
Kansas - common around Manhattan. (Johnston)

BUCKTHORN, COMMON (Rhamnus cathartica)
Puccinia coronata Cda. (Rust)
+Vermont - Burlington, July 8. (Gilbert)
+New York - probably statewide; Tompkins County, June 7. (Chupp)
+Connecticut - new to state; one report only; Berlin, July 1. (Clinton)
+Massachusetts - June 9. (Davis)
+Wisconsin - June 5. (Vaughan)
Minnesota - less than last year; general; Newport, Washington County, June 6. (Sect. Pl. Path.)
+South Dakota - June 10. (Evans)
+Montana - Froid, Roosevelt County, July 21. (Christopher)

BUTTERNUT (Juglans cinerea)
Cylindrosporium sp. (Blight)
Minnesota - Hancock, July 23. (Sect. Pl. Path.)

CAMPHOR-TREE (Cinnamomum camphora)
Cephaleuros virescens Kze. (Leafspot)
**+Georgia - Thomasville, Thomas County, November 8. (Boyd). P.r.: *La.
+Diplodia tubericola (Ell. & Ev.) Taub. (Canker)
Texas - (Taubenhaus)
Frenching (Physiological)
Florida - observed on the leaves of several trees apparently from lack of correct environment. (Weber)

CATALPA (Catalpa sp.)
Macrosporium catalpae Ell. & Mart. (Leafspot)
**+Pennsylvania - Mercer, Mercer County, August 6. (Kirby). P.r.: Ala., *Conn., *D. C., Ind., Mass., Mich., N. J., N. Y., *Ohio, R. I., Tex., W. Va.

CHERRY, BLACK (Prunus serotina)
Coccomyces lutescens Hig. (Leafblight)
*+Pennsylvania - generally prevalent in Center County, July 14. (Orton) P.r.: Ga., Ill., N. Y.
Exoascus pruni Fckl. (Pockets)
*+Virginia - Scottsville, Albemarle County, May 22. (Fromme). P.r.: Ala.
Sclerotinia seaverii Rehm (Brownrot)
Pennsylvania - Montrose, July 23. (Kirby). P.r.: *Iowa, *N. Y., *Va., *Wis.

CHESTNUT, AMERICAN (Castanea dentata)
Endothia parasitica (Murr.) And. (Chestnut blight) - See page 319.
+Leptothyrium castaneae (Spreng) Sacc. (Leafspot)
Florida - common on several trees in the vicinity of Gainesville. (Weber)
Microsphaera alni (Wallr.) Wint. (Powdery mildew)
*+Pennsylvania - fairly abundant; Center County, July 27. (Kirby) P.r.: Conn., *N. Y.
+Monochaetia pachyspora Bubak (Leafspot)
Florida - caused some defoliation. (Weber)
+Mycosphaerella maculiformis (Pers.) Schr. (Phyllosticta maculiformis Sacc.)
Pennsylvania - prevalent; Center and Huntingdon County, October 1. (Overholts)
+Scolecosporium fagi Lib. (Leafspot)
Florida - unimportant; Gainesville. (Weber)

CHINQUAPIN (Castanea pumila)
Monochaetia pachyspora Bubak (Leafspot)
Florida - caused considerable spotting of leaves. (Weber)

CHINQUAPIN, GIANT (Castanopsis chrysophylla)
Dothidella castanopsidis Dearn. (Leafspot)
Oregon - common, but caused little injury to the host; Government Camp, Clackamas County, May 27. (Boyce)

CHOKECHERRY, COMMON (Prunus virginiana)
Podosphaera oxyacanthae (DC.) D By. (Powdery mildew)
*+Pennsylvania - Montrose, Susquehanna County, August 15. (Kirby) P.r.: *Colo., Conn., *Mass., Minn., *Mont., N. Y., *N. D., *S. Car.
Sclerotinia angustior Rehm (Brown rot)
*+Pennsylvania - Duncannon, Perry County, May 17. (Kirby). P.r.: *N. Y., *N. D.
Sclerotinia cinerea (Bon.) Schroet. (Brown rot)
+Florida - very serious during the early growing season; in certain instances a large percent of the new shoots were killed. (Weber) P.r.: Wis.

CHOKECHERRY, WESTERN (Prunus demissa)
Podosphaera oxyacanthae (DC.) D By. (Powdery mildew)
+Washington - Whitman County. (Dept. Pl. Path.). P.r.: *Colo., *Nebr., *Utah, *Wyo.

CRAB, PRAIRIE (Malus ivensis)
+Bacillus amylovorus (Burr.) Trev. (Fireblight)
Indiana - Henry County, May 26. (Gardner)

DOGWOOD, PAGODA (Cornus alternifolia)
+Botrytis (Twig blight)
Pennsylvania - on young twigs; York Spring, York County, June 5. (Kirby)

DOGWOOD, FLOWERING (Cornus florida)
Septoria cornicola Desm. (Leafspot)
*+Pennsylvania - Stone Valley, Huntingdon County, August 10. (Kirby & Overholts). P.r.: *D. C., Ind., *Ky.

DOGWOOD (Cornus sp.)
Cercospora cornicola Tr. & Earle (Leafblight)
+Georgia - somewhat severe; caused a premature defoliation; general; Thomasville, July. (Boyd)

ELDER, AMERICAN (Sambucus canadensis)
Microsphaera sp. (Powdery mildew)
*+Pennsylvania - Hecla Park, Center County, September 17. (Kirby)
Phyllosticta sp. (Leafspot)
+Pennsylvania - Charteroak, Huntingdon County, September 12. (Overholts)
P.r.: *N. Y.
Puccinia sambuci (Schw.) Arth. (Rust)
+Florida - (Weber)
Ramularia sambucina Pk. (Leafspot)
*+Missouri - Columbia, Boone County, October 2. (Maneval). P.r.: N. Y.
Septoria sambucina Pk. (Leafspot)
+Florida - general. (Weber). P.r.: Ala., Ind., *Kans., *La., *Mich., *Nebr., *N. Y.
+Mosaic
*Pennsylvania - Lebanon, Lebanon County, September 25. (Kirby)
Florida - found in a typical condition stunting the plants. (Weber)

ELDER, EUROPEAN RED (Sambucus racemosa)
Microsphaera grossulariae (Wallr.) Lev.? (Powdery mildew)
British Columbia - attacks the leaves; Stanley Park, Vancouver, August 25. (Boyce). P.r.: *Del., *N. Y., *Pa.

ELM, AMERICAN (Ulmus americana)
Gnomonia ulmea (Sacc.) Thum. (Blackspot)
+Pennsylvania - Conewago, Lancaster County, September 25. (Kirby)

ELM, CHINESE (Ulmus parvifolia)
+Slime flux (fermentation of oozing sap)
Texas - (Taubenhaus)

ELM (Ulmus sp.)
+Phyllosticta confertissima Ell. & Ev. (Leafspot)
Pennsylvania - caused defoliation; Ulmus fulva apparently resistant, for nearby it was not attacked; Charteroak, Huntingdon County, September 12. (Overholts)

Pleurotus ulmarius Bull.
+Iowa - serious. (Melhus). P.r.: Ind., Ohio.

Ozonium omnivorum Shear (Rootrot)
Texas - prevalent. (Taubenhaus). P.r.: Ariz., *Texas.

+Valsa ambiens (Pers.) Fr.
Pennsylvania - parasitism not very evident; Charteroak, Huntingdon County, October 18. (Overholts)

Twig blight (unknown)
Ohio - this disease is rapidly destroying elms along the Ohio River. (Young)

EUCALYPTUS (Eucalyptus sp.)

Gloeosporium eucalyptorum Turconi, Macrophoma eucalyptorum Turconi, Physalospora eucalyptorum Turconi.
Turconi, M. Una moria di giovani piante di eucaliptii. Atti Inst. Bot. Univ. Pavia III, 1: 125-135. 1924.

HAWTHORNE (Crataegus sp.)

Bacillus amylovorus (Burr.) Trev. (Fire blight)
Connecticut - one report on the English hawthorne; new to state on this host; the blossom twigs all over the tree were killed; New Haven, July 1. (Clinton)

+Cylindrosporium brevispina Dearn. (Leafspot)
Idaho - on Cylindrosporium douglasii (Black Hawthorn); locally frequent; little injury to host; Upper Priest Lake Boundary County July 27. (Boyce)

+Gymnosporangium clavariaeforme (Jacq.) DC. (Rust)
Connecticut - eight reports; Lyme, June 19. (Hunt)

Gymnosporangium globosum Farl. (Rust)
+Florida - was collected at Micanopy showing the aecial stage in a very virulent form; severe on those plants but not common otherwise. (Weber). P.r.: Alaska, Conn., *Ind., *Ill., *Iowa, *Kans., *Ky., *Mass., *Mich., Minn., *Miss., *Mo., *Nebr., *N. J., *N. Y., Ohio, *Pa., *Texas, Vt., *Wis.

+Myriangium duriaei Mont. & Berk.
Pennsylvania - State College, Center County, January 13. (Overholts)

Physalospora cydoniae Arnaud
+Connecticut - New Haven, July 3. (Clinton). P.r.: *Md.

HAZLENUT (Corylus sp.)

Gloeosporium coryli Ell. & Ev. (Anthracnose)
+Pennsylvania - Charteroak, Huntingdon County, September 12. (Overholts). P.r.: *Me., *N. J., *Oreg., *Wash.

HICKORY (Hicoria sp.)

Gnomonia caryae Wolf (Gloeosporium caryae)(Anthracnose)
*+Pennsylvania - Brooklyn, Susquehanna County, August 14. (Kirby)
+Missouri - common and general. (Maneval)

Microstroma juglandis (Bereng.) Sacc. (Leafspot)
+Florida - collected on several trees in the vicinity of Gainesville, it caused a serious deformation of the leaves. (Weber).
P.r.: *Ala., *Ga., *Ill., Ind., Iowa, Kans., *Md., *Mass., *Mich., *Miss., *N. Y., *N. Car., *S. Car., W. Va., *Wis.

Phyllosticta caryae Pk. (Leafspot)
*+Pennsylvania - Brooklyn, Susquehanna County, August 14. (Kirby)
+Strumella coryneoides Sacc. & Wint. (Canker)
Pennsylvania - Rutz Gap, Center County, October 9. First record in Pennsylvania. (Overholts)

HORNBEAM, AMERICAN (Carpinus caroliniana)
Gloeosporium robergei Desm. (Leafspot)
+Pennsylvania - not prevalent; Charteroak, Huntingdon County, September 12. (Overholts). P.r.: *N. Y., *W. Va.

LINDEN, AMERICAN (Tilia americana)
**+Melanconium tiliae Pk. (Twig disease)
Ohio - Painesville, May 22. (A. E. Gravatt)
Unicinula clintoni Pk. (Powdery mildew)
+Pennsylvania - not common, Charteroak, Huntingdon County, October 5. (Overholts). P.r.: *Conn., *Fla., *Ill., *Ind., Iowa, Mass., *Mich., *Minn., *N. H., *N. Y., *N. D., Ohio, *Wis.

MAPLE, SILVER (Acer dasycarpum)
Gloeosporium apocryptum Ell. & Ev. (Leafblight)
+Virginia - severe; Lawrenceville, May 28. (Fromme)

MAPLE, ROCKY MOUNTAIN (Acer glabrum)
Cylindrosporium consociatum Dearn. (Leafspot)
British Columbia - Kelowna, August 30. (Boyce)
Idaho - Coolin, Bonner County, July 27. (Boyce)
Frequent, but resulted in little damage. (Boyce). P.r.: Ida., Wash.
Phyllosticta minutissima Ell. & Ev. (Leafspot)
British Columbia - abundant, but caused little injury; Kelowna, August 30. (Boyce). P.r.: *Colo., *Ida., *Mont., *Nebr., *Wyo.

MAPLE, BOXELDER (Acer negundo)
+Fusarium negundi Sherb. (Red stain)
Minnesota - University Farm, St. Paul. (Sect. Pl. Path.)
Hubert, E. E. The red stain in the wood of the boxelder. Am. Forests & Forest Life 30: 443. 1924.
Pleurotus ulmarius Bull. (White saprot)
Iowa - serious. (Melhus). P.r.: Iowa, Kans.

MAPLE, JAPANESE (Acer palmatum)
+Myxosporium sp. (Canker).
Pennsylvania - State College, Center County, May 1. (Overholts)
Nectria cinnabarina Fr. (Canker)
+Pennsylvania - not as active as usual. (Orton). P.r.: *Conn.
+Phoma palmarum Sacc. (Twigblight)
Pennsylvania - on twigs which were dead; State College, Center County, May 1. (Overholts)

MAPLE, STRIPED (Acer pennsylvanicum)
+Cylindrosporium acerinum Tr. & Earle (Leafspot)
Pennsylvania - new for state; Stone Valley, Huntingdon County, August 10. (Kirby & Overholts)

MAPLE, NORWAY (Acer platanoides)
Verticillium sp. (Wilt)
*+Michigan - reported very serious, Grand Rapids, June 10. (Coons)
P.r.: Conn., D. C., Ill., Ind., Md., N. Y., N. Car., Pa., Tenn., Va., W. Va. Wis.
Sun scald
*+Pennsylvania - in late May and early June the Norway maple particularly developed scald or sunburn to an unusual extent; the vitality of many trees were severely taxed; this injury persisted throughout the season; Lewistown, Mifflin County. (Kirby)
P.r.: *D. C., N. Y.

MAPLE, RED (Acer rubrum)
Phyllosticta sp. (Leafspot)
+Delaware - Wyoming, July 25. (Adams)
+Minnesota - (P. minima Berk. & Curt.) Ell. & Ev.) Forest Lake. (Sect. Pl. Path.). P.r.: Ala., D. C., Fla., La., Md., Miss., N. J., N. Y., Ohio, Pa., Va., W. Va.
Uncinula circinata Cke. & Pk. (Powdery mildew)
+Pennsylvania - not prevalent, Coburn, Center County, October 5. (Overholts). P.r.: *Ala., *D. C., *Ind., *Me., *Md., *Mass., *Mich., *N. H., Ohio, *Pa., *Va.

MAPLE, SUGAR (Acer saccharum)
+Gloeosporium apocryptum Ell. & Ev. (Anthracnose)
Pennsylvania - less than usual; Buskill, Pike County, July 29. (Orton)
Phyllosticta minutissima Ell. & Ev. (Leafspot)
+Pennsylvania - very prevalent; Coburn, Center County, October 5. (Overholts). P.r.: Ind., Mass., *Mo.
*Rhytisma punctatum (Pers.) Fr. (Black-specked leafspot)
+Pennsylvania - first collection in state on this host; two or three trees heavily infected; Charteroak, Huntingdon County, October 19. (Overholts)
+Septoria sp. (Leafspot)
Pennsylvania - associated with the Phyllosticta spot; rare; Coburn, Center County, October 5. (Overholts)
Verticillium sp. (Wilt)
*Pennsylvania - Laceyville, Washington County, August 29. (Kirby)
P.r.: Conn., D. C., Md., N. Y., Pa., Tenn., Va., W. Va.
Sunscald
+Pennsylvania - Bushkill, Pike County, July 29. (Orton). P.r.: *N. Y.

MAPLE, MOUNTAIN (Acer spicatum)
Rhytisma punctatum (Pers.) Fr. (Black-specked leafspot)
+Pennsylvania - State College, Center County, October 5. (Overholts)
P.r.: Me., *Mass., *N. Y., *Vt.

MAPLE (Acer spp.)
Coryneum negundinis Berk. & Curt. (Twig blight)
Howitt, J. E. Coryneum twig blight of Manitoba Maple. (Abstract) Phytopath. 14: 345. 1924. (In the vicinity of Ontario Agricultural College, Ontario, the trees have many blighted twigs.)

Fomes applanatus (Pers.) Wallr. (Ganoderma applanatum (Pers.) Pat.
(White streaked rot)
Connecticut - North Haven, July 26. (Clinton)
Gloeosporium apocryptum Ell. & Ev. (Anthracnose)
New York - Oswego County, August 13. (Chupp). P.r.: Conn., Del., Ill., Ind., Kans., Me., Mich., Minn., N. H., N. J., N. Y., *Ohio, Okla., S. Car., Wis.
+Gnomonia veneta (Sacc. & Speg.) Kleb. (Anthracnose)
Michigan - (Coons)
Phyllosticta minima (Berk. & Curt.) Ell. & Ev. (Leafspot)
*New Jersey - New Brunswick, Middlesex County, July 28. (Dept. Pl. Path.)
P.r.: Conn., *Del., *Me., Mass., *Mo., *Va.
Rhytisma acerinum (Pers.) Fr. (Tar spot)
*Arkansas - Rich Mountain, Polk County, August 14. (Young). P.r.: Ark., Conn., Fla., Ind., Iowa, *Kans., Ky., *Md., *Mass., Mich., Minn., Nebr., N. H., N. J., *N. Y., *N. Car., Ohio, Pa., *R. I., *S. Car., Vt., Wash., W. Va., Wis.
Bracher, Rose. Notes on Rhytisma acerinum and Rhytisma pseudoplatani. Trans. Brit. Mycol. Soc. 9: 133-186. 1924.
Rhytisma pseudoplatani Mueller - See R. acerinum literature reference.
Rhytisma punctatum (Pers.) Fr. (Black-specked leafspot)
Missouri - University campus, Columbia. (Maneval). P.r.: Mass., Minn., *N. Y., N. Car., Ohio, Pa., S. Car., *Wash., W. Va.
+Stereum purpureum Pers. (Silver leaf)
Washington - Walla Walla County. (Dept. Pl. Path.)
Drought injury
+Vermont - noted as of frequent occurrence in vicinity of Burlington. (Lutman). P.r.: Wash.
Leaf scorch
*+Kentucky - Louisville, Jefferson County, August 22. (Valleau). P.r.: Conn., Del., Ill., Ky., Me., Md., Mass., Mich., Minn., N. J., N. Y., N. Car., Ohio, Pa., R. I., Va., W. Va.
+Lightning injury
Connecticut - New Haven, July. (McClintock)

MIMOSA INVISA
Palm, B. T. and L. Fulmek. Ziekten en plagen van Mimosa invisa. (Diseases and pests of Mimosa invisa.) Meded. Deli Proefstat. te Medan-Sumatra Ser. 2, 35: 27-36. 1924.

MULBERRY, FRENCH - See Beautyberry, American.

MULBERRY (Morus sp.)
+Armillaria mellea (Vahl) Quel. (Rootrot)
Delaware - Wilmington, June 8. (Adams)

OAK, SILK (Grevillea robusta)
+Diplodia sp. (Gumming)
Florida - this disease was found to be the foregoing symptom of the complete girdling and killing of the tree, especially nursery stock. (Weber)

OAK, WHITE (Quercus alba)
+Armillaria mellea (Vahl) Quel. (Rootrot)
Pennsylvania - Charteroak, Huntingdon County, October 18. (Overholts)
+Cytosporella paucispora Pk. (Dieback)
Pennsylvania - on terminal twigs; Lamar, Clinton County, July 4. (Overholts)
Gnomonia veneta (Sacc. & Speg.) Kleb. (Anthracnose)
+Indiana - a very serious foliage injury, June. (Gardner).
P.r.: *Conn., D. C., Ga., *Ill., *Ind., Iowa, *Mass., Mich., Minn., N. J., *N. Y., *Pa., R. I. Tenn., *Wis.
+Polyporus dryadeus Fr. (White rootrot)
Pennsylvania - not common; State College, Center County, November 3. (Overholts)
+Papery Leafspot
Michigan - occurred on a street tree in dry soil. (Coons)

OAK, SCARLET (Quercus coccinea)
+Septobasidium pedicellatum Schw. (Canker)
New Jersey - (Taubenhaus)

OAK, LAUREL (Quercus laurifolia)
*Taphrina coerulescens (Mont. & Desm.) Tul. (Leaf blister)
Florida - Fort Barnacas; September 9. (Jenkins)

OAK, CHESTNUT (Quercus prinus)
+Coryneum (kunzei?) (Canker)
Pennsylvania - Mauch Chunk; Carbon County, July 7. (Orton)
Physalospora cydoniae Arnaud (Twig blight)
Rankin, W. H. The blackstreak canker of chestnut oak. Tree Talk 6: 8-10. 1924. First found 1911 in Pennsylvania. Found at Yonkers, New York, July 1912.
+Polyporus rheades Fr. (P. dryophilus Berk.) (White pocket rot)
Pennsylvania - new host; Stone Valley, Huntingdon County, November 16. (Overholts)
+Sphaeropsis quercina Cke. & Ell. (Dothiorella quercina (Cke. & Ell.) Sacc.) (Twig canker)
Pennsylvania - apparently common; Carbon County, July 7. (Rahm); somewhat common in York Springs, Adams County, June 5. (Kirby); Monroe County, July 29. (Anderson)

OAK, RED (Quercus rubra)
+Armillaria mellea (Vahl) Quel. (Rootrot)
Pennsylvania - Charteroak, Huntingdon County, October 18. (Overholts)
+Monochaetia desmazierii Sacc. (Large leafspot)
Pennsylvania - occurs in association with Taphrina coerulescens and appears to extend the damage considerably; Nittany Mountain; Center County, July 16. (Overholts)
+Strumella coryneoidea Sacc. & Wint. (Canker)
Pennsylvania - Beaver Meadows, Center County, October 9. (Overholts)
Taphrina coerulescens (Mont. & Desm.) Tul. (Leaf blister)
*+Pennsylvania - scattered; Gettysburg, Adams County, June 5. (Kirby)
+Michigan - (Coons). P.r.: Ala., *Ga., Iowa, N. H., *N. Y.

OAK, NORTHERN RED (Quercus rubra ambigun)

Taphrina coerulescens (Mont. & Desm.) Tul. (Leaf blister)

*+Virginia - Hot Spring, July 17; collected by P. Gravatt. (Jenkins) P.r.: Mass.

OAK, BLACK (Quercus velutina)

Taphrina coerulescens (Mont. & Desm.) Tul. (Leaf blister)

*+Pennsylvania - Mont Alto, September 13; collected by G. G. Hahn. (Jenkins). P.r.: D. C., Md., Mass., N. Y.

OAK, LIVE (Quercus virginiana)

+Poria medula-panis Pers. (Butt rot)

South Carolina - Sommerville, April 21. (Ludwig)

*+Taphrina coerulescens (Mont. & Desm.) Tul. (Leaf blister)

South Carolina - Landrum, May 16. (Jenkins)

OAK (Quercus spp.)

Cronartium cerebrum (Pk.) Hedgc. & Long (C. quercus (Brond.) Schroet.)

*+South Carolina - unimportant; northwestern part of state; Calhoun, Pickens County, June 29. (Ludwig). P.r.: *Calif., Del., *Fla., Ga., *Ill., Kans., *Md., Minn., Mo., N. Car., Pa., Va.

Endothia parasitica (Murr.) P. J. & H. W. Anderson (Blight)

+Connecticut - little injury; Mt. Carmel, July 14. (Graves) P.r.: *Md., *Pa.

*+Endothia radicalis mississippiensis Shear and Stevens

South Carolina - Society Hill, Darlington County, December 18, 1916. (Ludwig)

Gloeosporium sp.

Westerdijk, Johanna and A. Van Luijk. Die Gloeosporien der Eiche und der Platane. II. (The Gloeosporium species of the oak and of the plane. II.) Meded. Phytopath. Lab. 'Willie Commelin Scholten', Baarn (Holland) 6: 31-33. 1924.

Macrophoma sp. (Limb rot)

Florida - caused some trouble in nursery stock. (Weber)

Polystictus pergamenus Fr. (Polyporus pargamenus Fr.) (Sapwood rot)

New York - severe; local; Suffolk, October 18. (Welch). P.r.: *Ill., *Md., *N. Y., *N. Car., *Wis.

Taphrina coerulescens (Mont. & Desm.) Tul. (Leaf blister)

*South Carolina - McColl, October 28. (Jenkins)

Florida - was more plentiful and widespread than ever before; almost every oak tree examined had from 10 to 100 percent of the leaves infected; the disease caused considerable shedding in certain places. (Weber)

<u>Recent literature on other oak diseases.</u>

Boodle, L. A. Mistletoe on oaks. Bul. Misc. Inform. Kew 8: 331-333. 1924.

Braid, K. W. Some observations on Fistulina hepatica and hollow stag-headed oaks. Trans. Brit. Mycol. Soc. 9: 210-213. Aug. 1924.

Buchheim, A. Zur Kenntnis des Eichenmehltaus. (Contribution to the knowledge of oak mildew.) Zeitschr. fur Pflanzenkrankh. 34: 1-11. 1924.

Koning, M. de. Nieuwe onderzoekingen betreffende den eikenmeeldauw. Tijdschr. Plantenze. 31: 15-17. Jan. 1925.

Pater, B. Eine Beobachtung am Eichenmehltau, Microsphaera quercina Burrill. (An observation relating to oak mildew, Microsphaera quercina Burrill.) Buletinul de Informatii, (Cluj), 4: 25-26. 1924.

Petri, L. Sur la formation des chlamydospores chez l'Oidium des chenes. (On the formation of chlamydospores in the Oidium of the Oak.) Congres Path. Veg. (Centenaire de Pasteur), Strasbourg, 1923: 36-37. 1923.

PALMS

Graphiola phoenicis (Moug.) Poit. (False smut)
Florida - was well distributed but seldom proved of any consequence. (Weber)
Phyllosticta sp. (Leafspot)
Florida - not important. (Weber)
Thielaviopsis sp. (Rootrot)
Florida - the disease was destructive where found. (Weber)
Robertson-Proschowsky, A. Un champignon destructeur de Palmiers sur la Côte d'Azur. (A fungus destructive to Palms on the Riviers.) Rev. de Bot. Appliquée, IV, 30: 106-108. 1924.

PALM, PLUMOSA (Cocos plumosa)
+Alternaria sp. (Leafspot)
Florida - (Weber)

PALM, CHINESE FAN (Livistona chinensis)
+Cercospora sp. (Blotch)
Florida - (Weber)
+Thielaviopsis sp. (Rootrot)
Florida - did considerable damage to nursery stock on the West coast; not prevalent but severe. (Weber)

PALM, ROYAL (Roystonea regia)
+Colletotrichum sp. (Anthracnose)
Florida - caused a considerable amount of breaking over of leaf petioles; well distributed. (Weber)
+Curly leaf (unknown)
Florida - a serious condition; eventually kills the plants; Miami, Vero and Tarpon Springs. (Weber)
+Nematodes (Rootknot)
Florida - caused a definite stunting of small plants in the nursery. (Weber)

PALM, MEXICAN WASHINGTON (Washingtonia robusta)
+Cercospora sp. (Leafspot)
Florida - not plentiful; distribution scattered. (Weber)
+Pestalozzia palmicola Sacc. & Syd. (Leafspot)
Florida - very common on the host, attacking the older leaves; causing them to dieback from the margins. (Weber)

PALM, DATE (Phoenix dactylifera)
Exosporium palmivorum Sacc. (Leafspot)

Texas - prevalent but unimportant. (Taubenhaus). P.r.: *La.
Graphiola phoenicis (Moug.) Poit. (False smut)
Texas - quite prevalent but important. (Taubenhaus). P.r.: *Ariz., *Calif., *Cuba, *D. C., *Fla., *Hawaii, Porto Rico, *Texas.
Pestalozzia sp. (Blight)
Texas - trace; unimportant. (Taubenhaus)

PALM, CAROLINA (Sabal palmetto)
+Septobasidium pedicellatum Schw. (Canker)
Florida - (Taubenhaus)

PITHECOLLOBRIUM (Pithecollobrium sp.)
+Napicladium sp. (Leafspot)
Florida - Little River. (Weber)

PLANETREE (Platanus sp.)
Gloeosporium sp. - See Oak (Quercus sp.) Gloeosporium sp. literature reference.

PLUM, WILD GOOSE (Prunus munsoniana)
*+Coccomyces sp. (Leafspot)
Arkansas - Waldron, Scott County, September 4. (Young)

PLUM, BLACK SLOE (Prunus umbellata)
+Bacterium pruni EFS. (Bacterial spot)
Florida - not common. (Weber)
+Diplodia pruni Fckl. (Gummosis)
Florida - a very serious disease of plum trees in the vicinity of Gainesville and also at DeFuniak Springs, where it killed trees several years old. (Weber)
+Podosphaera oxyacanthae (DC.) D By. (Powdery mildew)
Florida - caused a definite twig blight in which the younger parts were attacked and as a result they became swollen, deformed and gradually died; the fungus appeared to be very much more virulent than is usually considered for this fungus. (Weber)
+Sclerotinia cinerea (Bon.) Schroet. (Monilia fructigena Pers.) (Brown rot)
Florida - collected on the young twigs of the host plant which were being killed back; leaves and fruit were also attacked; common. (Weber)

POPLAR, WHITE (Populus alba)
+Dothichiza populea Sacc. & M. Briard)
Pennsylvania - State College, Center County, June 17. (Kirby)

POPLAR, LARGETOOTH ASPEN (Populus grandidentata)
+Diplodia populi Fckl. (Twig blight)
Pennsylvania - on dead twigs, Susquehanna County, July 23. (Kirby)
+Fomes igniarius (L.) Fr. (White heart rot)
Pennsylvania - new host for state; Laurel Run, Huntingdon County, November 27. (Overholts)
+Valsa nivea (Hoffm.) Fr. (Canker)
Pennsylvania - slight loss; State College, November 1. (Overholts)

POPLAR, LOMBARDY (Populus nigra italica)
Cytospora chrysosperma (Pers.) Fr. (Canker)
*+Pennsylvania - Chambersburg, Franklin County, August 21. (Kirby)
*+Missouri - the damage from this canker at a nursery at St. Joseph has been quite severe, the company lost about a thousand trees from this disease last year; the trees are from 3 to 4 years old; according to their observation the trees appear healthy until fall when the disease spreads and the trees die; first report for state, July 16. (Maneval)
P.r.: Ariz., *Kans., Mich., N. Mex., Texas, Utah.
Long, W. H. Journal of Agricultural Research 13: 331-345. 1918. Since Doctor Long's publication the fungus has been found to be scattered more or less over the eastern United States and is now found around Washington, D. C.
Valsa nivea (Hoffm.) Fr. (Canker)
+Pennsylvania - State College, Center County, November 1. (Overholts)
P.r.: *Kans.

POPLAR, QUAKING ASPEN (Populus tremuloides)
*+Marssonia brunnea Ell. & Ev. (Sacc.) (Anthracnose)
Washington - Whitman County. (Dept. Pl. Path.)
Melampsora albertensis Arth. (Rust)
*+Alaska - collected on farm of United States Experiment Station at Fairbanks; trace; August 3. (Paxton)
British Columbia - found occasionally, Kelowna, August 30. (Boyce)
P.r.: *Colo., *Ida., *Mont., *Utah, *Wash., *Wyo.
Valsa nivea (Hoffm.) Fr. (Canker)
+Pennsylvania - State College, Center County, November 1. (Overholts)
P.r.: Mont., *N. Y.

POPLAR, BLACK COTTONWOOD (Populus trichocarpa)
Melampsora occidentalis Jack. (Rust)
British Columbia - very abundant, Revelstoke, September 2, and Kelowna, August 30. (Boyce)
P.r.: *Calif., Ida., Mont., *Oreg., *Wash.
+Stereum purpureum Fr. (Silver leaf)
Washington - Walla Walla, February 7. (Dept. Pl. Path.)

POPLAR (Populus spp.)
Cytospora chrusosperma (Pers.) Fr. (Canker)
Colorado - Delta, Denver, and Larimer Counties, May 14; the disease shows practically no difference in choice of species of hosts in state. (Learn). P.r.: Ariz., Colo., Ida., Ind., *Me., Mass., Mich., Minn., Nev., N. H., N. Mex., *N. Y., N. D., Ohio, Texas, *Utah.
Hypoxylon pruninatum (Klotszche) Cke. (Canker)
Provah, Alfred. Hypoxylon poplar canker. Phytopath. 14: 140-145. 1924.
P.r.: N. Y., Mich., Me.
Melampsora medusae Thuem. (Rust)
+North Dakota - common and general; on P. deltoides and P. tremuloides. (Jeniger). P.r. on former: *Ill., *Ind., Iowa, *Mass., N. Y., N. D., Okla., *Texas, *W. Va., *Wis.; on the latter: *Ind., Mont.
Schenk, P. J. Kanker van Canada-populier. Floralia 45: 89. 1924.

REDBUD, AMERICAN (Cercis canadensis)
+Pestalozzia sp. (Leafspot)
Florida - was causing considerable defoliation. (Weber)

SASKATOON (Amelanchier alnifolia)
Dimerosporium collinsii (Schw.) Thuem.
+Montana - Lincoln County, July 25. (Boyce)
Idaho - frequent above Upper Priest Lake, Boundary County, July 29. (Boyce). P.r.: *Calif., *Ida., *Mont., *N. D., *Oreg., Wash., *Wyo.

SASSAFRAS (Sassafras variifolium)
+Armillaria mellea (Vahl) Quel. (Rootrot)
Pennsylvania - new host for state; Stone Valley, Huntingdon County, November 16. (Overholts)

SCREWPINE, COMMON (Pandanus utilis)
+Colletotrichum sp. (Anthracnose)
Florida - very common on the leaves. (Weber)
+Melanconium pandani Lev. (Leafspot)
Florida - Bradentown. (Weber)
+Pestalozzia sp. (Leafspot)
Florida - caused a considerable dying back of the leaves from the leaves from the tip; common. (Weber)

SERVICEBERRY, DOWNY (Amelanchier canadensis)
Phyllosticta virginiana (Ell. & Hals.) Seaver (Leafspot)
+Pennsylvania - new for state; Stone Valley, Huntingdon County, August 9. (Kirby & Overholts). P.r.: N. Y.

SERVICEBERRY (Amelanchier florida)
+Phyllactinia corylea (Pers.) Karst. (Powdery mildew)
Washington - Whitman County. (Dept. Pl. Path.)

SUMAC, POISON (Rhus toxicodendron)
Uromyces toxicodendri (Berk. & Rav.) Arth.
Pennsylvania - Charteroak, Huntingdon County, September 12. (Overholts). P.r.: Ala., Colo., Ga., Ill., Ind., Iowa, Kans., La., Mass., Minn., Miss., Mo., Mont., Nebr., N. J., N. Y., N. C. N. Car., N. D., Ohio, Pa., S. Car., Texas, Vt., W. Va., Wis., Wyo.
Septoria irregularis Pk. (Leafspot)
*+New Jersey - New Brunswick, Middlesex County, August. (Dept. Pl. Path.) P.r.: Ill., Ind., Minn.

SUMAC, STAGHORN (Rhus typhina)
*+Sphaerotheca humuli (DC.) Burr. (Powdery mildew)
Pennsylvania - common on host on the low ground around the Lake in Heola Park, Center County, September 7. (Kirby)

SYCAMORE (Platanus occidentalis)
Gnomonia veneta (Sacc. & Speg.) Kleb. (Anthracnose)
The disease was worse than usual in Mass., Conn., *N. Y., *Pa., D. C., W. Va., Ind., Ohio, Mich., Iowa, Mo., Ill. The following states reported this disease for the first time to the

Plant Disease Survey: *N. J., Tenn., Ark. All reported that the disease was most severe. Mr. G. Flippo Gravatt in a note to the Plant Disease Survey on the prevalence of blight on sycamore during May 1924 said:

> "The blight is present in varying quantities practically every year and has for the past few years been a serious factor affecting the vitality of sycamores. This year it is even worse than it has been for the past few years. The depletion of the vigor of the trees due to the killing of a large percentage of the leaves and twigs is becoming apparent. A number of trees were observed which had more than one-half of their limbs killed, apparently due to the repeated attacks of this fungus."

Hysterium pulcherrimum Tehon & Young

Illinois - White Heath.

Tehon, L. R. and P. A. Young. A new Historium from Illinois. Mycologia 16: 30-32. 1924.

WALNUT, BLACK (Juglans nigra)

Gnomonia leptostyla (Fr.) Ces. & De Not. (Marssonia juglandis (Lib.) Magn.) (Anthracnose)

*+Missouri - probably occurs to some extent every year; first collected by Doctor Maneval at McBaine, Boone County, September 29, 1917; Columbia, Boone County. (Maneval)

WILLOW (Salix sp.)

Bacterium tumefaciens EFS. & Town. (Crown gall)

Connecticut - two reports; Westville, July 25. (Hunt). P.r.: Conn., Tex.

+Melampsora humboldtiana Speg. (M. americana Arth.) (Rust)

Pennsylvania - Charteroak, Huntingdon County, (Overholts); Danville, Montour County. (Orton)

+Polystictus hirsutus (Wulf.) Fr. (White rot)

Connecticut - one report on bark of living tree; Fairfield, August 24. (Clinton). P.r.: *La.

Fusicladium saliciperdum (All. & Tub.) Lind. (Septogloeum salicipordum) All. & Tub. (Dieback)

Alcock, N. L. A dieback and bark-disease of willows, attacking the young twigs. Trans. R. Scott. Arbor. Soc. 38: 128-130. 1924.

EVERGREEN TREES

Chlorosis (Smoke fumes)

Wisconsin - the effect was very noticeable on the evergreen trees from the smoke and fluoride from an enamel factory at Kohlor; it produced a reddening and occurred when the host was in full leaf at mid-summer. (Vaughan)

Rhizoctonia sp. and Pythium sp. (Damping-off)

Wisconsin - attacked the seedlings at Trout Lake, was also bad at Pine Lake and Sturgeon Bay; may be successfully controlled by sulphuric acid 9 ounces in 6 gallons of water to a bed 4 x 12; two applications applied 4-1/2 ounces and three gallons of water after the bed is tamped and 4-1/2 ounces and three gallons after sanding. (Vaughan)

Recent literature on general forest disease subjects:

Anderson, M. L. Heartrot in Conifers. Trans. Roy. Scot. Arbor Soc. 38: 37-45. 1924.

Bray, M. W. and T. M. Andrews. Chemical changes of groundwood during decay. Indus. & Engin. Chem. 16: 137-139. 1924.

Boyce, J. S. Status of forest tree diseases on the Pacific Coast. Timberm, 26: 60. 1924.

__________ Decay in Douglas fir in relation to cruising. The Timberm. 26 (1): 51-54. 1924.

__________ An unusual infection of Polyporus schweinitzii Fr. Phytopath. 14: 588. 1924.

__________ Report on the forest disease situation. Lumber World Review. 47 (12): 44. 1924.

Burt, E. A. Some wood-destroying fungi of Java. Ann. Missouri Bot. Gard. 11: 37-42. 1924.

Codding, G. M. Defoliation of shade trees due to heat. Tree Talk 6: 25-26. 1924.

Colley, R. H. Rotten wood. Timberm. 25: 56-57. 1924.

__________ A laboratory projection apparatus. Phytopath. 14: 424-426. 1924.

Collins, J. Franklin. Cavity work. Connecticut Agr. Exp. Sta. Bul. 263: 154-155. Dec. 1924.

__________ Protection of wounds in nut trees. No. Nut. Grow. Assoc. Proc. 15th Ann. Meeting, Sept. 3-5, 1924. P. 61-63. 1924.

Costantin, J. Remarques sur les relations des arbres avec les champignons souterrains. (Notes on the relations of trees with underground fungi.) Comptes Rendus Acad. des Sciences, 178: 158-161. 1924.

Ellis, E. H. Dryrot disease of timber. Chem. News 127, 3324: 402-403. 1924.

Fritz, C. W. Cultural criteria for the distinction of wood-destroying fungi. Proc. & Trans. Roy. Soc. Canada 17: 191-288. 1923.

Henkel, J. S. Preservative treatment of indigenous timbers. Rhod. Agr. Jour. 21: 61-63. 1924.

Hubert, E. E. The sapstain problem and a ten million dollar loss. So. Lumberm. 114: 47-48. 1924.

__________ The diagnosis of decay in wood. Jour. Agr. Res. 29: 523-567. 1924.

__________ and W. Karl Loughborough. Problems in the seasoning of southern hardwoods. Southern Lumberman 117: 170-174. 1924.

__________ The heat treatment of infected wood. Hardwood Record 57: 15, 17, 20; 58: 18, 20. 1924.

__________ Effect of kiln drying, steaming and air seasoning on certain fungi in woods. U. S. Dept. Agr. Bul. 1262: 1-20. 1924.

Humphrey, C. J. Decay of mine timber. Mimeographed from Proc. 18th Ann. Meet. Amer. Wood Pres. Assoc. P. 213-222. 1922.

Kallbrunner, H. Law for the protection of agriculture and forests against smoke injury in Austria. Intern. Rev. Sci. & Pract. of Agric., N. S., 2: 224-230. 1924.

Larue, P. Sur la coloration des bois. (The discoloration of timber.) La Vie Agric. et Rurale 25: 121-123. 1924.

Lawrence, C. C. Cankers and canker treatment. Tree Talk 6: 12-13. 1924.

Mangin, L. Les champignons destructeurs du bois. (Wood-destroying fungi.) Comptes Rendus Acad. d'Agric. de France 10: 428-429. 1924.

Melin, E. Ueber den Einfluss der Wasserstoffionkonzentrationen auf die Virulenz der Wurzelpilze von Kiefer und Fichte. (The influence of hydrogen-ion concentrations on the virulence of Pine and Fir root fungi.) Botaniska Notiser 1924: 38-48. 1924.

Mobius, M. Ueber das Grauwerden des Holzes. (The grey discoloration of wood.) Ber. Deutsch. Bot. Gesellsch. 42: 15-18. 1924.

Moir, W. S. White pine blister rust in Western Europe. U. S. Dept. Agr. Bul. 1186: 1-32. 1924.

Moll. Holzkonservierung und Schwammverhutung in land-wirtschaftlichen Betrieben. (Wood preservation and fungus prevention in agricultural structures.) Mitt. Deutsch. Landw. Gesellsch. 39: 344-345. 1924.

Reeve, A. T. A brown bast census. Year Book Dept. Agr. Ceylon 1924: 14-15. 1924.

Rhine, J. B. Clogging of stomata of conifers in relation to smoke injury and distribution. Bot. Gaz. 78: 226-232. 1924.

Richards, C. A. Control of decay and molding of wood pulp. Paper Trade Jour. 78: 55-60. 1924.

Rue, J. D. and C. J. Humphrey. Decayed wood for pulp - at a profit. Pamphlet issued by American Paper and Pulp Association, Canadian Pulp and Paper Assoc., Newsprint Service Bureau. p. 1-14. 1924.

__________, R. N. Miller, and C. J. Humphrey. Decayed wood for sulphite pulp. Pulp and Paper Mag. Canada 22: 93-100. 1924.

__________________________________ The utilization of decayed wood in the chemical processes. Paper Trade Jour. 78: 44-48. 1924.

Scherer, C. M. Tree surgery. Proc. Ohio State Hort. Soc. 56: 134-138. 1923.

Schmitz, H. Notes on wood decay. II. The Comparative resistance to decay of edge-grained and flat-grained Douglas fir and western yellow pine lumber. Idaho For. 6: 12-15. 1924.

Toumey, J. W. and T. T. Li. Nursery investigations with special reference to damping-off. Yale Univ. School Forest. Bul. 10: 36. 1924.

Vanine, E. Le Hydnum septentrionale, parasite des arbres a feuilles. Rep. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 264-267. 1923.

Warr, J. H. The antiseptic treatment of timber in India. Indian Forester 1(7): 351-356. 1924.

Wolpert, F. S. The growth of certain wood-destroying fungi in relation to the H-ion concentration of the media. Ann. Missouri Bot. Gard. 11: 43-97. 1924.

Royal Decree (March 12, 1924) for the control of the enemies and diseases of forest trees (in Spain). Intern. Rev. Sci. & Pract. of Agr. n. s., 2 (2): 476-477. 1924.

DISEASES OF ORNAMENTALS

AMARYLLIS, HOUSE (Hippeastrum equestre)

Mosaic

Kunkel, L. O. Further studies on the intracellular bodies associated with certain mosaic diseases. Hawaiian Sugar Plant. Assoc. Exp. Sta. Bul. Bot. Ser. 3: 108-114. 1924. Describes mosaic of Hippeastrum; states that it is probably the same disease as the mosaic that attacks tulips, narcissi, and hyacinths.

AMPELOPSIS or VIRGINIA CREEPER (Ampelopsis quinquefolia)

Cercospora ampelopsidis Pk. (Leafspot)

*+Missouri - Columbia, Boone County, July 4. (Maneval). P.r.: Ala., *Del., *D. C., *Ill., *Ind., *Iowa, *Kans., *Minn., Nebr., N. J., N. Y., *Pa., *W. Va.

Guignardia bidwellii (Ell.) Viala & Ravaz (Phoma uvicola Berk. & Curt.) (Blackrot)

+Florida - general throughout state; both on wild and cultivated; it was undoubtedly a source of infection for the disease on cultivated grapes. (Weber)

Uncinula necator (Schw.) Burr. (Powdery mildew)

*+Pennsylvania - State College, Center County, September 13. (Kirby)

AMPELOPSIS or JAPANESE CREEPER (Boston Ivy) (A. veitchi) (A. tricuspidata)

Guignardia bidwellii (Ell.) Viala & Ravaz (Leafspot)

+Florida - severe; Gainesville. (Weber)

Plasmopara viticola (Berk. & Curt.) Berl. & DeToni (Downy mildew)

Lustner, G. Ueber das auftreten der Plasmopara viticola Berlese et de Toni auf Ampelopsis veitchii im Rheingau. Nachrichtenbl. Deut. Pflanzenschutzd. 4: 74-75. 1924.

Zum "Auftreten von Plasmopara (Peronospora) viticola auf Ampelopsis veitchii." Nachrichtenbl. Deut. Pflanzenschutzd. 4: 92-93. 1924.

ARTICHOKE, JERUSALEM (Helianthus tuberosus)

Puccinia helianthi Schw. (Rust)

+Kansas - very common in the vicinity of Manhattan. (Johnston). P.r.: *Ark., Ind., *Iowa, *Kans., *Ky., *La., *Md., Miss., *Mo., *Nebr., *N. J., *N. Y., *N. D., *Ohio, *Okla., *S. Car.

ASTER, CHINA (Callistephus chinensis)

Coleosporium solidaginis (Schw.) Thuem. (Rust)

Pennsylvania - State College, October 6. (Orton). P.r.: Conn., *Ga., *Ind., Md., Mass., Miss., *N. Y., N. Car., N. D., Pa., *Va.

+Fusarium oxysporum Schlecht. (Wilt)

*Kentucky - Lexington, Fayette County. (Ky. Agr. Exp. Sta.)

Yellows

+Arkansas - very common and severe and frequently noted in association with similar symptoms on Erigeron canadensis. ((Dept. Pl. Path.)

+Indiana - destroyed practically all asters grown; worse than the previous years; a similar trouble was widespread on *Erigeron* sp. which is related to the aster; it seems possible that the weed may serve as a source of infection; no cross inoculations were made. (Gardner)

+Michigan - more than last year; general; one report stated that the various varieties from seedhouses were almost a failure, while the homegrown seeds gave beautiful blooms; several growers reported a total failure of the aster planting from this disease. (Coons)

+North Dakota - scarcely any of the varieties in the infected area of the state were free from disease; yellows was the limiting factor in aster production instead of wilt, which is usually the disease which causes considerable trouble, Fargo, July 7. (Weniger)

+South Dakota - from a very high to a total loss; seems to be associated with a similar disease on *Erigeron canadensis*; the reports were mostly from the eastern half of the state. (Petry)

+Kansas - general. (White)

+Smelter injury

Washington - Pierce County. (Dept. Pl. Path.)

Recent literature:

Laubert, R. Die welkekrankheit der astern. Gartenw. 28: 463-464. 1924.

AZALEA, INDICA (Azalea indica)

Exobasidium azaleae Pk. (Galls)

+Florida - West Palm Beach; disease was not of a serious nature. (Weber). P.r.: *S. Car.

AZALEA, JAPANESE (Azalea japonica)

+Exobasidium sp.

Washington - Lewis and Pacific Counties. (Dept. Pl. Path.)

AZALEA, SWAMP (Azalea viscosa)

Exobasidium vaccinii (Pk. (Gall)

+Florida - collected at several different places near Gainesville; the galls hung like pendants from the leaves or flowers and were bell-shaped except that they were solid. (Weber).

P.r.: *Ala., Miss., *N. J.

BABYSBREATH (Gypsophila paniculata)

+Botrytis sp. (Gray mold)

New Jersey - produced ashen, gray spots on bud scales and stems; stems apparently dead for several nodes and internodes at top of the plants; Middlesex, July 15. (Martin)

BALSAM, GARDEN (Impatiens balsamina)

Mosaic

Ocfemia, G. O. Notes on some economic plant diseases new in the Philippine Islands. Philippine Agr. 13: 163-166. Sept. 1924. Collected in a flower garden in Los Banos, Laguna, December 1923. Plants affected did not produce any flowers although unaffected plants of the same age fruited abundantly.

SNAPWEED, SPOTTED (Impatiens biflora)
    Puccinia impatientis (Schw.) Arth. (Rust)
        New York - common in Genesee and Orleans Counties. (Chupp)
        P.r.: *Ind., *Miss., *N. Y., *N. D., *Wash.

SNAPWEED, PALE (Impatiens pallida)
    +Peronospora corydalis D By. (Downy mildew)
        New York - Tompkins County, May 12. (Chupp)

SNAPWEED (Impatiens sp.)
    +Cercospora sp. (Leafspot)
        Florida - caused considerable damage to local flower bed by leafspotting and defoliation. (Weber)
    +Rhizoctonia sp. (Damping-off)
        Florida - very prevalent, in many instances affecting 50% of the plantings. (Weber)

BAMBOO (Bambusa sp.)
    +Helminthosporium sp. (Leafspot)
        Florida - not important; considerable discoloration and dropping of foliage. (Weber)

BARBERRY, COMMON (Berberis vulgaris)
    Bacterial leafspot (undetermined)
        *+Pennsylvania - Lancaster County, July 8. (Kirby)
        P.r.: N. Y., Iowa, Nebr., Wis.
    Puccinia graminis - See Cereal Supplement 40, 1925.

BEGONIA, PERPETUAL (Begonia semperflorens)
    +Cercospora sp. (Leafspot)
        Florida - of no consequence; collected on the wild plants. (Weber)

BEGONIA (Begonia sp.)
    +Aphelenchus ormerodis Ritzma Bos (Nematode)
        New York - found in a nursery; produced numerous red blisters on the lower side of the leaf followed by the dying of the infected foliage; Long Island, October. (Chupp)
    Leaf blight (non-parasitic)
        +Washington - Thurston County. (Frank). P.r.: Ohio.
    Leaf drop (Physiological)
        Washington - Island County. (Dept. Pl. Path.)

BEAUTYBERRY, AMERICAN (Callicarpa americana)
    +Cercospora pulvinulata Sacc. & Wint. (Leafspot)
        Florida - caused defoliation. (Weber)

BOX (Buxus sempervirens)
    +Laestadia buxi (Desm.) Sacc. (Leafspot)
        Mississippi - one report; Alcorn County, September. (Neal & Wallace)
    Nectria rousselliana Tul. (Volutella buxi Cda.) (Canker)
        Pennsylvania - Philadelphia, July; Philadelphia County. (Miles)
        P.r.: Md., N. J., *Pa.

+Phyllosticta suerswaldii Allesch. (Leafspot)

New Jersey - Essex County, June 9. (Martin)

Sunscorch

Connecticut - (Clinton & Stoddard)

CALENDULA (Calendula sp.)

+Mosaic

Minnesota - noted on only a few plants in one garden, Ramsey County; the disease symptoms were very much like those of aster yellows - a bushy growth and mottled leaves; the plants were covered with aphids. (Sect. Pl. Path.)

CALLA (Zantedeschia sp.)

Bacillus carotovorus L. R. Jones (Soft rot)

New York - on variety Godfreyii, in a greenhouse; rotting near surface of soil; New Rochelle. (Chupp). P.r.: Pa.

Bacillus sp. (Soft rot)

New Jersey - stems decayed above ground finally causing plants to topple over as in damping off; Atlantic, Aug. 18. (Martin)

CAMELLIA, COMMON (Camellia japonica)

+Exobasidium camelliae Shirai (Gall)

Mississippi - important locally; rather prevalent in Jackson and Harrison Counties, April 25. (Neal)

+Gloeosporium sp. (Anthracnose)

Mississippi - Copiah County, September 1. (Neal & Wallace)

Bud dropping (undetermined)

Washington - King County. (Frank)

CANNA (Canna indica)

Bacterium cannae M. K. Bryan (Bacterial bud rot) (Phytomonas cannae (Bryan) Com. S.A.B.)

+Connecticut - new to state; Hartford County, August 19. (Clinton) P.r.: *D. C., Ill.

CARNATION (Dianthus caryophyllus)

Botrytis sp. (Bud blight)

+Connecticut - (Clinton) P.r.: Ill., Ohio, *Pa.

Fusarium sp.

Pennsylvania - locally severe; State College, Center County, October 6. (Orton). P.r.: Ala., Calif., Del., *D. C., Fla., Ill., Mass., Minn., Nebr., N. Y., N. Car., *Ohio, *Pa., *Texas.

Uromyces caryophyllinus (Schrank) Wint. (Rust)

+Virginia - severe in a greenhouse on Beacon variety; Oak Ridge, March 22. (Fromme)

+Colorado - unimportant; just present in a greenhouse; Ft. Collins. (Learn)

CHRYSANTHEMUM (Chrysanthemum sp.)

Cylindrosporium chrysanthemi Ell. & Dearn.

+Georgia - quite destructive in greenhouses; affected 45% of the plants in the gardens; maximum loss in one garden 100%; general appeared too late in the season to be generally destructive to outdoor planting; Bainbridge, September 23; period of greatest injury October 25 to November 10. (Boyd). P.r.: Conn., *Mass., *Miss., N. Car., Pa.

Heterodera radicicola (Greef) Muell. (Rootknot)

+Mississippi - of slight importance; Tate County, September 24. (Neal & Wallace). P.r.: *Texas, Wash.

Septoria chrysanthemella Cav. (Leafspot)

*Kentucky - Lexington, Fayette County. (Ky. Agr. Exp. Sta.)

Chlorosis (non-parasitic)

+Pennsylvania - very severe; severe on certain varieties; State College, Center County, November 21. (Orton). P.r.: Md.

+Yellows (Undetermined)

Michigan - occurred in the greenhouses for the first time as far as the records at the Agricultural College show. This was attributed to the fact that aster yellows was widespread and destructive out of doors as well as affecting all varieties in the greenhouses; while there was no definite proof that the two diseases are identical there seems little doubt that such is the case. The symptoms are the same in every way and those working on this disease have felt justified in calling the disease on this host "yellows" and classifying this host as one of several that are affected by this disease as well as the aster; the blooms were discolored and failed to open; important in some greenhouses. (Nelson)

<u>Recent literature on chrysanthemum diseases</u>:

Chifflot, Jean. Maladies et parasities des boutures de chrysanthèmes. Congr. Path. Veg. Strasbourg 1923: 42-44. 1923.

______________ Maladies et parasities des chrysanthèmes. Observations de l'annee 1923. Chrysanthème. 27: 504-505. 1924.

Macself, A. J. Deterioration in chrysanthemums. Gard. Chron. 3, 75: 20-21. 1924.

CLEMATIS (Clematis sp.)

Puccinia triticina Eriks. (Dicaeoma clematidis (DC.) Arth.) (Rust)

Washington - Okanogan and Walla Walla Counties. (Dept. Pl. Path.)

P.r.: *Calif., *Colo., *Ga., Ind., Iowa, *Kans., Minn., *Mo., *Mont., *Nebr., N. Y., *Oreg., Texas, *Utah, Vt., Va., *Wash., *Wis., *Wyo.

COLEUS, COMMON (Coleus blumei)

+Heterodera radicicola (Greef) Muell. (Rootknot)

*New York - Flushing, Queens County, April 7. (Chupp)

+Orobanche ramosa L. (Branched broom-rape)

*New York - this together with nematodes caused the loss of several hundred plants daily in a greenhouse; Flushing, Queens County, February 4. (Muenscher)

Muenscher, W. C. Orobanche ramosa on a Coleus. Rhodora. 26: 133-135. 1924.

______________ Coleus parasited by broom-rape. Gard. Chron. Amer. 28: 165. 1924.

OSMOS, COMMON (Cosmos bipinnatus)
  Phomopsis stewartii Pk. (Stem canker)
    +Michigan - caused failure of many plantings. (Nelson). P.r.: Ohio, *S. D.
  Bacterial wilt (Undetermined)
    Porto Rico - severe. (Cook.). P.r.: N. Car.
    Cook, M. T. A bacterial wilt of cosmos. (Preliminary paper) Jour. Dept. Agr. Porto Rico 8: 14. 1924.
  +Mosaic
    Florida - apparently not transmissible since healthy plants grew beside it several months; was observed during the season on several plants in Gainesville. (Weber)

CRAPEMYRTLE, COMMON (Lagerstroemia indica)
  Cercospora sp. (Leafspot)
    +Florida - Gainesville. (Weber). P.r.: Cercospora lythracearum Heald & Wolf, *Texas.
  +Powdery mildew. (Undetermined)
    Texas - Harrison and Smith Counties. (Taubenhaus)
  +Witches broom (Unknown)
    Florida - local; found near Davie. (Weber)

CYCLAMEN (Cyclamen sp.)
  Heterodera radicicola (Greef) Muell. (Rootknot)
    +Indiana - occurred in a greenhouse; Lawrence County, August 11. (Gardner). P.r.: Nebr., Ohio, W. Va.
  +Phoma cyclamenae Hals. (Leafspot)
    Ohio - this disease caused a $5000 loss to a greenhouse at Cleveland, 80% of the plants being attacked. (Young)
  Ramularia cyclaminicola Trel.
    *+Minnesota - observed in only one greenhouse in Minneapolis, September 17. (Sect. Pl. Path.). P.r.: Ill.

DAHLIA, AZTEC (Dahlia pinnata)
  +Cercospora sp. (Leafspot)
    Florida - severe in certain localities. (Weber)
  +Choanephora sp. (Blossom blight)
    Florida - caused a serious blighting of the flowers, which were attacked often before fully opened; not reported outside of Gainesville. (Weber)
  +Sclerotium rolfsii Sacc. (Stemrot)
    Florida - girdled the stalks of plants, also attacked the tubers. (Weber)

DAHLIA (Dahlia sp.)
  Botrytis sp.? (Budrot)
    *+Pennsylvania - Lebanon, Lebanon County, August 12. (Kirby). P.r.: Mich., N. J.
  Erysiphe cichoracearum DC. (Powdery mildew)
    +Connecticut - Fairfield, August 24. (Clinton)
    +Washington - Asotin County. (Dept. Pl. Path.). P.r.: Calif., Iowa, Md., N. C., Ohio, W. Va.

Erysiphe sp.
*+Pennsylvania - Lebanon, Lebanon County, August 12. (Kirby)
+Michigan - some varieties badly affected in nursery; more than last year. (Nelson)
Heterodera radicicola (Greef) Muell. (Rootknot)
+Mississippi - Oktibbeha County, March 25. (Barker). P.r.: Calif.
Macrosporium sp.
*+Missouri - Columbia, Boone County, October 19. (Maneval). P.r.: *Ala., Mo., Pa., *S. Car.
Pythium debaryanum Hesse (Damping off)
+Washington - heavy loss suffered by cuttings in greenhouse; Colfax. (Dept. Pl. Path.). P.r.: Conn.
+Smelter injury - SO_2
Washington - Pierce County. (Dept. Pl. Path.)
Rootrot (Undetermined)
+Washington - Pierce County. (Frank). P.r.: Md.
Schenk, P. J. Wortelnobbel aan dahlia. Floralia 45: 254-255. 1924.
Anon. Wortelknobbel aan dahlia's. Floralia. 46: 6. 1925.

DAISY, BUSHY ARCTOTIS (Arctotis grandis)
+Cercospora sp. (Leafspot)
Florida - caused a shedding of leaves. (Weber)

DELPHINIUM (Delphinium sp.)
Bacterium delphinii (EFS.) Bryan (Blackspot)
Bryan, M. K. Bacterial leafspot of Delphinium. Jour. Agr. Res. 28: 261-270. 1924.
P.r.: Conn., Ill., Me., Mass., N. H., N. Y., Oreg., Pa.
Botrytis sp. (Graymold rot)
+Connecticut - (Clinton). P.r.: Pa., Wash.
Corticium vagum Berk. & Curt. (Stemrot)
+Michigan - (Coons). P.r.: N. Y.
Erysiphe polygoni DC. (Powdery mildew)
+Connecticut - apparently a new host to state; Fairfield, August 18. (Clinton). P.r.: Minn., *N. Y., *Pa., Wis.
+Fusarium sp. (Wilt)
Florida - killed a number of plants in flower beds at Ocala. (Weber)
Gloyer, W. O. and H. Glasgow. Cabbage seedbed diseases and Delphinium rootrots: their relation to certain methods of cabbage maggot control. New York (Geneva) Agr. Exp. Sta. Bul. 513: 1-31. 1924.
Rea, J. L. Our best blue flower. Larkspur in superlative strains from seed and cuttings. Blight resistant plants through hybridizing. Gard. Mag. 39: 407-408. 1924.
Schenk, P. J. Ziekten van Delphinium en Phlox. Floralia 45: 110-111. 1924.

DIGITALIS - See Foxglove

EUONYMUS SP.
Marssonia thomasiana Sacc. (Leafspot)
*+Missouri - Columbia, Boone County, July 4, 1918. (Maneval). P.r.: Ind., *Wis.

FERN, ASPARAGUS (Asparagus plumosus)
+Physarum cinereum (Batsch.) Pers.
Florida - quite prevalent; not considered serious. (Weber)

FERN, COMMON SWORD or BOSTON (Nephrolepis exaltata)
+Cercospora sp. (Leafspot)
Indiana - in a greenhouse; Terre Haute, April 30. (Gardner)

FOXGLOVE (Digitalis sp.)
Fasciation
Anon. Fasciation in Digitalis. Australian Nat. 5: 163. 1924. Casual observation over several years showed a case of fasciation to follow approximately the ratio in Mendel's law.

FUNKIA (Hosta lanceolata)
+Sclerotium rolfsii Sacc. (Stemrot)
*Maryland - Takoma Park. (Jenkins)

GAILLARDIA (Gaillardia sp.) (Cone Flower)
+Phyllosticta sp. (Leafspot)
Florida - slight damage to foliage in several gardens; Gainesville. (Weber)

GALE, SWEET - See Sweetgale

GERANIUM (Pelargonium sp.)
Bacterium erodii I. M. Lewis (Bacterial leafspot)
*+Illinois - DeKalb. (Matteson)
Pythium compectens Braun (Stemrot)
Braun, H. Geranium stemrot caused by Pythium complectens n. sp. Host resistance reactions; significance of Pythium type of sporangial germination. Jour. Agr. Res. 29: 399-419. 1924. Reported from D. C., Okla.
+Smelter injury - SO2
Washington - (Frank)

GLADIOLUS (Gladiolus sp.)
Bacterium gummisudans McC. (Bacterial blight)
*+Minnesota - very heavy infections were found on the following varieties: Pride of Joshen and Red Emperor; moderate on Master Wietze, Pink Perfection, and Herada; plants were from Farmington on exhibit at the State Fair; the same disease was found last year at Hopkins, Hennepin County; September 6. (Sect. Pl. Path.)
+North Dakota - Bismarck, July 16; first report of occurrence. (Weniger) Also reported from Abercrombie and on varieties Dr. Van Fleet and Golden Butterfly. (McCulloch). P.r.: Mich.
Bacterium marginatum McC. (Stemrot and Scab)
*+Mississippi - Long Beach, Harrison County, December. (Neal). P.r.: Mich.
McCulloch, L. A leaf and corm disease of gladioli caused by Bacterium marginatum. Jour. Agr. Res. 29: 159-177. 1924.
Corticium vagum Berk. & Curt. (Rootrot)
+North Dakota - reported from Hillsboro and Washburn only; first record of occurrence. (Weniger). P.r.: N. J.

Fusarium sp.
*+Mississippi - Long Beach, Harrison County, December. (Neal)
Penicillium sp.
*+Mississippi - Long Beach, Harrison County, December. (Neal)
Septoria gladioli Pass. (Hardrot) (Leafspot)
*+New Jersey - there was some indication of varietal resistance; severe infection, Eshwaben; slight infection, King and Mrs. F. King; the heaviest infection was in low lying areas in which case every leaf was seriously infected; more than in previous years; Middlesex, April 16. (Martin)
+Ohio - one report. (Young). P.r.: Ind., *Mich., Minn., N. Y.
Rootrot (Undetermined)
Michigan - most serious gladiolus disease of season; general; practically all the plantings were affected; 100% infection for the Prince of Wales variety; general in nursery stock. (Nelson)

GOLDEN GLOW (Rudbeckia laciniata hort. variety)
Ramularia rudbeckiae Pk. (Leafspot)
+Pennsylvania - Charter oak, Huntingdon County, September 12. (Overholts)
P.r.: *Colo., *Iowa, *Mich., *Mont., N. Y.

GOLDEN SEAL (Hydrastis canadensis)
Botrytis sp. (Leaf blight)
Heald, F. D. and B. F. Dana. Notes on plant diseases in Washington. 1. Botrytis Diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924. "This disease is apparently identical with the Botrytis blight of golden seal reported from Michigan, New York, and Wisconsin." P.r: *Conn., Ind., Mich., *N. Y., Wash., Wis.
Fusarium sp. (Rootrot) (Wilt)
+Washington - Skagit County. (Dept. Pl. Path.). P.r.: Ill., N. Y.,Ohio.

HEPATICA (Hepatica sp.)
Urocystis anemones (Pers.) Wint. (Smut)
*+Wisconsin - Milwaukee, Milwaukee County, June 6; plants were 5 to 10 years old; this is the first occurrence of this disease on them. (Vaughan). P.r.: *Ill., Ind., *Iowa, Minn., *N. Y., *Wis.

HIBISCUS, CHINESE (Hibiscus rosa-sinensis)
+Pestalozzia sp. (Leafspot)
Florida - not important. (Weber)
+Puccinia malvacearum C. G. Tertero (Rust)
Florida - local. (Weber)

HOLLY, AMERICAN (Ilex opaca)
+Diplodia sp. (Footrot)
Florida - not frequently found; in case reported the stems were girdled and the plant killed. (Weber)
Phyllosticta opaca Ell. & Ev. (Leafspot)
*+South Carolina - Calhoun, Pickens County, February 11. (Ludwig)
P.r.: *W. Va.

HOLLYHOCK (Althaea rosea)

Cercospora althaeina Sacc. (Leafspot)

+Indiana - LaFayette, July 28. (Gardner)

*+South Dakota - Brookings, July 9. (Evans)

Cercospora sp. (Leafspot)

+New Jersey - leaves badly spotted; in some instances causing defoliation; spore measurements much larger than those given by Schwartz, Saccardo and Stevens for Cercospora althaeina. (Martin)

Colletotrichum malvarum (Braun & Casp.) E. A. Southworth (Anthracnose)

*+Indiana - one seedbed in a nursery completely killed by this disease; Indianapolis, July 11. (Dietz). P.r.: Iowa, N. Y., Ohio.

Puccinia malvacearum C. G. Bertero (Rust)

The usual amount of rust was reported from the following states: N. H., *Mass., Del., *Pa., Ind. (in a variety test plot rust was worse on a double white and sulphur yellow), Mich., Minn., Colo.

Blaringhem, L. Variations de la sporulation du Puccinia malvacearum Mont. sous l'influence du greffage des hôtes. (Variations in the sporulation of Puccinia malvacearum Mont. as affected by the grafting of the hosts.) Rev. Path. Vég. et Ent. Agr. 11: 125-131. 1924.

HONEYSUCKLE, BUSH (Diervilla sp.)

+Microsphaera alni lonicerae (DC.) Salm. (Powdery mildew)

Washington - Whitman County. (Dept. Pl. Path.)

HYACINTH (Hyacinthus orientalis)

+Fusarium bulbigenum Cke. & Mass. (Bulbrot)

Rhode Island - Kingston. (Weiss)

HYDRANGEA (Hydrangea sp.)

+Ascochyta sp. (Leafspot)

Pennsylvania - Coburn, Center County, October 5. (Overholts)

HYDRANGEA, SMOOTH (Hydrangea arborescens)

Pucciniastrum hydrangeae (Berk. & Curt.) Arth. (Rust)

+Pennsylvania - Center and Mifflin Counties; September 17. (Overholts)

P.r.: D. C., Ill., Ind., N. Car., S. Car., *Va., W. Va.

HYDRANGEA (Hydrangea hortorum)

Ascochyta hydrangeae Arnaud & Arnaud

Arnaud, G. and Mme. Arnaud. Trois Ascochyta nouveaux ou peu connus. (Three new or little-known species of Ascochyta. Rev. Path. Veg. et Ent. Agr. 11: 56-59. 1924.

HYDRANGEA, HOUSE (Hydrangea opuloides)

+Cercospora sp. (Leafspot)

Florida - found on leaves; gradually killed them. (Weber)

HYDRANGEA (Hydrangea sp.)

Oidium sp. (Powdery mildew)

+New Jersey - greenhouse; Middlesex, October 21. (Martin). P.r.: Fla.

Septoria hydrangeae Bizz. (Leafspot)

+Mississippi - numerous reports received but apparently no heavy damage occurred; Holmes County, July 7. (Neal & Wallace)

P.r.: Ohio.

IRIS (Iris sp.)
Bacillus carotovorus Jones (Softrot)
+New Jersey - Middlesex County, July 11. (Martin)
+Cladochytrium tenue Now. (Leafspot)
*Arkansas - Rich Mountain, Polk County, August 14. (Young)
Didymellina iridis (Desm.) Hoehn. (Heterosporium gracile (Wahl.) Sacc.) (Leafspot)
+Washington - Whitman County. (Dept. Pl. Path.)
+Pseudomonas iridis van Hall (Rhizome rot)
South Dakota - many specimens were received from various parts of the state; severe. (Evans)
+Septoria sp. (Leafspot)
North Dakota - common. (Weniger)
Shreve, R. W. Iris rootrot and "spent" rhizomes for propagating. Flwo. Grow. 11: 146. 1924.

IVY, ENGLISH (Hedera helix)
Vermicularia trichella Fr. (Leafspot)
**+Ohio - Gambier, Knox County, June 15. (Detmers)

JASMINE, CAPE (Gardenia florida)
+Capnodium sp. (Sooty mold)
Texas - prevalent; unimportant. (Taubenhaus). P.r.: *La., *Miss.
Chlorosis
Texas - trace. (Taubenhaus)

JERUSALEM CHERRY (Solanum pseudocapsicum)
+Oedema (Physiological)
Washington - Pierce County. (Frank)

JESSAMINE (Rhadbadenia corrallicola Small)
+Cephaleuros virescens Kunze
Florida - Algae attacked the upper surface of the leaves; was very common; caused little damage. (Weber)
+Cercospora sp. (Leafspot)
Florida - caused defoliation and considerable spotting of the leaves; very common in the vicinity of Gainesville. (Weber)

LARKSPUR - See Delphinium

KENTIA (Kentia sp.)
+Colletotrichum sp. (Anthracnose)
Florida - collected at Miami, where it was apparently killing the young plants; first attacking the petioles and gradually working to the younger leaves and crown of the plant. (Weber)

KUDZU-BEAN (Pueraria thunbergiana)
+Bacterial leafspot (Undetermined)
Connecticut - new to state and probably to the United States; produced yellow spots on leaves exactly like wildfire of tobacco, but so far have failed to produce the disease; some spots are like the bacterial spot of bean. (Clinton)

KALMIA, MOUNTAIN LAUREL (Kalmia latifolia)
+Mycosphaerella colorata (Pk.) Earle (Leafspot)
*Pennsylvania - York Springs, Adams County, May 8. (Kirby)

LABURNUM (Laburnum sp.)
Stereum purpureum Sacc. (Silverleaf)
Brooks, F. T. Silverleaf disease of fruit trees. Jour. Min. Agr. Great Britain 31: 954-957. 1925. "In small gardens laburnum trees often succumb to it, chiefly on account of the drastic pruning to which they are often subjected."

LILAC (Syringa vulgaris)
Ascochyta syringae Bres.
Arnaud, G. and Mme. Arnaud. Trois Ascochyta nouveaux ou peu connus. (Three new or little known species of Ascochyta.) Rev. Path. Veg. et Ent. Agr. 11: 56-59. 1924.
+Botrytis cinerea Pers. (Leafblight)
Washington - Pierce County. (Dept. Pl. Path.)
Heald, F. D. and B. F. Dana. Notes on plant diseases in Washington. 1. Botrytis Diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924. "Two reports from the same place in Pierce County were received of this disease, which showed lesions extending inward from the margin. The owner stated in communication that the disease appeared early in the growing season and involved both blossoms and foliage. A cultural study of the fungus showed it to be Botrytis cinerea. From the study of the literature, it appears that this is a new host for this fungus."
Cercospora lilacis (Desm.) Sacc. (Leafspot)
+Mississippi - Copiah County, August 30. (Neal & Wallace). P.r.: S.Car.
Sphaeropsis sp.
*+Pennsylvania - Media, Delaware County, May 28. (Kirby). P.r.: Of S. syringae (Fr.) Pk. & Cke. *Mass.
Taphrina sp.
New York - Walton, Delaware County, June 30. No report of a Taphrina on this host has been found. (Jenkins)
De Bruyn, Helena L. G. De oorzaak van het epidemisch optreden van de Phytophthoraziekte van de Seringen. (The cause of the epidemic occurrence of Phytophthora disease of Lilacs.) Tijdschr. over Plantenziekten 30: 113-122. 1924.
Massalongo, C. Mallattia parassitaria osservata sopra una pianta di "Syringa vulgaris L." Bul. Soc. Bot. Ital. 1924: 162-164. 1924.

LILY, EASTER (Lilium longiflorum)
Nematodes (Rootknot)
Florida - caused many plants to die before blooming. (Weber)

LILY, LEOPARD (Lilium pardalinum)
+Botrytis sp.
*Maryland - Takoma Park, June 30. (Jenkins)

MARGUERITE (Chrysanthemum frutescens)
Preti, G. Intorno ad una malattia del 'Chrysanthemum frutescens' Tumb. (Concerning a disease of Chrysanthemum frutescens Tumb.) Riv. Patol. Veg. 14: 6-12. 1924.

TRIMONY VINE, COMMON (Lycium halimifolium)
Microsphaera sp.
*+Pennsylvania - State College, Center County, October 21. (Kirby)
Sphaerotheca pannosa (Wallr.) Lev. (Powdery mildew)
*Washington - Whitman County. (Dept. Pl. Path.). P.r.: Ida., Wash.

NARCISSUS (Narcissus sp.)
Botrytis sp. (Blight)
Washington - a market grower from near Seattle reported a very serious case of Botrytis of jonquils. The loss during the first season when the disease appeared was negligible, but it increased to alarming proportions the second year. Leaves were blighted beginning at the tip, and the bulb also was involved with a rot at the center. Numerous sclerotia, as well as the grey mold characteristic of this fungus, were produced on the diseased portions. Spores of the fungus were produced very sparingly on culture media at laboratory temperature.
Heald, F. D. and B. F. Dana. Notes on plant diseases in Washington. 1. Botrytis Diseases. Trans. Amer. Microscop. Soc. 43: 136-144. 1924.
Bulb sterilization
Anon. Sterilization of narcissus bulbs by hot water. Gard. Chron. 3, 75: 193-194. 1924.
Sclerotium sp.
Alcock, N. L. A disease of Narcissus bulbs caused by a Sclerotium-producing fungus. Trans. Brit. Mycol. Soc. 10: 127-128. 1924.
Dowson, W. J. A sclerotial disease of Narcissus. Gard. Chron. 3, 75: 160. 1924. "Similar to disease of tulips caused by Botrytis parasitica.
Soil sterilization
P__________, T., and A. W. S__________. A preliminary note on partial soil sterilization for bulb growing. Bul. Bur. Bio. Techn. Murphy & Son 2: 124-126. Dec. 1924. Apparently partial sterilization stimulated and increased growth of roots; and tended to induce earlier flowering. Sterilizers used were Alvesco No. 2 (liquid) and Alvesco Sterilizer Powder. No fertilizers were used.
Tylenchus dipsaci (Kuehn) Bast. (Bulb nematode)
California - Phytopath. 14: 495-502. 1924. P.r.: Ill.
Ramsbottom, James. K. The control of the Narcissus eelworm. Gard. Chron. 3, 77: 76-77, 96. 1925.

NASTURTIUM, COMMON (Tropaeolum majus)
+Alternaria sp. (Blackmold)
New Jersey - associated with *Pleospora tropaeoli* Hals.; Monmouth, July 1. (Martin)
Pleospora tropaeoli Hals. (Leafspot)
+New Jersey - Monmouth, July 1. (Martin). P.r.: Ohio.
Bacterial wilt (Undetermined)
Washington - Kitsap County. (Frank)
+Smelter injury SO_2
Washington - Pierce County. (Frank)

OREGON HOLLY GRAPE (Mahonia aquifolium)
Puccinia koeleriae Arth. (Rust)
+Idaho - very rare; Upper Priest Lake, Bonner County, August 2. (Boyce)
P.r: *Colo., *Mont., *Oreg.

OSAGE ORANGE (Maclura pomifera)
Sporodesmium maclurae Thuem.
*+Missouri - Columbia, Boone County, October 11. (Maneval). P.r: Texas.

PANSY (Viola tricolor)
Colletotrichum sp. (Anthracnose)
+Florida - not common; in some cases killing the leaves; Gainesville. (Weber). P.r.: Of C. violae tricolaris Sm., Mass., N. J., N. Y.
Ramularia lactea (Desm.) Sacc.
Van Keulen, K. Ramularia lactea, oorzak van een bladvlekkenziekte der Viooltjes. (Ramularia lactea, the cause of a leafspot disease of Pansies.) Tijdschr. over Plantenziekten 30: 123-124. 1924.

PASSION VINE (Passiflora edulis)
Sclerotinia sp. (Rot)
Birmingham, W. A. Sclerotinia rot of passion vine. Agr. Gaz. New South Wales 35: 57-58. 1924. "This disease (Sclerotinia sp.) attacks the stem of Passiflora edulis at about the ground level, resulting in loss of cortex. Initial attacks generally result from wounds made by cultivation implements. It is recommended that diseased plants be removed and burned."

PASSION VINE (Passiflora sp.)
+Colletotrichum sp. (Seedling wilt)
Porto Rico - one record on the Experiment Station grounds. (Nolla)

PEONY (Paeonia spp.)
Botrytis spp. (Blight)
+New Jersey - Botrytis paeoniae Oud. severe locally; more prevalent; Burlington, June 21. (Martin)
Indiana - Marion County, May 12. (Dietz)
+Wisconsin - statewide; of major importance; more prevalent. (Vaughan)
Washington - Botrytis cinerea Pers. and Botrytis paeoniae Oud. "These troublesome diseases, which have been serious in the eastern United States, have occurred in both eastern and western Washington. The bases of leaf and flower stalks are attacked, the rot penetrating some distance below the soil level. The center is first affected and soon a wilting of both leaves and flower stalks takes place, leaving a ring of healthy shoots around the outside. The fruiting stage of Botrytis covers affected parts up to within one-half inch of the advancing edge of the rot. Observation has shown that these parasites gain entrance to a garden and gradually spread from the original center of infection, and, when unchecked, have caused considerable loss. Specimens agree with both B. cinerea Pers. and B. paeoniae Oud. have been received." (Heald & Dana)

Cladosporium paeoniae Pass. (Leafmold)
*+Illinois - southern part of state, August. (Young)
Heterodera radicicola (Greef) Muell. (Rootknot)
+South Carolina - Sumter, Sumter County, October 13; unimportant. (Ludwig)
*+Indiana - Rockport, August 28. (Hansen)
+North Dakota - severe in one large acreage at Abercrombie; first record of occurrence. (Weniger)
+Washington - King and Yakima Counties. (Dept. Pl. Path.)
Phyllosticta sp. (Leafspot)
*Pennsylvania - State College, Center County, November 1. (Kirby)
Phytophthora sp. (Stemrot, leafspot)
+Indiana - rather serious; Lafayette, June 10. (Gardner)
+Mosaic
Connecticut - new to state; Westville, July 3. (Clinton)

PERIWINKLE (Vinca minor)
Botrytis sp. (Leafblight)
Heald, F. D. and B. F. Dana. Notes on plant diseases in Washington 1. Botrytis Diseases. Trans. Amer. Microscop. Soc. 43: 136-144. 1924.
"Leaf lesions only have been observed on this host. These were brown or black in color and in most cases extended inward from the margin of the leaf, and frequently advanced until the whole leaf was involved. The invaded leaf tissue was filled with mycelium of Botrytis and the surface showed a copious development of the spore stage of this fungus. This disease appears to be only of local occurrence. No reference to the occurrence of Botrytis on this host has come to the attention of the writers."
Bastard blossom (Undetermined)
Texas - a condition similar to that which has been described for the watermelon was also met with on this host; the examination of the root of both the watermelon and the periwinkle plant did not reveal any abnormal condition. (Taubenhaus)

PETUNIA (Petunia sp.)
+Cercospora sp. (Leafspot)
Florida - partial defoliation; local; Gainesville. (Weber)

PHLOX (Phlox sp.)
Erysiphe cichoracearum DC. (Powdery mildew)
*+Pennsylvania - Lebanon, Lebanon County, June 24. (Kirby)
Septoria sp. (Leafspot)
Michigan - (Coons)
Tylenchus dipsaci (Kuehn) Bast. (Eelworm disease)
Wilson, G. F. The eelworm disease of phloxes. Jour. Roy. Hort. Soc. 49: 203-210. 1924. Caused by Tylenchus devastatrix Kuehn. Known for many years. Only disease of importance attacking the herbaceous perennial phloxes. Varieties of both Phlox decussata and P. suffruticosus. Known for many years in European countries, first described in 1898. Weiss (New Jersey State Dept. Agr. Bur. State. and Inspec. Circ. 64. 1923) described it for the first time in America, and suggested that it was introduced

from Holland. Gives list showing comparative susceptibility of varieties, mostly of P. decussata, in the garden at Wisley. Very susceptible: George A. Stroehlein, Le Mahdi, Rijnstroom; susceptible: Baron von Dedem, Frau Antonin Buchner, Gen. van Heutsz; fairly resistant: Elizabeth Campbell, Maspero, Rosamundi; resistant: Esclairmonde, Aegir, Boule de Feu, Netty Stuart; very resistant: Antonin Mercie, Widar. All of these are P. decussata except Netty Stuart (P. suffruticosa).

Schenk, P. J. Ziekten van Delphinium en Phlox. Floralia. 45: 110-111. 1924.

PITTOSPORUM TOBIRA (Tobira)
+Diplodia sp. (Footrot)
Florida - (Weber)
+Nematode (Rootknot)
Florida - (Weber)

PITTOSPORUM (Pittosporum sp.)
Winter injury
Louisiana - southern part of state. (Edgerton)

POINSETTIA (Poinsettia pulcherrima)
+Ozonium omnivorum Shear (Rootrot)
Texas - trace. (Taubenhaus)

PRIMROSE, ENGLOSH (Primula acaulis)
Ramularia primulae Thuem. (Leafspot)
+Connecticut - new to state; one report, Norfolk, February 3. (Clinton)
P.r.: *Del., N. Y.

PRIMROSE, TOP (Primula obconica)
+Mosaic
Pennsylvania - loss 5 to 10% in a greenhouse; starts in fall with few plants but increases greatly by springtime; State College, Center County, December 3. (Orton)
Pape, H. Ueber eine Blatterkrankung bei Primula obconica Hance. Angew. Bot. 6: 255-275. 1924. Not due to animal or plant parasites.

PRIVET (Ligustrum vulgare)
Glomerella cingulata(Ston.) Spauld. & Schrenk.
*+Kansas - Manhattan, Riley County, July. (Stokdyk). P.r.: Ala., *Conn., Ill., Ind., *Miss., N. J., N. Y., Ohio, Okla., Tex.

RHODODENDRON, COAST (Rhododendron californicum)
+Coryneum rhododendri Sch. (Leafspot)
Oregon - occasional; little injury; Clackamas and Douglas Counties, May 13. (Boyce)
+Melampsoropsis piperiana Arth. (Rust)
Oregon - occasional; Clackamas and Douglas Counties, May 13. (Boyce)

RHODODENDRON, ROSEBAY (Rhododendron maximum)
Pestalozzia guepini Desm. (Leafspot)

+Pennsylvania - Stone Valley, Huntingdon County, August 10. (Kirby & Overholts). P.r.: *N. Y.

RHODODENDRON (Rhododendron sp.)

Exobasidium vaccinii (Fckl.) Wor.

Pennsylvania - Center and Huntingdon Counties, July 12. (Orton & Overholts)

+Florida - attacked mostly the young buds; Quincy. (Weber). P.r.: Ind., Md., Oreg., Pa.

Phyllosticta maxima Ell. & Ev.

Tengwall, T. A. Ueber einige parasitische Pilze auf kultivierten Rhododendron. (Some parasitic fungi on cultivated Rhododendrons.) Meded. Phytopath. Lab. 'Willie Commelin Scholten', Baarn (Holland) 6: 58-61. 1924.

Stereum purpureum Pers. (Silverleaf)

Cotton, A. D. On the occurrence of the silverleaf fungus in rhododendrons. Gard. Chron. 3, 77: 112. 1925. Course of the disease slower in rhododendrons than in plums; no silvering of the foliage develops; sporophores develop on branches still living. Control same as has been described for other hosts.

Venturia rhododendri Tengwall

See reference under *Phyllosticta maxima* Ell. & Ev.

ROSE (Rosa sp.)

Bacterium tumefaciens EFS. & Town. (Crowngall)

+Florida - common on the older bushes, killing some of them. (Weber)

Botryosphaeria ribis Gross. & Dug.

Stevens, Neil E. and Anna E. Jenkins. Occurrence of the currant cane blight fungus on other hosts. Jour. Agr. Res. 27: 839. 1924.

Found at Bell Station, Maryland on *Rosa setipoda* and other varieties.

Botrytis spp. (Bud blight)

**+Pennsylvania - Lebanon, Lebanon County, June 24. (Kirby)

**+Virginia - *B. cinerea* Pers. on unopened buds; Falls Church, May 31. (Jenkins)

Cercospora rosicola Pass. (Leafspot)

+Pennsylvania - on cultivated roses; fairly abundant; first report from Pennsylvania so far as known; Charteroak, Huntingdon County, July 24. (Overholts)

Coniothyrium wernsdorfiae Laubert.

Ontario - Guelph. Apparently the first report of this disease in America. (Jenkins)

Coryneum microstictum Berk. & Br. (Canker)

+Pennsylvania - apparently causing death of back and cortex on stems; Phillipsburg, Center County, May 14. (Emigh). P.r.: Ala.

Diaporthe umbrina Jenkins (Canker)

**+North Carolina - stem canker, Shelby, June; on petals, Burgaw, Sept. (Jenkins)

Diaporthe sp.

**+Louisiana - Phomopsis stage found on petals; perfect stage developed in artifical culture, not *D. umbrina*; Baton Rouge, May. (Jenkins)

Diplocarpon rosae Wolf (Actinomena rosae (Lib.) Fr.) (Blackspot)

Florida - general; was the worst of the leaf diseases; caused the leaves to shed early and stunted the blooms. (Weber)

+New Mexico - somewhat general, June 3. (Crawford)

Michigan - very important; general; unsprayed plants of susceptible varieties were badly defoliated by September; perfect control obtained by a combination of bordeaux spraying early and sulfur dust in mid-summer. (Nelson)

Minnesota - noted only in Ramsey County but usually common throughout state; May 24. (Dept. Pl. Path.)

Holmes, Eber. Roses and blackspot disease. Flor. Exch. 57: 1633-1639. 1924.

Diplodia sp. (Twigblight)

+Florida - caused considerable dying back of old shoots; attacked them at the surface of the soil and girdled them. (Weber). P.r.: Of Diplodia rosae Fr. *S. Car.

+Discosia artocreas (Tode) Fr. (Blossom blight)

*Louisiana - on unopened blossoms; Baton Rouge, May 3. (Jenkins)

+Dothiorella sp. (Blossom blight)

*Louisiana - on unopened blossoms; Baton Rouge, May 3. (Jenkins)

Leptosphaeria coniothyrium (Fckl.) Sacc. (Coniothyrium fuckelii Sacc.) (Cane blight)

New Jersey - 30% infection on one-year old Golden Emblem and Premier varieties; Union, May 24. (Martin)

*+South Carolina - unimportant; Ft. Mill, York County, May 12. (Ludwig)

Texas - traces. (Taubenhaus)

Macrosporium sp. (Canker)

+Pennsylvania - associated with a stem canker; Phillipsburg, Center County, May 30. (Emigh). P.r.: *Okla.

Phoma sp. (Thorn disease)

+Pennsylvania - caused a bleached, pale color of thorns; Phillipsburg, Center County, May 30. (Emigh). P.r.: Md.

Phomopsis sp. (Canker) Not identical with Phomopsis stage reported under Diaporthe sp. from Louisiana.

*+Kentucky - Lexington, June. (Jenkins). P.r.: *Va.

Mosaic

Texas - a condition resembling a mosaic disease of rose leaves was found by the writer in two localities in Texas, one in the vicinity of Troup and the other at College Station. The disease exhibited all the earmarks of a mosaic, that is, the mottling and stunting of the foliage. No inoculation experiments have been carried out to determine definitely the mosaic nature of this trouble. (Taubenhaus)

Phragmidium spp.

Connecticut - +P. speciosum on wild rose; Canaan, June 10; +P. subcorticinum on cultivated rose, Middlebury, June 14. (Clinton)

Pennsylvania - P. speciosum. (Overholts)

Texas - +P. speciosum; trace. (Taubenhaus)

Wisconsin - *+P. rosae-acicularis, Eau Claire, Eau Claire County, July 21. (Vaughan)

Iowa - +P. speciosum on cultivated rose; June 10. (Melhus)

Washington - Pierce County. (Dept. Pl. Path.)

Alaska - *+P. speciosum, Fairbanks, June 13. (Paxton)

Phyllosticta rosae Desm. (Leafspot)

+Florida - not common; Homestead. (Weber). P.r.: Ind.

Polyspora (?) sp. (Blight)

A fungus evidently new and more or less of the nature of Polyspora, Protocoronospora, etc. has been found associated with a disease on Rosa hugonis, an introduced yellow Chinese rose. Although the study of the organism is still in progress and on account of its apparent parasitic nature it has seemed best to report its occurrence on this valuable host. It has been observed on specimens of this species of rose from three different states as follows:

Maryland - Chevy Chase (1923). The plant from which the specimens were taken was apparently killed by the disease. The leaves and stems were brown and had the appearance of having been severely blighted. Tufts of fertile hyphae were plainly visible on the leaves and petioles; they were also present on stem though less conspicuous.

Virginia - National Rose Test Garden, Arlington Experiment Farm (1923-24). Small amount of infection present.

North Carolina, Raleigh. Specimen from Dr. F. A. Wolf. From diseased specimens of Rosa sp. (Van Fleet Hybrid) collected at Norfolk, Virginia, an organism has been isolated similar to that from Rosa hugonis just mentioned. The symptoms, however, were very different from those of the disease on Rosa hugonis. On the large green stems were irregular purple areas from one-fourth of an inch to more than an inch across. The surface of these areas was mostly of the same character as that of the unaffected parts of the stem and their margins were delimited only by the abrupt change in color. Certain ones, however, showed some longitudinal cracking of the bark and on others there was a ring of lighter color near the center. Hyphae of the fungus were present in the discolored tissus but no fruiting structures were seen on the specimens. (Jenkins)

+Physalospora malorum (Pk.) Shear (Sphaeropsis malorum) (Canker)

Texas - rose bushes frequently die as a result of various cankers which attack the limbs. Such cankers may be caused by a variety of organisms which will not be considered here. Several times diseased rose twigs were received from the vicinity of Troup and Jacksonville in which the malady appeared to be similar to blackrot canker of apples. A fruiting fungus which greatly resembled Sphaeropsis malorum Pk. was constantly found on the dead tissue. Cultures made of spores and of infected tissue readily yielded a growth which produced the pycnidia of a Sphaeropsis. Cross inoculations were carried out with this organism on limbs of both apples and rose bushes. Likewise, an authentic culture of S. malorum from apple limbs was also used to inoculate both rose and apple limbs. The method of inoculation consisted in inserting bits of pure culture mycelium in slits made in the cambium of healthy limbs or twigs; the inoculations on apple limbs were made at the orchard of the Texas Agricultural Experiment Station at College Station, and the rose inoculations were made in the writer's home garden. The inoculated areas were protected with sterile cloth bands and grafting wax. The results of the inoculation seemed to indicate that the organism from the rose and from the apple were apparently one and the same. Specimens of the rose canker submitted to Dr. Hesler were pronounced by him to be typical of

Physalospora cydoniae Arn. (Sphaeropsis malorum). The strains of Sphaeropsis from the apple and the rose when grown on nutrient media were found to be similar. In no case was the Physalospora stage obtained. (Taubenhaus)

+Sclerotinia sp. (Blight)

Mississippi - of moderate importance; probably general; quite a few specimens received from different sections; Oktibbeha County, August. (Neal & Wallace)

Sphaerotheca pannosa(Wallr.) Lev. (Oidium leucoconium Desm.) (Powdery mildew)

+Vermont - unusually prevalent. (Gilbert)

Georgia - less prevalent than last year; severe on some varieties; Dorothy Perkins and Ramblers most susceptible. (Boyd)

Florida - general; occasionally proved serious. (Weber)

Michigan - second to blackspot in importance; general in unsprayed plantings. (Nelson)

+New Mexico - considerable amount, June 3. (Crawford)

Idaho - important. (Hungerford)

Esmarch, F. Der Rosenmehltau und seine Bekämpfung. (Rose mildew and its control.) Die kranke Pflanze 1: 21-23. 1924.

S____________, N. K. The analysis of ammonium polysulphide solutions. Bul. Bur. Bio-Techn. Murphy & Son 2: 129-130. Used in the control of rose mildew.

Vardabasso, G. La muffa o malbianco delle rose (Sphaerotheca pannosa) Istria Agr. 4: 132-135. 1924.

Stilbum sp. (Canker)

Cuba - Harvard Botanical Garden, Soledad, Cuba on the horticultural varieties Bride, Bridesmaid, Captain Christy and Mme. Marie Guillet. Identified from specimens collected by J. R. Weir and J. F. Faris, November, 1924. It seems very likely that this is the same fungus as that mentioned by J. B. Rorer from Trinidad in two brief reports: Trinidad Agri. Dept. Bull. Agr. Inf. N. S. 63: 91, 1909 and Bull. Dept. Agr. Trinidad and Tobago 18: 31, 1919. In the first report it is mentioned that "when inoculated into healthy plants the disease spreads rapidly killing the tissues." (Jenkins)

Frost injury

Anon. Protecting roses from frost injury. Missouri Bot. Gard. Bul. 12: 129-132. 1924.

Smoke injury

Anon. Smoke injury to roses. Missouri Bot. Gard. Bul. 12: 132-133. 1924.

RUBBERTREE, INDIA (Ficus elastica)

Gloeosporium sp.

*+Missouri - in the horticultural greenhouse, University of Missouri, May 17. (Maneval). P.r.: La., Md.

SMILAX (Smilax sp.)

Cercospora sp. (Leafspot)

+Florida - general. (Weber)

SNAPDRAGON (Antirrhinum spp.)

Fusarium sp. (Root and Crownrot)

+Washington - Franklin County. (Dept. Pl. Path.). P.r.: Fla.

Heterodera radicicola (Greef) Muell. (Rootknot)

+Mississippi - of slight importance; Copiah County, September 1. (Neal & Wallace). P.r.: D. C., Nebr.

Puccinia antirrhini Diet. & Holw. (Rust)

New Jersey - Morris, October 1. (Martin)

+Virginia - severe in greenhouse at Blacksburg. (Fromme)

Florida - killed leaves from the bottom of plant upward; Oneco. (Weber)

+Mississippi - unimportant; Hinds County, July 17. (Neal & Wallace)

+Texas - trace. (Taubenhaus)

Colorado - unimportant;,Ft. Collins, September 1. (Learn)

Recent literature on snapdragon rust:

Anon. Plant disease investigations of the New Hampshire Station. New Hampshire Agr. Exp. Sta. Bul. 212: 32-33. 1924.

Doran, W. Snapdragon rust and its control. Flor. Exch. 58: 483-484. 1924.

Maines, E. B. Notes on the life history of the snapdragon rust, Puccinia antirrhini Diet. & Holw. Phytopath. 14: 281-287. 1924.

Seaver, F. J. The snapdragon rust. Jour. New York Bot. Gard. 25: 203-204. 1924.

__________ The snapdragon rust. Mycologia. 17: 42-44. 1925.

Sclerotinia sclerotiorum (Lib.) Massee (S. libertiana Fckl.)

Dowson, W. J. A flower-spike disease of cultivated Antirrhinums. Gard. Chron. 3, 75: 62. 1924.

Sooty mold

Anon. Plant disease investigations of the New Hampshire Station. New Hampshire Agr. Exp. Sta. Bul. 212: 32, 33. 1924. Both dusting with sulphur and spraying with calcium polysulphid were found beneficial for the control of sooty mold.

Diseases in general.

Buddim, W. and Elsie M. Wakefield. Notes on some Antirrhinum diseases. Gardeners' Chron. 76: 150-152. 1924.

SNOWBALL (Viburnum opulus)

Botrytis sp. (Blight)

Heald, F. D. and B. F. Dana. Notes on plant diseases in Washington. 1. Botrytis Diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924. "The same grower who submitted the periwinkle specimens also sent specimens of a disease on this host which a laboratory study showed to be due to a species of Botrytis. Grayish brown lesions appeared on the leaves, advancing inward from the margin, gradually involving the whole leaf. Affected blossom clusters were entirely blighted. From the leaf and blossom clusters, the disease spread to the twig, killing it as far as it progressed. Dark gray sclerotia were found in the blighted blossom masses and sparingly on diseased leaves. This apparently is a new host for the Botrytis."

SNOWBERRY, COMMON (Symphoricarpos racemosus)

+Gloeosporium sp. (Anthracnose)

New York - very common. (Chupp)

Microsphaera diffusa Cke. & Pk. (Powdery mildew)

*+Pennsylvania - State College, Center County, October 21. (Kirby) P.r.: *Ida., N. Y., *Oreg., *Wash.

Puccinia abundans (Pk.) Jack. (Rust)
Washington - occasional; Skamania County, August 14. (Boyce)
P.r.: *Ida.

SNOWBERRY (Symphoricarpos vulgaris)
Microsphaera diffusa Cke. & Pk. (Powdery mildew)
*Indiana - Greencastle, Putnam County, July 26; very common. (Yuncker)
P.r.: Conn., Ill., Ind., *Kans., *Mo., N. Y., Texas, *Va.

SPIREA (Spiraea sp.)
Podosphaera oxyacanthae DC. (Powdery mildew)
Washington - Whitman County. (Dept. Pl. Path.). P.r.: Mass., Mo., N. H., Ohio, Wash., Wyo.

SUNFLOWER, SWAMP (Helianthus angustifolius)
+Puccinia helianthi Schw.(Rust)
Florida - Vero. (Weber)

SUNFLOWER, COMMON (Helianthus annuus)
Plasmopara halstedii (Downy mildew)
+Minnesota - St. Paul, June 11. (Dept. Pl. Path.). P.r.: Ind., Iowa, Kans., N. Dak., *Ohio, *W. Va.
Puccinia helianthi Schw. (Rust)
*New Jersey - Middlesex, September 2. (Martin)
*Pennsylvania - Oley, Berks County, September 2. (Kirby)
*Mississippi - Pontotoc County; September 22. (Wallace)
Illinois - 66% infected plants in state; found in southern tip of state; Washington County, August 26. (Tehon).
Kansas - very common in the vicinity of Manhattan. (Johnston)
Colorado - unimportant; Ft. Collins, July. (Learn)
Septoria helianthi Ell. & Kell. (Leaf spot)
+Illinois - first report; 100% infection found in southern tip of state on a 24 acre commercial crop; Washington County, August 26. (Tehon)
Minnesota - general; University Farm, St. Paul, June 17. (Dept. Pl. Path.)
P.r.: Conn., Ind., *Kans., Minn., *Miss., *Nebr., *N. J., *N. Y., *N. D., *Ohio, Utah.
Sclerotinia sclerotiorum (Lib.) Massee (S. libertiana Fckl.) (Stemrot)
Bisby, G. R. The Sclerotinia disease of sunflowers and other plants. Scient. Agr. 4: 381-384. 1924.
Wakefield, E. M. On the names Sclerotinia sclerotiorum (Lib.) Massee, and S. libertiana Fckl. Phytopath. 14: 126-127. 1924.

SWEETGALE (Myrica gale)
Cronartium comptoniae Arth. (Rust)
+Washington - Pacific County. (Dept. Pl. Path.). P.r.: *Me.
British Columbia - found occasionally; Daisy Lake, October 13. (Boyce)

SWEET PEA (Lathyrus odoratus)
Cladosporium album Dowson
Dowson, W. J. A new disease of sweet peas. Jour. Roy. Hort. Soc. 49: 211-221. 1924. First seen July 1922. Fungus is indistinguishable from C. <u>herbarum</u> except from its lack of color, but because

of its marked parasitic nature it is considered desirable to give it specific rank. No infection was obtained on <u>Pisum sativum</u> or on <u>Lathyrus aphaca</u>. High temperature and a moist atmosphere are the important factors concerned in the spread of the disease, particularly under glass. Dusting with fine sulfur recommended to protect plants from infection.

Corticium vagum B. & C. (Damping-off)

Florida - widespread and serious. (Weber). P.r.: Calif., Colo., Fla., Mass., Mich., Minn., *N. J., N. Y., N. Car., Pa., Utah, Wash.

Fusarium martii pisi F. R. Jones (Rootrot)

New York - general; important each year; Ontario County, July 18. (Chupp). P.r.: Ala., Calif., Colo., Conn., Del., Ga., *Ill., Ind., Kans., La., Me., Md., Mass., Mich., Minn., Miss., Mont., N. H., *N. J., N. Y., Ohio, Pa., S. Car., Utah, Va., Wis.

Thielavia basicola (Berk. & Br.) Zopf (Black rootrot)

Connecticut - Hartford, April. (Clinton). P.r.: Ark., Conn., Md., N. Y., Pa.

Mosaic

+Wisconsin - probably statewide; caused a mottling of leaves, a dwarfing and no flowers; caged test showed this disease carried by aphids the same as cucumber. (Vaughan). P.r.: Calif.

Rootrot (Undetermined)

New York - (Dept. Ent. Pl. Path. News Letter)

Washington - Pierce County. (Dept. Pl. Path.)

Smelter injury SO_2

Washington - Pierce County. (Frank)

Undetermined mildew-like disease.

Dowson, W. J. A new disease of sweet peas. Gard. Chron. 75: 10. Jan. 1924.

SNOWBERRY (Symphoricarpus sp.)

Microsphaera diffusa Cke. & Pk.

+Connecticut - Fairfield, August 24. (Clinton & Hunt)

P.r.: *Calif., *Conn., *Ida., *Ill., *Ind., *Kans., *La., Minn., *Mo., *Mont., *Nebr., *N. Y., *N. Dak., Ohio, *Oreg., *Pa., *S. Dak., *Texas, *Va., *Wash.

Puccinia symphoricarpi Hark. (Rust)

In Supplement 23, page 481, line 18, read "telial" instead of "aecial."

TOBIRA - See Pittosporum tobira

TULIP (Tulipa sp.)

Botrytis tulipae (Lib.) E. F. Hopkins (Botrytis blight)

*+Pennsylvania - Biglerville, Adams County, June 4. (Kirby)

+Minnesita - about 10% of the plants in one of the commercial greenhouses were rotted off; local; Ramsey County, March 3. (Sect. Pl. Path.

Washington - King and Pierce Counties. (Dept. Pl. Path.). P.r.: *Wash.

Heald, F. D. and B. F. Dana. Notes on plant diseases in Washington 1. Botrytis Diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924.

Botrytis sp.

Hostermann, G. Eine Botrytis-orkrankung an tulpenbluten. Angew. Bot. 6: 39-40. 1924.

UNICORNPLANT (Martynia sp.)
    Bacterium martyniae C. Elliott (Bacterial leafspot)
        Elliott, C. A bacterial leafspot of Martynia. Jour. Agr. Res. 29: 490. Nov. 1924.

VIOLET (Viola sp.)
    Puccinia violae (Schum.) DC. (Rust)
        *Pennsylvania - Brooklyn, Susquehanna County, August 14. (Kirby)
    Septoria violae Desm. (Leafspot)
        +Florida - not important. (Weber). P.r.: *N. J., Wis.
    Thielavia basicicola (Berk. & Br.) Zopf (Black rootrot)
        New York - (Chupp). P.r.: Conn., *D. C., Mass., Miss., *N. Y., *N. Car.

WALLFLOWER, COMMON (Cheiranthus cheiri)
    Winter injury (Low temperatures and Botrytis invasions)
        Washington - King County. (Dept. Pl. Path.)
    Wilt (Undetermined)
        Washington - King County. (Dept. Pl. Path.)

ZINNIA (Zinnia elegans)
    +Alternaria sp. (Leafmold)
        Florida - uncommon; unimportant; Lake Alfred. (Weber)
    +Choanephora sp. (Blossom blight)
        Florida - attacked blossoms, ruining them completely; not widespread. (Weber)
    Erysiphe cichoracearum DC. (Powdery mildew)
        +Connecticut - apparently new host for state; Fairfield, August 18. (Clinton). P.r.: W. Va.
    Fusarium sp. (Wilt)
        +Washington - first report; 30 to 50% of plants killed; Whitman County. (Dept. Pl. Path.). P.r.: *Iowa.
    Recent literature on bulb diseases:
        Slogteren, Egnertus van. Modern methods of combating bulb diseases. Rep. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 150-162. 1923.

DISEASES OF MISCELLANEOUS PLANTS

AGRIMONIA MOLLIS (Soft agrimony)
    Pucciniastrum agrimoniae (Schw.) Tranz. (Rust)
        *+Missouri - (Maneval). P.r.: Ind., Iowa, Mass., Minn., N. Y., W. Va., Wis.

AMARANTHUS BLITOIDES (Prostrate amaranth)
    Albugo bliti (Biv.) Kze. (White rust)
        *+Pennsylvania - (Kirby). P.r.: Iowa, Kans., Minn., *N. D.

AMARANTHUS RETROFLEXUS (Great amaranth, Red root)
    Cercospora sp. (Leafspot)
        +Florida - (Weber)

AMBROSIA ELATIOR (Ragweed)
Albugo tragopogonis (DC.) S. F. Gray (White rust)
+Florida - (Weber). P.r.: Ala., Conn., Ind., Iowa, Kans., *Me., *Mass., *N. J., *N. Y., *N. Car., *S. D., Wis.
Erysiphe cichoracearum DC. (Powdery mildew)
+Florida - (Weber)
+Mosaic
Florida - (Weber)

AMBROSIA TRIFIDA (Great ragweed)
Cercospora racemosa Ell. & Mart. (Leafspot)
*+Missouri - (Maneval). P.r.: *D. C., *Ill., *Kans.
Puccinia xanthii Schw. (Rust)
Kansas - (Johnston). P.r.: Ala., *D. C., *Ill., *Ind., *Iowa, *Kans., *Mich., *Minn., *Mo., *Nebr., *S. D., *Texas.

AMORPHA HERBACEA (False indigo)
Uropyxis amorphae (Curt.) Schroet. (Rust)
Florida - (Weber). P.r.: Fla., S. Car.

AMPHICARPA MONOICA (Hog peanut)
Erysiphe polygoni DC. (Powdery mildew)
*+Pennsylvania - (Kirby). P.r.: Ill., Iowa, N. Y.
Synchytrium decipiens Farl. (Rust)
*+Pennsylvania - (Kirby). P.r.: *Miss., *N. Y., *Va.

ANEMONE QUINQUEFOLIA (American wood anemone)
Puccinia fusca (Pers.) Wint. (Polythelis fusca (Pers.) Arth.) (Rust)
New York - (Chupp). P.r.: *Del., *Ind., *Iowa, *Mich., Minn., *N. Y., *Ohio, *Wis.
Tranzschellia punctata (Pers.) Arth. (Puccinia pruni spinosae Pers.) (Rust)
+Pennsylvania - (Overholts). P.r.: *Iowa, *Texas, *Wis.

ANEMONE VIRGINIANA (Tall anenome)
Puccinia anemones-virginianae Schw. (Rust)
+Pennsylvania - (Overholts). P.r.: *Del., *D. C., *Ill., *Ind., *Iowa, *Kans., *Mass., *Mich., Minn., *Miss., *Mo., *N. Y., *N. D., *Ohio, *Va.

ARALIA RACEMOSA (American spikenard)
+Verticillium sp. (Wilt)
New York - (Chupp)

ARCTIUM MINUS (Burdock)
+Phyllosticta lappae Sacc. (Leafspot)
Pennsylvania - (Kirby)
Puccinia bardanae Cda. (Rust)
+Pennsylvania - (Orton). P.r.: *Conn., *Ill., *Ind., *Ky., *Mich., *Mo., *N. Y., *N. D., *Ohio, *Wis.

ARCTOSTAPHYLOS SPP.
Exobasidium vaccinii (Fckl.) Wor. (Leafspot)
Oregon - A. nevadensis, (Boyce); *Colorado - +A. uva-ursi. (Jenkins)

ARISAEMA DRACONTIUM (Dragon root)
    Uromyces arisaemae Cke. (Rust)
        +Florida - (Weber). P.r.: *Md., *N. Y.

ASCLEPIAS SYRIACA (Common milkweed)
    Cercospora clavata (Ger.) Pk. (Leafspot)
      *+Missouri - (Maneval). P.r.: *Colo., *Del., *Ill., *Ind., *Iowa, *Kans., *Mass., *Mich., *Mont., *Nebr., *N. J., *N. Y., *Wis.

ASCLEPIAS SP. (Milkweed)
    Colletotrichum sp. (Stemblight)
        Pennsylvania - (Orton)
    Leptomonas elmassiana (Migone) Holmes (Flagellate)
        Maryland - Holmes, Francis O. Herpetomonad flagellates in the latex of milkweed in Maryland. Phytopath. 14: 146-151. 1924.
        New Jersey - Phytopath. 15: 46. 1925.
    Mosaic
        New York - (N. Y. Dept. Bul. Pl. Path. News Letter, July 14)

ASIMINA TRILOBA (North american papaw)
    Phleospora asiminae Ell. & Morg. (Leafspot)
      *+Missouri - (Maneval). P.r.: *Ill., *Kans.

ASTER SPP. (Aster)
    Coleosporium solidaginis (Schw.) Thuem. (Rust)
        Kentucky - (Valleau)
        Washington -(A. douglasii). (Boyce). P.r.: *Ala., *Calif., *Colo., *D. C., *Ida., *Ill., *Ind., *Iowa, *Ky., *Me., *Mass., *Mich., *Minn., *Miss., *Mo., *Mont., *Nebr., *N. H., *N. Y., *N. D., *Ohio, *Oreg., *Pa., *S. Car., *S. D., *Vt., *Va., *Wash., *W. Va., *Wis.

BARBAREA VULGARIS (Winter cress)
    Ramularia barbareae Pk.
      *+Pennsylvania - (Kirby)

BIDENS FRONDOSA (Beggar ticks)
    Sphaerotheca humuli var. fuliginea (Schlect.) Salm. (Powdery mildew)
      *+Pennsylvania - (Kirby)

BIGNONIA RADICANS (Trumpet flower)
    Cercospora sordida Sacc.
        Missouri - (Maneval). P.r.: Ala., *Ark., Conn., *D. C., *Ill., Ind., *Iowa, *Kans., *La., *Miss., *Mo., *N. J., *Ohio, *Okla., *Texas.

BOEHMERIAE CYLINDRICA (False nettle)
    Cercospora boehmeriae Pk. (Leafspot)
      +Pennsylvania - (Overholts). P.r.: Ala., *Nebr., N. Y., *Wis.

BOERHAAVIA ERRECTA
    +Albugo candida (Pers.) Kze. (White rust)
        Florida - (Weber)

BURSA BURSA-PASTORIS (Shepherd's purse)
Albugo candida (Pers.) Kze. (White rust)
*+Pennsylvania - (Kirby)
*Virginia - (Pathological Collections)
Peronospora parasitica (Pers.) D By. (Downy mildew)
+New York - (Chupp)
+New Jersey - (Martin)
+Pennsylvania - (Kirby). P.r.: *Colo., Ind., Iowa, Kans., N. H., Wash.

CACTUS
+Perisporium wrightii Berk. & Cke. (Charcoal spot)
Texas - (Taubenhaus)
+Bacillus carotovorus L. R. Jones (Damping-off)
Texas - (Taubenhaus)

CAMPANULA AMERICANA (Tall bellflower)
Septoria campanulae (Lev.) Sacc. (Leafspot)
+Missouri - (Maneval). P.r.: Iowa, Kans., *Miss.

CARTHAMUS TINCTORIUS (Safflower)
Sclerotinia sclerotiorum (Lib.) Mass. (S. libertiana) (Wilt)
Joshi, S. D. The wilt disease of safflower. Mem. Dept. Agr. India
Bot. Ser. 13: 39-46. 1924.

CASTILLEJA MINIATA (Indiana paint brush)
+Cronartium filamentosum (Pk.) Hedgc. & Long (Rust)
Washington - (Boyce)

CEANOTHUS SANGUINEUS (Buckbrush)
+Septoria sp. (Leafspot)
Idaho - (Boyce)

CHAMAEDAPHINE SP. (Leatherleaf)
Exobasidium vaccinii (Fckl.) Wor. (Leafpockets)
+Pennsylvania - (Overholts). P.r.: *N. H., *N. Y.

CHELONE GLABRA (White turtlehead) (Snakehead)
Erysiphe galeopsidis DC. (Powdery mildew)
+Pennsylvania - (Overholts)
+Puccinia andropogi Schw. (Rust)
Pennsylvania - (Orton)
Septoria wilsonii Clint. (Leafspot)
+Pennsylvania - (Overholts). P.r.: *N. Y., *Ohio, *Vt.

CHENOPODIUM ALBUM (White goosefoot)
Peronospora effusa (Grev.) Rabh. (Downy mildew)
*+Pennsylvania - (Kirby)
Phyllosticta chenopodii Sacc. (Leafspot)
*+New York - (Chupp). P.r.: Ind.

CHENOPODIUM AMBROSIOIDES (Mexican tea)
Phyllosticta ambrosioides Thuem. & Syd. (Leafspot)
+Illinois - (Tehon). P.r.: Del., Ind., *La., *N. J., *P. I.

CHENOPODIUM SP. (Pigweed)
Albugo bliti (Biv.) Kze. (White rust)
*+New Jersey - (Sect. Pl. Path.). P.r.: On C. album from *Va.

CERATONI SILIQUM (Carob)
+Pestalozzia sp. (Leafspot)
Florida - (Weber)

CIMICIFUGA RACEMOSA (American bugbane)
+Puccinia triticina Erik. (P. clematidis Lagh.) (Rust)
Pennsylvania - (McCubbin)
Uromyces caecinodes Berk. & Curt. (Smut)
Pennsylvania - (Orton). P.r.: N. Y., N. Car., *Ohio, Pa., Tenn.

COLUTEA ARBORESCENS (Common bladder-senna)
+Diplodia colutae Schnabe (Twig dieback)
Pennsylvania - (Overholts)

COMPTONIA ASPLENIFOLIA (C. peregrina) (Sweetfern)
Cronartium comptoniae Arth. (Rust)
+Pennsylvania - (Orton & Thurston). P.r.: *Conn., *Mass., *N. H.,
*N. J., N. Y., N. Car., Vt., *Wis.

CONVOLVULUS SEPIUM (Hedge bindweed)
Puccinia convolvuli (Pers.) Cast. (Rust)
*+Pennsylvania - (Kirby)
Septoria sp. (Leafspot)
*+Pennsylvania - (Kirby)

COPTIS TRIFOLLA (Goldthread)
Septoria coptidis Berk. & Curt. (Leafspot)
New York - (Jenkins). P.r.: *N. Y., *Vt.

CYSTOPTERIS FRAGILIS (Brittle fern)
Hyalopsora polypodii (DC.) Magn. (Rust)
Pennsylvania - (McCubbin & Hildebrandt). P.r.: *Colo., *Ill., *Ind.,
Iowa, *Md., *Miss., *Mo., *Nebr., *N. Y., *Utah, *Wis.

CYPERUS ESCULENTUS (Sedge)
Puccinia canaliculata (Schw.) Lag. (Rust)
+Florida - (Weber). P.r.: Ind., *Mo., *Ohio.

DESMODIUM TORTUOSUM (Beggerweed)
Cercospora sp. (Leafspot)
Florida - (Weber)

DIANTHERA AMERICANA (Denseflowered water willow)
Cercospora dianthorae Ell. & Kell. (Leafspot)
*+Missouri - (Maneval). P.r.: *D. C., *Ill., *Kans., *Texas.

DRYOPTERIS LINNAEANA (Oakfern)
Hyalopsora aspidiotus (Pk.) Magn. (Leaf rust)
+Idaho - (Boyce). P.r.: Mich., Mont., *N. H., *N. Y., *Wash., Wis.

ECHINOCYSTIS LOBATA (Mock-cucumber)
+Alternaria sp. (Leafspot)
Florida - (Weber)
Cercospora sp. (Leafspot)
+Florida - (Weber). P.r. of Cercospora echinocystis Ell. & Mart., Ind., Iowa, Ky., *Nebr., Ohio, *Pa., Wis.
+Colletotrichum sp. (Anthracnose)
Florida - (Weber)
+Fusarium sp. (Wilt)
Florida - (Weber)

ELEPHANTOPUS CAROLINIANUS (Carolina elephant's-foot)
Cercospora elephantopodis Ell. & Ev. (Leafspot)
*+Missouri - (Maneval). P.r.: Ala., *Del., Miss.

ERIGERON SP. (Erigeron)
Septoria erigerontea Pk. (Leafspot)
+Pennsylvania - (Kirby). P.r.: *Ill., Ind., Iowa, *Miss., *N. J., *Ohio.

ERYTHRONIUM AMERICANUM (Yellow adders'-tongue)
Ustilago heufleri Fckl. (Smut)
Michigan - Sartoris, Geo. B. Studies in the life history and physiology of certain smuts. Amer. Jour. Bot. 11: 617-648. 1924.

EUPATORIUM URTICIAEFOLIUM (Snow thoroughwort)
Erysiphe cichoracearum DC. (Powdery mildew)
Pennsylvania - (Overholts). P.r.: *D. C., Iowa, *Nebr., *N. Y.

FRAGARIA CHILOENSIS (Chiloe strawberry)
Mycosphaerella fragariae (Tul.) Lind.
*+Pennsylvania - (Kirby). P.r.: *Alaska, *Me., Wash., *Wis.

GAURA BIENNIS (Biennial gaura)
+Uromyces plumbarius Pk. (Rust)
Pennsylvania - (Orton)

GERANIUM CAROLINIANUM (Geranium)
Plasmopara geranii (Pk.) Berl. & DeToni (Downy mildew)
Florida - (Weber). P.r.: Ala., *D. C., *Fla., *Ill., *Ind., Iowa, Kans., *Md., *Miss., *Mo., *N. J., *N. Car., *Texas, *Va.

GERANIUM SANGUINEUM (Bloodred cranesbill)
+Bacterium erodii Lewis (Bacterial spot)
Florida - (Weber)

GERANIUM SIBIRICUM (Siberian cranesbill)
+Peronospora geranii Pk. (Plasmopara geranii (Pk.) Berl.) (Downy mildew)
*Pennsylvania - (Kirby)

HELIANTHUS PETIOLARIS (Prairie sunflower)
Puccinia helanthi Schw. (Rust)
Kansas - (Johnston). P.r.: *Colo., Ind., *Kans., *Mont., *Nebr.

HEPATICA SP. (Hepatica)
+Peronospora pygmea (Ung.) Schroet. (Downy mildew)
Pennsylvania - (Overholts)

HYDROCOTYLE SP. (Pennywort)
Cercospora sp. (Leafspot)
Florida - (Weber). P.r.: Of *Cercospora hydrocotyles* Ell. & Ev.
Ala., *Fla., *La., Miss., *Texas.
Puccinia hydrocotyles (Mont.) Cke. (Rust)
Florida - (Weber). P.r.: Ala., *Ariz., *Calif., *Del., *Fla., *Hawaii,
*Miss., *Nev., Texas.

HUMULUS LUPULUS (Hop)
+Fumago vagans Pers. (Sooty mold)
*Washington - (Sect. Pl. Path.)
S.________, N. K. The analysis of ammonium polysulphide solutions. Bul. Bur. Bio-Techn. Murphy & Son 2: 129-130. 1924. Originally introduced by Salmon of Wye for controlling mould on hops. Not advisable to use it on certain varieties.
Peronospora sp. (Downy mildew)
Salmon, E. S. and W. M. Ware. An endemic *Peronospora* on hop in England. Gard. Chron. 3, 76: 265. 1924. *P. urticae* not uncommon on the nettle "is in its characters closely similar to, if not identical with the species on the hop." Not yet determined whether the two are really distinct.

HYPERICUM PROLIFICUM (Shrubby St. Johnswort)
Uromyces hyperici-frondosi (Schw.) Arth. (Rust)
*+Missouri - (Maneval). P.r.: Ind., *Miss., W. Va.

IPOMOEA DISSECTA (Morning-glory)
+Coleosporium ipomoeae (Schw.) Burr. (Rust)
Florida - (Weber)

IPOMOEA TRILOBA
+Mosaic
Florida - (Weber)
+Septoria convolvuli Desm. (Leafspot)
Florida - (Weber)

IPOMOEA SP.
Septoria convolvuli Desm. (Leafspot)
+Pennsylvania - (Kirby)

LACTUCA CANADENSIS (Wild lettuce)
+Rio Grande Valley Disease (Undetermined)
Texas - (Taubenhaus)

LACTUCA VIROSA (L. scariola) (Prickly or Wild lettuce)
Septoria lactucae Pass. (Leafspot)
*+Pennsylvania - (Kirby). P.r.: Ind., *Kans., *La., *Ohio.

LEDUM GROENLANDICUM (True Labrador tea)
Melampsoropsis abietina (Alb. & Schw.) Arth. (Melampsora abietina (Alb. Schw.) Arth. (Rust)
British Columbia - (Boyce). P.r.: N. H., Wis.

LEPTILON CANADENSE (Horseweed)
Fasciation
*+Maryland - (Norton). P.r.: *Ga.

LESPEDEZA HIRTA (Hairy bushclover)
Microsphaera diffusa Cke. & Pk. (Powdery mildew)
*+Pennsylvania - (Kirby). P.r.: Ill.

LUPINUS SP. (Lupine)
Mastigosporium lupini (Sor.) Cav.
Cavaea, F. Di una infezione crittogamica del Lupino Mastigosporium lupini (Sor.) Cav. (A cryptogamic infection of the Lupin, Mastigosporium lupini (Sor.) Cav.) Riv. Patol. Veg. 14: 13-16. 1924.
Nanism and dying off (fertilizer injury)
Peyronel, B. Sopra un caso di nanismo e di deperimento del Lupino in seguito a concimazione con calciocianamide. (On a case of nanism and dying off of the Lupin caused by fertilization with calcium cyanamide.) Boll. Mensile R. Staz. Pat. Veg. 5: 20-26. 1924.

MADIA RACEMOSA (Tarweed)
+Coleosporium madiae Cke. (Rust)
Washington - (Boyce)

MELANTHERA DELTOIDEA
+Puccinia obtecta Pk. (Rust)
Florida - (Weber)

MELIOTUS ALBA (Sweet clover)
Cercospora davisii Ell. & Ev. (Leafspot)
+Pennsylvania - (Kirby). P.r.: Ala., Ind., *Iowa, *Kans., Minn., *Wis.

MENZIESIA FERRUGINEA (False azalea)
+Exobasidium vaccinii (Fckl.) Wor. (Leaf gall)
Idaho - (Boyce)

MENTHA ARVENSIS (Mint)
Puccinia menthae Pers. (Rust)
+Florida - (Weber). P.r.: N. Y.
Ross, H. Weber die Pfefferminzen und deren Befall durch den Rostpilz _Puccinia menthae_ Pers. (Peppermints and their infection by the rust fungus _Puccinia menthae_ Pers.) Zeitschr. Pflanzenkr. 34: 3-4, 101-107. 1924.

MONARDA SP. (Bee balm)
Puccinia menthae Pers. (Rust)
Connecticut - (Clinton & Hunt). P.r.: Ark., Colo., Conn., Del., Ida., Ill., Ind., Iowa, Kans., Mich., Minn., Miss., Mo., Mont., Nebr., N. Mex., N. Y., N. D., Ohio, Pa., S. D. Texas, Utah, Va., Wis., Wyo.

NEPETA CATARIA (Catnip)
+Puccinia menthae Pers. (Rust)
Florida - (Weber)

OENOTHERA BIENNIS (Common evening primrose)
Erysiphe polygoni DC. (Powdery mildew)
+Pennsylvania - (Kirby). P.r.: Ala., Ida., Ill., Iowa, Minn., Miss., N. Y., N. D., Ohio.
Maranon, J. M. A biochemical study of resistance to mildew in Oenothera. Philipp. Jour. Sci. 24: 369-441. 1924.

OENOTHERA HUMIFERA (Primrose)
+Septoria oenotherae West (Leafspot)
Florida - (Weber)

ONOCLEA SENSIBILIS (Sensitive fern)
Uredinopsis mirabilis (Pk.) Magn. (Rust)
Pennsylvania - (Overholts & Thurston). P.r.: *Conn., Ill., *Ind., *Iowa, Me., *Md., *Mass., *Nebr., *N. H., *N. Y., *Pa., Wis.

OPUNTIA SPP. (Prickly pear)
Bacillus cacticidus Johnston & Hitchcock (Bacteriosis)
Johnston, T. H. and L. Hitchcock. A bacteriosis of prickly pear plants (Opuntia spp.) Trans. & Proc. Roy. Soc. So. Australia 47: 162-164. 1923.

OSMORRHIZA LONGISTYLIS (Smoother sweet-cicely)
Puccinia osmorrhizae (Pk.) Cke. & Pk. (Rust)
Pennsylvania - (Kirby). P.r.: *Iowa, *Ky., *Md., *Mo., *Nebr., *N. Y., *N. D., *Pa., *Va., *Wis.

OXALIS VIOLACEA (Oxalis)
Uredo oxalidis Lev. (Rust)
+Florida - (Weber). P.r.: Texas.

PACHISTIMA MYRSINITES (Myrtle pachistima)
+Mycosphaerella sp. (Leafspot)
Idaho - (Boyce)

PENTSTEMON SP. (Pentstemon)
+Cercosporella nivosa Ell. & Ev.? (Leafspot)
Pennsylvania - (Orton)

PERSICARIA PENNSYLVANICA (Pennsylvania persicaria)
Septoria polygonorum Desm. (Leafspot)
Pennsylvania - (Kirby). P.r.: *Ill., Ind., Minn., *Miss., *Mont., *Nebr., *N. J., *N. Y., *Ohio, *Pa., *Va., *Wis.

Ustilago utriculosa (Nees) Tul. (Smut)
*+Pennsylvania - (Kirby). P.r.: Ala., Conn., *Del., *Ill., *Ind., *Iowa, *Kans., *Md., *Mass., Miss., *Mo., Nebr., *N. H., *N. J., *N. Y., Ohio, R. I., Vt., *Va., *W. Va.

PERSICARIA PERSICARIA (Smartweed)
+Puccinia polygoni Pers. (Rust)
Kansas - (Johnston)
Septoria polygonorum Desm. (Leafspot)
+Kansas - (Johnston). P.r.: *Ky., *Me., *Miss., *Nebr,, *N. J., *N. Y., *N. D.
Ustilago utriculosa (Nees) Tul. (Smut)
Kansas - (Johnston). P.r.: Ind., *Kans., Minn.

PHYSALIS SP.
+Mosaic
Connecticut - (Clinton)

PLANTAGO LANCEOLATA (Ribwort)
+Physarum cinereum (Batsch) Pers.
*Pennsylvania - (Kirby)

PLANTAGO MAJOR (Common plantain)
Erysiphe cichoracearum DC. (Powdery mildew)
British Columbia - (Boyce). P.r.: *Colo., *D. C., Ind., Iowa, Minn., Mo., *Mont., *Nebr., *N. Y., *N. D., *Pa., Wash.
Peronospora alata Fckl. (Downy mildew)
+Pennsylvania - (Orton). P.r.: *Ill., *Ind., *Iowa, *Kans., *Me., *Mass., *Miss., *Nebr., N. Y., *Wash., *Wis.
+Physarum cinereum (Batsch) Pers.
*Pennsylvania - (Kirby)
Ramularia plantaginis Ell. & Mart. (Leafspot)
+Pennsylvania - (Orton)

POLYGONUM AVICULARE (Knot grass, Door weed)
Erysiphe polygoni DC. (Powdery mildew)
+Pennsylvania - (Kirby)

POLYGONUM ERECTUM (Erect knotweed)
Cercospora avicularis Wint. (Leafspot)
*+South Dakota - (Evans). P.r.: Minn.
Erysiphe polygoni DC. (Powdery mildew)
*+Pennsylvania - (Kirby)
Uromyces polygoni (Pers.) Fckl. (Rust)
Pennsylvania - (Kirby). P.r.: Conn., Del., Ill., Ind., Iowa, Miss., Mo., N. J., N. Y., N. Car., N. D., Pa., S. D., W. Va., Wis.

POTENTILLA CANADENSIS (Common cinquefoil)
Frommea obtusa (Strauss) Arth. (Rust)
+Pennsylvania - (Orton). P.r.: Minn., *Miss.
+Synchytrium aureum Schroet.
Pennsylvania - (Orton)

POTENTILLA MONSPELIENSIS (Rough cinquefoil)
Beloniella dehnii (Rab.) Rehm (Mollisia dehnii (Rab.) Karst.)
+Pennsylvania - (Thurston). P.r.: Ind., Iowa, N. D.

PTERIDIUM AQUILINUM PUBESCENS (Bracken)
+Phyllachora pteridis (Reb.) Fckl. (Black leafspot)
Washington - (Boyce)
Oregon - (Boyce)
Uredinopsis pteridis Dearn. & Holw. (Rust)
+British Columbia - (Boyce)
+Idaho - (Boyce)
+Oregon - (Boyce). P.r.: *Calif., *Wash.

RANUNCULUS ACRIS (Tall or Meadow buttercup)
Erysiphe polygoni DC. (Powdery mildew)
*+Pennsylvania - (Kirby)
Peronospora ficariae Tul. (Downy mildew)
*+Pennsylvania - (Kirby)

RAPHANUS RAPHANISTRUM (Wild radish)
+Peronospora parasitica (Pers.) D By. (Downy mildew)
*New Jersey - (Martin)

RIBES CEREUM (Wild currant)
Coleosporium ribicola (Cke. & Ell.) Arth. (Rust)
*+New Mexico - (Crawford). P.r.: *Colo., *Mont., Utah.

RIBES CYNOSBATI (Pasture gooseberry)
Cronartium ribicola Fischer (Blister rust)
+Connecticut - (McDonnell). P.r.: Minn., *N. H.
Puccinia grossulariae (Schum.) Lagh. (Rust)
*+Pennsylvania - (Kirby). P.r.: Me., Minn., N. H., N. Y., Vt.

RIBES VISCOSISSIMUM
+Septoriopsis ribis Davis (Leafspot)
British Columbia - (Boyce)

RICHARDIA SCABRA (Mexican clover)
+Peronospora sp. (Downy mildew)
Florida - (Weber)

RUBUS SPECTABILIS (Salmonberry)
Sphaerotheca humuli (DC.) Burr. (Powdery mildew)
+Washington - (Boyce). P.r.: *Oreg.

RUMEX SPP.
+Uromyces acetosae Schroet. (Rust)
*Pennsylvania - *R. acetosella and *R. acetosa. (Kirby)

RUMUX CRISPUS (Curled or Narrow dock)
Ovularia obliqua (Cke.) Oud.
*+Pennsylvania - (Kirby). P.r.: *Colo., *Kans., *Md., *Mont., *Nebr., *N. J., *N. Y., N. D., *Wash., *Wis.

RUMEX OBTUSIFOLIUS (Bitterdock)
+Ramularia macrospora Fres. (Leafspot)
*New York - (Chupp)
+Mosaic
*New York - (Chupp)

RUMEX OCCIDENTALIS (Dock)
+Mycosphaerella sp. (Leafspot)
Washington - (Boyce)

SAPONARIA OFFICINALIS (Bouncing bet)
+Phyllosticta tenerrima Ell. & Ev. (Leafspot)
New Jersey - (Martin)

SHEPHERDIA CANADENSIS (Russet buffaloberry)
Puccinia rhamni (Pers.) Wettst. (Rust)
+Idaho - (Boyce). P.r.: *Mont.
+Septoria shepherdiae (Sacc.) Dearn. (Leafspot)
Idaho - (Boyce)

SISYMBRIUM ALTISSIMUM (Norta altissima) (Tall sisymbrium)
Albugo candida (Pers.) Kuntze (White rust)
*+New York - (Chupp). P.r.: *Mont.

SMILAX SP. (Smilax)
Phyllosticta smilacinis Ell. & Mart. (Leafspot)
+Pennsylvania - (Orton). P.r.: *Ala., *Ark., *Del., *D. C., *Kans., *La., *Nebr., *N. Y., *Tenn., *Texas, *Va., *W. Va.

SOLANUM CAROLINENSE (Horse nettle)
Erysiphe cichoracearum DC. (Powdery mildew)
*+Pennsylvania - (Kirby). P.r.: Ala., *Texas.

SOLANUM NIGRUM (Black nightshade)
+Alternaria solani Ell. & Mart. (Early blight)
Florida - (Weber)
Cercospora atro-marginalis Atk. (Leafspot)
+Florida - (Weber). P.r.: Ala.
+Mosaic
Florida - (Weber)

SOLIDAGO SPP. (Goldenrod)
Coleosporium solidaginis (Schw.) Thuem. (Rust)
+Oregon-(*S. elongata*); +Montana - (*S. missouriensis*); +Washington - (*S. rigida*). (Boyce)
Rhytisma solidaginis Schw. (Tarspot)
*+New Jersey - (Martin). P.r.: Ala., *Del., *D. C., Fla., Iowa, *Md., *Mass., *N. Y., *Ohio, *Pa., *Vt., Wash.

SONCHUS OLERACEUS (Sowthistle)
+Alternaria sp.
Florida - (Weber)
+Bremia lactucae E. Regel (Downy mildew)
Florida - (Weber)

Oidium sp. (Powdery mildew)
Florida - (Weber)

STEIRONEMA CILIATUM (Fringed loose strife)
Puccinia dayi Clint. (Rust)
Pennsylvania - (Overholts). P.r.: *Ind., *Iowa, *N. Y., *Pa., *Wis.

STROPHOSTYLES HELVOLA (Trailing wild bean)
Bacterium phaseoli EFS. (Bacterial blight)
Indiana - Phytopath. 14: 7, 341. 1924.
Uromyces appendiculatus (Pers.) Link. (Rust)
Kansas - (Johnston). P.r.: Ala., *Ark., *Del., *Ill., *Ind., *Iowa, *Kans., Md., *Miss., *Nebr., *N. J., *N. Y., N. Car., *Ohio, Okla., R. I., S. Car., *Va., *W. Va., Wis.

TARAXACUM OFFICINALE (Dandelion)
+Physarum cinereum (Batsch) Pers.
*Pennsylvania - (Kirby)
Ramularia taraxaci Karst. (Leafspot)
+Pennsylvania - (Kirby)

TEUCRIUM CANADENSE (American germander)
Cercospora racemosa Ell. & Mart. (Leafspot)
*+Missouri - (Maneval). P.r.: *Ill., *Ind., *Iowa, *Kans., *Mich., *Nebr., *N. Y.

THALICTRUM DIOICIUM (Meadow rue)
Polythelis thalictri (Chev.) Arth. (Rust)
Pennsylvania - (McCubbin). P.r.: *Ind., *Iowa, Minn., *N. Y., *N. D., Pa., *Wis.

THALICTRUM SP. (Meadowrue)
Erysiphe polygoni DC. (Powdery mildew)
+Pennsylvania - (Overholts). P.r.: Ill., *Ind., *N. H., *N. D., Ohio, *S. D.

THEOBROMA CACAO (Cacao)
+Diplodia cacaoicola Henn.
Florida - (Weber)

TRIFOLIUM INCARNATUM (Crimson clover)
Phyllachora trifolii (Pers.) Fckl. (Polythrincium trifolii Kze.) (Blackspot)
+Pennsylvania - (Orton). P.r.: *Ala., Ga., *Md., *N. Car., *Va.

TRIFOLIUM PRATENSE (Red clover)
Cercospora zebrina Pass. (Leafspot)
+Pennsylvania - (Orton). P.r.: *Ind., Iowa, Mich., N. Y.

TRILLIUM DISCOLOR
*+Septoria trillii Pk. (Leafspot)
South Carolina - (Ludwig)

VACCINIUM OVALIFOLIUM (Tall billberry)
+Calyptospora columnaris (Alb. & Schw.) Kuhn (Rust)
Oregon - (Boyce)
+Pucciniastrum myrtilli (Schum.) Arth. (Rust)
Washington - (Boyce)

VACCINIUM MEMBRANACEUM (Big whortleberry)
+Exobasidium vaccinii (Fckl.) Wor. (Leafspot)
Idaho - (Boyce)
+Pucciniastrum myrtilli (Schum.) Arth. (Leaf rust)
Washington, Oregon - (Boyce)

VACCINIUM PARVIFOLIUM (Red whortleberry)
+Calyptospora columnaris (Alb. & Schum.) Kuhn (Rust)
Washington - (Boyce)

VERATRUM VIRIDE (American false-hellebore)
Puccinia veratri Niessel (Rust)
+Pennsylvania - (Orton & Thurston). P.r.: *Calif., *N. H., *N. Y., *W. Va.

VERNONIA GIGANTEA (Ironweed)
Puccinia vernoniae Schw. (Rust)
+Florida - (Weber). P.r.: *Texas.

VICIA SP. (Vetch)
+Colletotrichum viciae Dearn. & Overh. (Anthracnose)
Pennsylvania - (Orton)
Protocoronospora nigricans (Atk. & Edg.) emend. Wolf
North Carolina - (Jenkins). P.r.: *Ga., La., Miss., *N. Y., *N. Car., S. C., Tenn., *Va.

VIOLA PAPILIONACEA (Butterfly violet)
Puccinia violae (Schum.) DC. (Rust)
New York - (Chupp). P.r.: Ind., Iowa, *N. Y., N. D.

VIOLA SP. (Violet)
Ascochyta sp. (Leafspot)
Pennsylvania - (Kirby)

XANTHIUM SPP.
Cuscuta sp. (Dodder)
*+Pennsylvania - X. orientale. (Kirby). P.r.: *Texas.
+Mosaic
*New York - (Chupp)
Puccinia xanthii Schw. (Rust)
+Kansas - X. commune. (Johnston)
+Kansas - X. pennsylvanicum. (Johnston). P.r.: Ind., *Mo.
*+Pennsylvania - X. orientale. (Kirby). P.r.: Ala., Colo., Ind., Iowa, Miss., N. J., *N. Y., N. D., *Okla., Wash.

THE PLANT DISEASE REPORTER

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The Office of Plant Disease Survey
and
Pathological Collections

Supplement 43

Crop Losses from Plant Diseases in the United States in 1924

October 1, 1925

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

CROP LOSSES FROM PLANT DISEASES IN THE UNITED STATES IN 1924

Plant Disease Reporter
Supplement 43

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CONTENTS

INTRODUCTORY STATEMENT

Through its system of state collaborators the Plant Disease Survey for a number of years has made estimates of losses for plant diseases of some of the major crops. The estimates for 1924, herewith presented, are the eighth of the series that have been issued by the office. The methods followed in preparing these estimates have been the same as those used in previous years. (See Plant Disease Bulletin, Supplements 6, 12, 24, 30, and 36.)

Estimated percentage loss to twelve crops from
plant diseases 1919 to 1924.

Crop	Percent loss					
	1919	1920	1921	1922	1923	1924
Wheat	16.96	11.70	9.2	8.9	11.82	8.87
Rye	1.74	1.98	1.4	1.9	2.32	2.04
Barley	5.90	4.60	5.7	4.6	5.69	3.78
Oats	5.90	4.80	8.6	5.6	6.06	6.79
Corn	6.41	6.39	8.8	6.0	10.7	9.43
Potato	19.50	21.70	18.6	21.1	16.20	19.15
Sweet potato	36.23	25.8	28.3	21.49	20.9	17.72
Dry bean	3.70	4.3	14.1	16.1	10.0	-
Cotton	13.59	13.4	15.8	9.2	19.5	12.65
Apple	11.37	16.5	11.3	22.5	13.20	18.68
Peach	12.04	19.4	15.3	18.6	6.0	9.41
Pear	-	-	-	-	7.42	9.37

Estimated reduction in yield of wheat due to scab (Gibberella saubinetti), leaf rust (Puccinia triticina), stem rust (Puccinia graminis), and bunt (Tilletia laevis and T. tritici), 1924.

State	Production: 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease							
		Scab		Leaf rust		Stem rust		Bunt	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Me.	130	-	-	-	-	-	-	-	-
Vt.	60	-	-	0.5	+	0.5	1	-	-
Conn.	-	0.25	-	-	+	0.25	+	0	0
N. Y.	6,840	t	+	1	71	6	+	t	+
N. J.	1,309	0.5	7	t	+	-	-	-	-
Pa.	20,020	5	1,180	1	236	0.2	47	0.5	118
Del.	1,616	2	34	0.1	1	-	-	0.1	2
Md.	8,532	1.5	141	2	187	t	+	1.5	141
Va.	9,628	1	104	1	104	0.3	31	1.5	156
W. Va.	2,574	t	+	t	+	t	+	t	+
N. C.	5,544	1	63	3	189	1	63	1	63
S. C.	1,476	-	-	1	15	-	-	-	-
Ga.	850	-	-	5	46	t	+	1	9
Ohio	37,313	1.5	618	-	-	1	412	1.5	618
Ind.	31,437	0.5	168	t	+	t	+	1	336
Ill.	35,758	2	794	2.4	953	0.75	298	2.3	913
Mich.	20,014	1	211	0.5	105	t	+	3	632
Wis.	2,353	1	25	1	25	3	74	0	0
Minn.	36,513	t	+	t	+	1	386	t	+
Iowa	8,628	5	490	t	+	t	+	2	196
Mo.	24,629	-	-	-	-	-	-	-	-
N. Dak.	134,618	1	1,622	t	+	3	4,865	1	1,622
S. Dak.	34,138	0	0	0	0	1	355	1	355
Nebr.	57,115	t	+	t	+	0	0	t	+
Kans.	153,738	t	+	t	+	t	+	8	13,515
Ky.	4,340	0.5	23	t	+	0	0	t	+
Tenn.	3,570	5	192	-	-	-	-	-	-
Ala.	80	-	-	-	-	t	+	-	-
Miss.	32	0	0	0	0	0	0	0	0
La.		-	-	t	+	t	+	-	-
Tex.	25,826	t	+	1	277	1	278	0.5	139
Okla.	54,874	1	617	0	0	3	1,850	2	1,233
Ark.	678	t	+	t	+	t	+	4	31
Mont.	51,668	0	0	t	+	1	549	3	1,649
Wyo.	2,131	0	0	0	0	0.5	10	-	-
Colo.	21,030	-	-	0	0	0	0	0.75	162
N. Mex.	2,551	1	28	-	-	1	28	1	27
Ariz.	837	0	0	-	-	0	0	2	17
Utah	4,413	0	0	0.1	4	0.5	23	0.6	27
Nev.	402	0	0	-	-	-	-	-	-
Idaho	17,828	0	0	0	0	t	+	8	1,593
Wash.	27,300	0	0	t	+	t	+	6	1,761
Oregon	15,450	0	0	t	+	t	+	4	650
Calif.	4,770	0	0	0	0	0	0	1.5	73
U. S.	872,673	0.66	6,317	0.23	2,213	0.97	9,270	2.72	26,038

Estimated reduction in yield of wheat due to loose smut (Ustilago tritici), and other diseases, 1924.

State	Estimated reduction in yield due to disease							
	Loose smut		Other Diseases		Sum of traces and no data		All diseases	
	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Me.	-	-	-	-	-	-	-	-
Vt.	-	-	-	-	2	1	3	2
Conn.	2	+	-	-	0	0	2.5	+
N. Y.	1	71	1.5	107	0.5	36	4	285
N. J.	1.5	21	t	+	1	14	3	42
Pa.	2	472	6.5	1,535	0	0	15.2	3,588
Del.	0.5	8	1.5	25	0	0	4.2	70
Md.	3	281	1	93	0	0	9	843
Va.	3	311	0.5	52	0	0	7.3	758
W. Va.	2	53	t	+	1	26	3	79
N. C.	3	189	3	189	0	0	12	756
S. C.	1	15	1.5	24	0	0	3.5	54
Ga.	-	-	1	9	0	0	7	64
Ohio	1.5	618	4	1,650	0	0	9.5	3,916
Ind.	5	1,681	-	-	0	0	6.5	2,185
Ill.	0.5	199	2	794	0	0	9.95	3,951
Mich.	0.5	105	-	-	0	0	5	1,053
Wis.	t	+	0.5	12	0	0	5.5	136
Minn.	0.5	193	-	-	4	1,546	5.5	2,125
Iowa	2	196	3	294	0	0	12	1,176
Mo.	-	-	-	-	-	-	-	-
N. Dak.	1.5	2,433	10.5	17,030	0	0	17	27,572
S. Dak.	t	+	2	712	0	0	4	1,422
Nebr.	1	582	t	+	1	583	2	1,165
Kans.	0.5	844	-	-	0.5	845	9	15,204
Ky.	1.5	68	3	137	0	0	5	228
Tenn.	2	76	-	-	0	0	7	268
Ala.	-	-	-	-	-	-	-	-
Miss.	0	0	0	0	-	-	-	-
La.	t	+	-	-	-	-	t	+
Texas	0.5	139	4	1,111	0	0	7	1,944
Okla.	1	616	4	2,466	0	0	11	6,782
Ark.	5	38	2	15	0	0	11	84
Mont.	t	+	1	550	1	550	6	3,298
Wyo.	-	-	-	-	-	-	0.5	10
Colo.	0	0	-	-	1.25	268	2	430
N. Mex.	5	138	-	-	0	0	8	221
Ariz.	-	-	-	-	-	-	2	17
Utah	1.2	55	1	46	0	0	3.4	155
Nev.	-	-	-	-	-	-	-	-
Idaho	2	398	0.5	100	0	0	10.5	2,091
Wash.	t	+	t	+	1	293	7	2,054
Oregon	t	+	t	+	1	163	5	813
Calif.	0	0	1	49	0	0	2.5	122
U. S.	1.02	9,800	2.82	27,000	0.45	4,325	8.87	84,963

RYE

Estimated reduction in yield of rye due to smut (Urocystis occulta), ergot (Claviceps purpurea), leaf rust (Puccinia dispersa), stem rust (Puccinia graminis), and other diseases, 1924.

State	Production 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease													
		Smut		Ergot		Leaf rust		Stem rust		Other diseases		Sum of traces and no data		All diseases	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Mass.	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conn.	72	0	0	-	-	1.5	1	1.5	1	-	-	0	0	3	2
N. Y.	935	t	+	t	+	1	9	t	+	1.5	14	0.5	5	3	28
N. J.	1,138	-	-	t	+	2	23	-	-	t	+	0.5	6	2.5	29
Pa.	3,264	0.5	17	0	0	0.5	17	t	+	5.5	192	0	0	6.5	226
Del.	81	-	-	-	-	t	+	-	-	1	1	0	0	1	1
Md.	300	-	-	-	-	1	3	-	-	-	-	1	3	2	6
Va.	537	0	0	t	+	t	+	0	0	1	5	0	0	1	5
W. Va.	112	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N. C.	852	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S. C.	32	-	-	-	-	-	-	-	-	1	+	0	0	1	+
Ga.	184	-	-	-	-	1	1	t	+	t	+	1	2	2	3
Ohio	1,280	-	-	2	27	3	41	1	14	1	14	0	0	7	96
Ind.	3,682	-	-	-	-	-	-	-	-	0.5	18	0	0	0.5	18
Ill.	2,580	0.3	8	1	26	0.5	13	-	-	0.6	16	0	0	2.4	63
Mich.	6,006	t	+	2	123	t	+	1	62	-	-	0	0	3	185
Wis.	5,457	t	+	t	+	t	+	t	+	4	227	0	0	4	227
Minn.	11,780	0.5	59	-	-	-	-	t	+	-	-	0.5	60	1	119
Iowa	864	t	+	4	36	t	+	t	+	t	+	0	0	4	36
Mo.	270	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N. Dak.	13,860	t	+	0.5	70	0	0	t	+	t	+	0.5	70	1	140
S. Dak.	2,956	1	31	2	61	0	0	1	31	0	0	0	0	4	123

State	Production 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease													
		Smut		Ergot		Leaf rust		Stem rust		Other diseases		Sum of traces and no data		All diseases	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Nebr.	1,914	-	-	0	0	-	-	0	0	-	-	-	-	-	-
Kans.	568	-	-	-	-	t	+	t	+	t	+	t	+	t	+
Ky.	176	0	0	0.5	1	t	+	0	0	3	5	0	0	3.5	6
Tenn.	198	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ala.	10	-	-	-	-	-	-	-	-	10	1	0	0	10	1
Miss.		0	0	0	0	t	+	0	0	15	+	0	0	15	+
La.		-	-	-	-	t	+	-	-	-	-	-	-	t	+
Texas	272	-	-	-	-	-	-	-	-	3	8	0	0	3	8
Okla.	518	-	-	-	-	t	+	t	+	t	+	-	-	t	+
Ark.	11	-	-	-	-	t	+	t	+	1	+	1	+	2	+
Mont.	1,750	0	0	t	+	t	+	0	0	-	-	t	+	t	+
Wyo.	264	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colo.	740	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N. Mex.	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Utah	99	-	-	t	+	-	-	-	-	-	-	-	-	-	-
Idaho	154	t	+	t	+	0	0	t	+	0	0	0	0	t	+
Wash.	100	0	0	0	0	0	0	t	+	t	+	0	0	t	+
Oregon	280	0	0	0	0	-	-	t	+	-	-	0	0	t	+
Calif.		0	0	0	0	0	0	0	0	0	0	0	0	0	0
U. S.	63,446	0.18	115	0.53	344	0.17	108	0.17	108	0.77	501	0.22	146	2.04	1,322

Estimated reduction in yield of barley due to stripe (Helminthosporium gramineum), loose smut (Ustilago nuda), and covered smut (Ustilago hordei), 1924.

State	Production: 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease					
		Stripe		Loose smut		Covered smut	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Me.	104	-	-	-	-	-	-
N. H.	26	-	-	-	-	-	-
Vt.	288	-	-	0.5	1	0.5	1
Conn.		0	0	1.5	+	0.5	+
N. Y.	6,900	t	+	2.5	184	1	73
Pa.	318	t	+	4	13	1.5	5
Del.		t	+	t	+	1	+
Md.	175	-	-	-	-	-	-
Va.	324	0.1	+	3	10	5	18
S. C.		-	-	1	+	-	-
Ga.		-	-	1	+	1	+
Ohio	2,250	0.5	11	-	-	-	-
Ind.	800	-	-	3	25	t	+
Ill.	7,781	1.8	149	2	165	t	+
Mich.	4,743	t	+	0.5	24	t	+
Wis.	13,536	1.5	209	t	+	t	+
Minn.	29,248	1.5	447	0.5	149	t	+
Iowa	4,710	5	286	1	57	3	171
Mo.	100	-	-	-	-	-	-
N. Dak.	35,100	1	370	1	369	1	369
S. Dak.	22,428	2	472	1	236	0	0
Nebr.	6,275	t	+	t	+	-	-
Kans.	11,550	-	-	2	242	2	242
Ky.	120	-	-	2.5	3	5	6
Tenn.	360	-	-	5	18	-	-
Ala.		-	-	-	-	3	+
La.		t	+	-	-	-	-
Texas	3,220	t	+	0.5	18	0.5	18
Okla.	4,675	-	-	-	-	-	-
Mont.	3,100	t	+	1	32	2	63
Wyo.	900	-	-	-	-	-	-
Colo.	8,160	0.1	8	0.1	8	0.1	8
N. Mex.	240	-	-	2	4	-	-
Ariz.	1,260	0	0	1	13	2	25
Utah	936	1.5	14	0.2	2	t	+
Nev.	145	-	-	-	-	-	-
Idaho	2,958	0.5	15	t	+	1.5	46
Wash.	2,640	t	+	0	0	1	26
Oregon	2,425	t	+	t	+	1	24
Calif.	10,080	t	+	t	+	0.5	51
U. S.	187,875	1.01	1,981	0.81	1,573	0.59	1,146

Estimated reduction in yield of barley due to leaf rust (Puccinia simplex), stem rust (Puccinia graminis), and other diseases, 1924.

State	Estimated reduction in yield due to disease									
	Leaf rust		Stem rust		Other diseases		Sum of traces and no data		All diseases	
	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted	%	Bushels (000 omitted)
Me.	-	-	-	-	-	-	-	-	-	-
N. H.	-	-	-	-	-	-	-	-	-	-
Vt.	-	-	-	-	-	-	-	-	1	2
Conn.	0.25	+	0.25	+	-	-	0	0	2.5	+
N. Y.	t	+	1	73	1.5	110	0	0	6	440
Pa.	t	+	t	+	2	7	0	0	7.5	25
Del.	-	-	-	-	-	-	0	0	1	+
Md.	-	-	-	-	-	-	-	-	-	-
Va.	t	+	t	+	0	0	0	0	8.1	28
S. C.	-	-	-	-	1	+	1	+	3	+
Ga.	t	+	-	-	2	+	0	0	4	+
Ohio	-	-	0.5	12	1	23	0	0	2	46
Ind.	-	-	-	-	-	-	1	8	4	33
Ill.	t	+	-	-	2	165	0	0	5.8	479
Mich.	t	+	t	+	0.5	24	0.5	24	1.5	72
Wis.	t	+	0.5	69	-	-	0.5	69	2.5	347
Minn.	0	0	t	+	-	-	0	0	2	596
Iowa	t	+	1	57	7.5	428	0	0	17.5	999
Mo.	-	-	1	1	-	-	3	3	4	4
N. Dak.	0	0	1	370	1	369	0	0	5	1,847
S. Dak.	0	0	2	472	0	0	0	0	5	1,180
Nebr.	0	0	0	0	-	-	-	-	t	+
Kans.	-	-	-	-	0.5	60	0	0	4.5	544
Ky.	t	+	0	0	0.5	1	0	0	8	10
Tenn.	-	-	-	-	-	-	0	0	5	18
Ala.	-	-	-	-	-	-	0	0	3	+
La.	t	+	-	-	-	-	1	+	1	+
Texas	1	35	1	35	5.5	193	0	0	8.5	299
Okla.	-	-	-	-	-	-	-	-	-	-
Mont.	t	+	0	0	-	-	-	-	3	95
Wyo.	-	-	-	-	-	-	-	-	-	-
Colo.	0	0	0	0	-	-	0	0	0.3	24
N. Mex.	-	-	t	+	-	-	0	0	2	4
Ariz.	0	0	0	0	0	0	0	0	3	38
Utah	t	+	t	+	0.1	1	0	0	1.8	17
Nev.	-	-	-	-	-	-	-	-	-	-
Idaho	0	0	t	+	1	30	0	0	3	91
Wash.	0	0	t	+	t	+	0	0	1	26
Oregon	-	-	t	+	t	+	-	-	1	24
Calif.	0	0	0	0	t	+	0.5	51	1	102
U. S.	0.01	35	0.56	1,089	0.72	1,411	0.08	155	3.78	7,390

OATS

Estimated reduction in yield of oats due to loose and covered smuts (<u>Ustilago avenae</u> and <u>U. levis</u>), stem rust (<u>Puccinia graminis</u>), crown rust (<u>Puccinia coronata</u>), and other diseases, 1924.

State	Production: 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease											
		Loose and covered smut		Stem rust		Crown rust		Other diseases		Sum of traces and no data		All diseases	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Me.	4,477	-	-	-	-	-	-	-	-	-	-	-	-
N. H.	702	t	+	1	7	t	+	-	-	1	7	2	14
Vt.	2,584	2	54	1	27	2	55	-	-	0	0	5	136
Mass.	272	2	5	t	+	t	+	-	-	1	3	3	8
R. I.	30	-	-	-	-	-	-	-	-	-	-	-	-
Conn.	290	2	6	1	3	1	3	-	-	0	0	4	12
N. Y.	34,056	4	1,481	t	+	2	740	2	740	0	0	8	2,961
N. J.	2,144	3	67	-	-	t	+	t	+	1	22	4	89
Pa.	37,080	5.5	2,242	1	407	1	407	1.5	611	0	0	9	3,667
Del.	210	1	2	-	-	t	+	1	2	0	0	2	4
Md.	2,074	3	65	t	+	t	+	-	-	1	21	4	86
Va.	4,394	6	286	t	+	1	48	1	48	0	0	8	382
W. Va.	4,784	1	48	t	+	t	+	t	+	1	49	2	97
N. C.	4,644	2.4	114	-	-	-	-	-	-	0	0	2.4	114
S. C.	7,704	5	405	-	-	-	-	-	-	0	0	5	405
Ga.	3,978	4	171	-	-	2	85	1	43	0	0	7	299
Fla.	465	-	-	-	-	-	-	-	-	-	-	-	-
Ohio	64,657	1.5	1,043	0.5	348	0.5	347	4.5	3,128	0	0	7	4,866
Ind.	70,034	2	1,429	-	-	t	+	-	-	-	-	2	1,429
Ill.	163,680	5.7	11,067	0.5	971	0.5	971	9	17,474	0	0	15.7	30,483
Mich.	67,200	3	2,100	1	700	t	+	-	-	0	0	4	2,800
Wis.	103,600	2.5	2,701	1	1,080	0.5	540	0.1	108	0	0	4.1	4,429
Minn.	193,500	3	6,078	0.5	1,013	t	+	-	-	1	2,026	4.5	9,117
Iowa	248,282	5	13,642	t	+	t	+	4	10,913	0	0	9	24,555

State	Production: 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease											
		Loose and covered smut		Stem rust		Crown rust		Other diseases		Sum of traces and no data		All diseases	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Mo.	41,745	-	-	-	-	-	-	-	-	-	-	-	-
N. Dak.	93,364	2	1,951	1.5	1,463	t	+	0.8	781	0	0	4.3	4,195
S. Dak.	98,050	2	2,086	3	3,129	t	+	1	1,043	0	0	6	6,258
Nebr.	76,136	1	793	0	0	0	0	-	-	3	2,379	4	3,172
Kans.	39,806	2	821	1	410	-	-	t	+	0	0	3	1,231
Ky.	5,336	8	464	0	0	0	0	t	+	0	0	8	464
Tenn.	4,950	5	260	-	-	-	-	-	-	0	0	5	260
Ala.	2,955	-	-	-	-	-	-	-	-	-	-	-	-
Miss.	2,124	3	71	0	0	5	118	2	47	0	0	10	236
La.	1,060	t	+	0	0	1	10	-	-	-	-	1	10
Texas	48,892	1	531	1	531	1	531	5	2,658	0	0	8	4,251
Okla.	38,880	2	845	1	422	-	-	4	1,691	1	422	8	3,380
Ark.	5,500	15	1,031	t	+	t	+	5	344	0	0	20	1,375
Mont.	19,854	3	626	0	0	-	-	2	418	-	-	5	1,044
Wyo.	5,239	-	-	-	-	-	-	-	-	-	-	-	-
Colo.	6,500	0	0	0	0	0	0	-	-	0.5	32	0.5	32
N. Mex.	1,536	2	32	2	32	-	-	-	-	0	0	4	64
Ariz.	700	t	+	0	0	0	0	0	0	-	-	t	+
Utah	3,080	4	128	-	-	-	-	-	-	0	0	4	128
Nev.	102	-	-	-	-	-	-	-	-	-	-	-	-
Idaho	6,624	2	135	t	+	0	0	0.5	34	0	0	2.5	169
Wash.	8,611	0.5	43	t	+	0	0	t	+	0.5	43	1	86
Oregon	8,370	1	84	t	+	t	+	t	+	-	-	1	84
Calif.	1,645	t	+	t	+	t	+	2	33	0	0	2	33
U. S.	1,541,900	3.20	52,907	0.64	10,543	0.23	3,855	2.42	40,116	0.30	5,004	6.79	112,425

Estimated reduction in yield of corn due to smut (<u>Ustilago zeae</u>), leaf rust (<u>Puccinia sorghi</u>), and brown spot (<u>Physoderma zeae-maydis</u>), 1924.

State	Production 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease					
		Smut		Leaf rust		Brown spot	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Me.	756	-	-	0	0	0	0
N. H.	1,232	t	+	0	0	0	0
Vt.	4,230	1	42	0	0	0	0
Mass.	2,745	1	29	t	+	0	0
R. I.	504	-	-	0	0	0	0
Conn.	3,268	3	102	0	0	0	0
N. Y.	24,519	2	527	t	+	0	0
N. J.	8,024	0.5	43	-	-	0	0
Pa.	55,692	5	3,315	t	+	0	0
Del.	4,725	0.5	26	-	-	1	52
Md.	18,538	1.5	314	-	-	-	-
Va.	37,086	1.5	615	t	+	0	0
W. Va.	15,176	1	158	-	-	-	-
N. C.	44,514	2	995	1	497	0.5	249
S. C.	21,862	1	226	-	-	-	-
Ga.	50,203	2	1,167	t	+	3	1,751
Fla.	12,252	-	-	-	-	-	-
Ohio	94,900	3	3,181	-	-	-	-
Ind.	116,916	0.4	494	t	+	-	-
Ill.	293,600	3.3	11,787	0.5	1,786	1	3,572
Mich.	43,836	t	+	t	+	0	0
Wis.	57,980	t	+	0	0	0	0
Minn.	126,336	0.5	638	-	-	0	0
Iowa	304,752	3	10,389	t	+	0	0
Mo.	170,612	-	-	-	-	-	-
N. Dak.	22,740	4	957	t	+	0	0
S. Dak.	99,990	t	+	0	0	0	0
Nebr.	203,280	2.5	5,240	0	0	0	0
Kans.	130,905	3	4,462	t	+	0	0
Ky.	80,850	0.5	470	0	0	-	-
Tenn.	69,718	-	-	-	-	1	882
Ala.	42,185	1	453	t	+	0.5	227
Miss.	29,316	t	+	t	+	t	+
La.	18,998	t	+	t	+	0.5	100
Texas	78,200	0.5	418	t	+	0	0
Okla.	65,600	2	1,581	-	-	-	-
Ark.	36,300	t	+	t	+	t	+
Mont.	9,198	t	+	0	0	0	0
Wyo.	2,310	-	-	-	-	0	0
Colo.	15,650	t	+	-	-	0	0
N. Mex.	4,200	3	131	t	+	0	0
Ariz.	930	1	9	0	0	0	0
Utah	728	1	7	-	-	0	0
Nev.	27	-	-	-	-	0	0
Idaho	2,800	t	+	0	0	0	0
Wash.	2,345	0.5	11	0	0	0	0
Oregon	2,135	t	+	0	0	0	0
Calif.	3,850	10	453	0	0	0	0
U. S.	2,436,513	1.79	48,240	0.08	2,283	0.25	6,833

Estimated reduction in yield of corn due to rootrot (Gibberella saubinetii), ear rots (Fusarium sp.) and other diseases, 1924.

State	Estimated reduction in yield due to disease									
	Root rots		Ear rots		Other diseases		Sum of traces and no data		All diseases	
	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Me.	-	-	-	-	-	-	-	-	-	-
N. H.	-	-	-	-	-	-	-	-	-	-
Vt.	-	-	-	-	-	-	-	-	1	42
Mass.	1	28	t	+	-	-	2	57	4	114
R. I.	-	-	-	-	-	-	-	-	-	-
Conn.	0.5	17	0.5	17	-	-	0	0	4	136
N. Y.	4	1,054	t	+	1	264	0	0	7	1,845
N. J.	4	345	2.5	215	-	-	0	0	7	603
Pa.	5	3,315	6	3,978	0	0	0	0	16	10,608
Del.	1.5	78	5	259	1	52	-	-	9	467
Md.	5	1,047	5	1,047	-	-	0	0	11.5	2,408
Va.	4	1,639	4	1,639	t	+	0	0	9.5	3,893
W. Va.	2	316	1	158	t	+	0	0	4	632
N. C.	3	1,492	4	1,989	-	-	0	0	10.5	5,222
S. C.	1	225	1	225	-	-	0	0	3	676
Ga.	3	1,751	4	2,335	2	1,168	0	0	14	8,172
Fla.	-	-	-	-	-	-	-	-	-	-
Ohio	2.5	2,651	4	4,241	1	1,060	0	0	10.5	11,133
Ind.	5	6,179	t	+	-	-	0	0	5.4	6,673
Ill.	10	35,717	-	-	3	10,715	0	0	17.8	63,577
Mich.	5	2,332	-	-	-	-	1	466	6	2,798
Wis.	3	1,821	1	607	t	+	0.5	304	4.5	2,732
Minn.	t	+	t	+	-	-	0.5	638	1	1,276
Iowa	1	3,463	6	20,779	2	6,926	0	0	12	41,557
Mo.	-	-	-	-	-	-	-	-	-	-
N. Dak.	t	+	t	+	t	+	1	239	5	1,196
S. Dak.	4	4,210	1	1,052	-	-	0	0	5	5,262
Nebr.	0	0	t	+	-	-	0.5	1,047	3	6,287
Kans.	6	8,926	3	4,462	-	-	0	0	12	17,850
Ky.	12	11,281	1.5	1,410	-	-	0	0	14	13,161
Tenn.	10	8,825	10	8,825	-	-	0	0	21	18,532
Ala.	3	1,361	2	907	-	-	0.5	227	7	3,175
Miss.	-	-	-	-	-	-	4	1,221	4	1,221
La.	2	400	2	400	-	-	0.5	100	5	1,000
Texas	1	836	1	836	4	3,346	0	0	6.5	5,436
Okla.	7	5,532	6	4,742	2	1,581	-	-	17	13,436
Ark.	t	+	2	764	3	1,146	0	0	5	1,910
Mont.	-	-	-	-	-	-	-	-	t	+
Wyo.	-	-	-	-	-	-	-	-	-	-
Colo.	-	-	-	-	-	-	-	-	t	+
N. Mex.	-	-	1	44	-	-	0	0	4	175
Ariz.	-	-	0	0	-	-	-	-	1	9
Utah	-	-	-	-	-	-	-	-	1	7
Nev.	-	-	-	-	-	-	-	-	-	-
Idaho	0	0	0	0	0	0	-	-	t	+
Wash.	0	0	0	0	t	+	-	-	0.5	11
Oregon	-	-	t	+	-	-	-	-	t	+
Calif.	5	226	t	+	-	-	0	0	15	679
U. S.	3.91	105,067	2.26	60,931	0.98	26,258	0.16	4,299	9.43	253,911

POTATO

Estimated reduction in yield of potato due to mosaic, leaf roll, late blight (*Phytophthora infestans*), rhizoctonia (*Rhizoctonia solani*), blackleg (*Bacillus phytophthorus*), and fusarium wilt (*Fusarium oxysporum*), 1924.

State	Production 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease											
		Mosaic		Leaf roll		Late blight		Rhizoctonia		Blackleg		Fusarium wilt	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Me.	41,175	-	-	-	-	-	-	-	-	-	-	0	0
N. H.	2,520	10	345	5	173	10	345	t	+	t	+	0	0
Vt.	4,290	5	290	5	290	8	463	2	116	t	+	0	0
Mass.	4,340	5	255	5	255	1	51	2	102	t	+	0	0
R. I.	420	-	-	-	-	-	-	-	-	t	+	-	-
Conn.	3,425	0.25	10	-	-	t	+	0.25	10	0.5	20	-	-
N. Y.	46,620	4	2,722	5	3,403	8	5,445	5	3,403	0.2	136	1	680
N. J.	11,544	3	417	1.5	209	2	278	1	139	t	+	t	+
Pa.	28,792	2	753	-	-	9	3,387	-	-	t	+	4	1,505
Del.	819	0.5	4	t	+	-	-	-	-	-	-	-	-
Md.	3,818	5	223	2	89	-	-	3	134	1	45	-	-
Va.	19,200	2	419	1	210	t	+	3	629	1	210	0.5	105
W. Va.	4,841	1	80	t	+	25	2,018	t	+	1	80	t	+
N. C.	6,195	5	398	1	79	3	238	4	318	1	79	-	-
S. C.	3,885	t	+	t	+	1	50	-	-	-	-	-	-
Ga.	1,608	5	89	1	18	0	0	t	+	0	0	0.5	9
Fla.	2,900	5	181	t	+	-	-	-	-	-	-	-	-
Ohio	11,500	3	426	5	710	1	142	1	142	1	142	0.5	71
Ind.	7,227	-	-	-	-	-	-	-	-	t	+	-	-
Ill.	11,960	t	+	t	+	t	+	t	+	t	+	-	-
Mich.	38,252	2	1,108	5	2,772	5	2,772	8	4,435	2	1,109	2	1,109
Wis.	31,460	t	+	t	+	16	6,215	1	388	t	+	0	0
Minn.	44,352	2	1,152	t	+	1	576	3	1,728	2	1,152	t	:

State	Production: 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease											
		Mosaic		Leaf roll		Late blight		Rhizoctonia		Blackleg		Fusarium wilt	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Iowa	10,744	2	269	t	+	t	+	8	1,074	1	134	2	269
Mo.	10,200	-	-	t	+	-	-	-	-	-	-	-	-
N. Dak.	11,960	1	139	t	+	0	0	4	556	2	278	1.5	208
S. Dak.	5,822	3	203	1	68	0	0	3	203	1	67	1	67
Nebr.	7,743	t	+	t	+	0	0	t	+	0	0	10	980
Kans.	5,130	2	123	t	+	-	-	10	614	1	61	t	+
Ky.	5,700	10	803	5	401	0	0	5	401	0	0	2	161
Tenn.	3,500	10	463	2	93	0	0	0	0	0	0	-	-
Ala.	2,970	5	167	-	-	-	-	t	+	t	+	1	33
Miss.	1,296	10	151	-	-	-	-	t	+	0	0	0.5	7
La.	1,904	10	224	t	+	0	0	1	22	0	0	0	0
Texas	2,223	t	+	-	-	0	0	0.5	12	0	0	1	25
Okla.	3,225	10	379	t	+	0	0	t	+	1	38	1	38
Ark.	2,664	15	605	-	-	-	-	-	-	-	-	-	-
Mont.	3,256	5	181	t	+	0	0	1	36	t	+	1	36
Wyo.	1,520	-	-	-	-	-	-	-	-	-	-	-	-
Colo.	11,640	-	-	-	-	-	-	-	-	-	-	-	-
N. Mex.	210	2	5	2	5	-	-	-	-	-	-	-	-
Ariz.	260	0	0	0	0	0	0	4	14	0	0	15	51
Utah	2,184	10	272	2	54	-	-	2	54	0.6	16	4	109
Nev.	620	-	-	-	-	-	-	-	-	-	-	-	-
Idaho	10,725	10	1,324	2	265	0	0	2	265	0.5	66	1.5	198
Wash.	6,615	10	778	2	156	0	0	2	156	t	+	-	-
Oregon	3,780	5	220	t	+	t	+	5	219	0.5	22	1	44
Calif.	7,750	-	-	-	-	-	-	-	-	-	-	-	-
U. S.	454,784	2.70	15,178	1.64	9,250	3.91	21,980	2.70	15,170	0.65	3,655	1.01	5,705

POTATO (continued)

Estimated reduction in yield of potato due to tipburn and hopperburn, early blight (Alternaria solani), and other diseases, 1924.

State	Production: 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease									
		Tipburn and hopperburn		Early blight		Other diseases		Sum of traces and no data		All diseases	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Me.	41,175	-	-	-	-	-	-	-	-	-	-
N. H.	2,520	-	-	1	34	-	-	1	35	27	932
Vt.	4,290	-	-	1	58	5	290	0	0	26	1,507
Mass.	4,340	-	-	t	+	-	-	2	102	15	765
R. I.	420	-	-	-	-	-	-	15	74	15	74
Conn.	3,425	0.5	20	0.5	20	12	484	1	40	15	604
N. Y.	46,620	5	3,403	0.3	204	3	2,042	0	0	31.5	21,438
N. J.	11,544	3	417	3	417	3.5	487	0	0	17	2,364
Pa.	28,792	-	-	0.5	188	-	-	8	3,011	23.5	8,844
Del.	819	0.5	4	1	9	1.5	13	3	26	6.5	56
Md.	3,818	1.5	67	-	-	-	-	2	89	14.5	647
Va.	19,200	t	+	t	+	-	-	1	210	8.5	1,783
W. Va.	4,841	12	969	t	+	t	+	1	80	40	3,227
N. C.	6,195	3	238	2	159	3	238	0	0	22	1,747
S. C.	3,885	-	-	15	757	3	151	4	202	23	1,160
Ga.	1,608	2	36	t	+	2	36	0	0	10.5	188
Fla.	2,900	-	-	-	-	-	-	15	544	20	725
Ohio	11,500	5	709	0.5	71	2	284	0	0	19	2,697
Ind.	7,227	-	-	-	-	-	-	-	-	t	+
Ill.	11,960	1	125	1.5	188	1	125	1	125	4.5	563
Mich.	38,252	t	+	t	+	7	3,880	0	0	31	17,185
Wis.	31,460	t	+	t	+	1	388	1	388	19	7,379
Minn.	44,352	15	8,640	t	+	t	+	0	0	23	13,248

State	Production 1924 Bushels (000 omitted)	Tipburn and hopperburn %	Tipburn and hopperburn Bushels (000 omitted)	Early blight %	Early blight Bushels (000 omitted)	Other diseases %	Other diseases Bushels (000 omitted)	Sum of traces and no data %	Sum of traces and no data Bushels (000 omitted)	All diseases %	All diseases Bushels (000 omitted)
Iowa	10,744	2	269	t	+	5	671	0	0	20	2,686
Mo.	10,200	-	-	-	-	-	-	-	-	t	+
N. Dak.	11,960	t	+	t	+	5	696	0.5	69	14	1,946
S. Dak.	5,822	5	339	t	+	-	-	0	0	14	947
Nebr.	7,743	-	-	t	+	10	980	1	98	21	2,058
Kans.	5,130	0.5	31	t	+	3	184	0	0	16.5	1,013
Ky.	5,700	-	-	5	401	-	-	2	161	29	2,328
Tenn.	3,500	10	463	0.5	23	-	-	2	93	24.5	1,135
Ala.	2,970	-	-	1	33	3	101	1	33	11	367
Miss.	1,296	0.5	7	1	15	-	-	2	30	14	210
La.	1,904	0	0	t	+	4	90	0	0	15	336
Texas	2,223	3	74	1	25	5	124	0	0	10.5	260
Okla.	3,225	t	+	1	38	2	76	-	-	15	569
Ark.	2,664	3	121	1	41	15	605	0	0	34	1,372
Mont.	3,256	0	0	0	0	2	72	1	36	10	361
Wyo.	1,520	-	-	-	-	-	-	-	-	-	-
Colo.	11,640	-	-	-	-	-	-	-	-	-	-
N. Mex.	210	10	26	-	-	5	13	0	0	19	49
Ariz.	260	0	0	1	3	4	14	0	0	24	82
Utah	2,184	t	+	t	+	-	-	1	27	19.6	532
Nev.	620	-	-	-	-	-	-	-	-	-	-
Idaho	10,725	t	+	t	+	3	397	-	-	19	2,515
Wash.	6,615	t	+	t	+	-	-	1	77	15	1,167
Oregon	3,780	t	+	t	+	2	88	0.5	22	14	615
Calif.	7,750	-	-	-	-	-	-	-	-	-	-
U. S.	454,784	2.84	15,958	0.48	2,684	2.23	12,529	0.99	5,572	19.15	107,681

SWEET POTATO

Estimated reduction in yield of sweet potato due to stem rot (*Fusarium hyperoxysporum* and *F. batatatis*), Foot rot (*Plenodomus destruens*), and black rot (*Sphaeronema fimbriatum*), 1924.

State	Production 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease					
		Stem rot		Footrot		Blackrot	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
N. J.	2,431	15	498	-	-	0.2	7
Pa.	234	-	-	-	-	-	-
Del.	1,300	8	129	-	-	0.5	8
Md.	1,170	4	58	-	-	1	15
Va.	5,175	5	312	t	+	3	187
W. Va.	360	-	-	-	-	-	-
N. C.	9,292	2	224	3	336	3	336
S. C.	6,230	t	+	t	+	0.5	33
Ga.	8,704	0.5	49	0	0	2	194
Fla.	3,150	-	-	-	-	-	-
Ohio	336	-	-	-	-	-	-
Ind.	345	-	-	-	-	-	-
Ill.	864	-	-	-	-	-	-
Iowa	240	25	97	-	-	9	35
Mo.	1,400	-	-	-	-	-	-
Kans.	339	7	27	t	+	0.5	2
Ky.	1,748	-	-	-	-	-	-
Tenn.	3,230	2	99	0	0	8	398
Ala.	6,205	2	143	0	0	1	71
Miss.	4,400	10	571	t	+	2	115
La.	3,900	-	-	0	0	1	42
Texas	4,450	0	0	0	0	8	579
Okla.	2,430	4	128	-	-	5	160
Ark.	2,880	2	87	-	-	5	218
N. Mex.	120	-	-	-	-	-	-
Ariz.	250	1	2	0	0	1	2
Wash.		t	+	0	0	0	0
Calif.	678	-	-	-	-	-	-
U. S.	71,861	2.78	2,424	0.38	336	2.75	2,402

SWEET POTATO (continued)

Estimated reduction in yield of sweet potato due to storage rots, pox (Cystospora batata), and other diseases, 1924.

State	Estimated reduction in yield due to disease									
	Storage rots		Pox		Other diseases		Sum of traces and no data		All diseases	
	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
N. J.	-	-	0.5	16	1	33	10	332	26.7	886
Pa.	-	-	-	-	-	-	-	-	-	-
Del.	-	-	0.5	8	0.5	8	10	161	19.5	314
Md.	15	219	-	-	-	-	0	0	20	292
Va.	8	499	1	62	-	-	-	-	17	1,060
W. Va.	-	-	-	-	-	-	-	-	-	-
N. C.	6	671	-	-	3	336	0	0	17	1,903
S. C.	5	333	-	-	1	67	0	0	6.5	433
Ga.	5	486	0	0	3	292	0	0	10.5	1,021
Fla.	-	-	-	-	-	-	-	-	-	-
Ohio	-	-	-	-	-	-	-	-	-	-
Ind.	-	-	-	-	-	-	-	-	-	-
Ill.	-	-	-	-	-	-	-	-	-	-
Iowa	4	15	-	-	t	+	0	0	38	147
Mo.	-	-	-	-	-	-	-	-	-	-
Kans.	3	11	t	+	t	+	0	0	10.5	40
Ky.	-	-	-	-	-	-	-	-	-	-
Tenn.	25	1,242	-	-	-	-	0	0	35	1,739
Ala.	10	713	0	0	-	-	0	0	13	927
Miss.	10	571	t	+	1	57	0	0	23	1,314
La.	2	85	t	+	-	-	5	212	8	339
Texas	25	1,809	0.5	36	5	362	-	-	38.5	2,786
Okla.	10	319	-	-	5	160	-	-	24	767
Ark.	25	1,092	-	-	2	87	-	-	34	1,484
N. Mex.	1	1	-	-	-	-	-	-	1	1
Ariz.	5	14	0	0	0	0	-	-	7	18
Wash.	0	0	0	0	0	0	-	-	t	+
Calif.	-	-	-	-	-	-	-	-	-	-
U. S.	9.25	8,080	0.14	122	1.61	1,402	0.81	705	17.72	15,471

TOMATO

Estimated percentage reduction in yield of tomatoes due to blight, (*Septoria lycopersici*), fusarium wilt (*Fusarium lycopersici*), bacterial wilt (*Bacillus solanacearum*), early blight (*Alternaria solani*), and other dissases, 1924. (Production figures not available.)

State	Estimated reduction in yield due to disease						
	Blight	Fusarium wilt	Bacterial wilt	Early blight	Other diseases	Sum of traces & no data	All diseases
N. H.	-	0	0	t	-	2	2
Vt.	1	0	0	1	1	0	3
Mass.	t	0	t	1	10	1	12
R. I.	t	-	0	-	-	4	4
Conn.	0	0.5	0	-	3.5	0	4
N. Y.	t	1	0	3	10	0	14
N. J.	10	t	0	t	5	0	15
Pa.	5	t	0	2	5	-	12
Del.	35	0.5	0	0.5	15	0	51
Md.	15	5	0	-	-	5	25
Va.	15	2	t	1	5	0	23
W. Va.	5	t	t	5	1	1	12
N. C.	2	5	3	2	6	0	18
S. C.	15	-	-	-	30	0	45
Ga.	8	6	-	5	15	0	34
Fla.	t	-	-	-	-	-	-
Ohio	0.5	8	0	t	9	0	17.5
Ind.	8	1	0	-	-	3	12
Ill.	1	-	-	4	1	0	6
Mich.	10	t	0	t	-	2	12
Wis.	10	1	0	t	t	1	12
Minn.	1	0	0	-	1	0	2
Iowa	12	-	-	t	6	0	18
Mo.	15	-	-	-	-	5	20
N. Dak.	t	-	0	-	-	2	2
S. Dak.	t	t	0	t	-	1	1
Nebr.	0	0	0	t	2	-	2
Kans.	6	10	0	1	t	0	17
Ky.	15	4	0	0	-	2	21
Tenn.	10	20	0	0	10	0	40
Ala.	4	10	0.5	1	5	0	20.5
Miss.	t	10	t	2	16	0	28
La.	0	15	3	t	17	0	35
Texas	4	3	0	3	10	0	20
Okla.	-	10	2	t	2	-	14
Ark.	t	20	t	-	2	0	22
Mont.	0	1	0	-	2	-	3
Colo.	t	0	0	0	0	0	t
N. Mex.	4	-	-	-	17	-	21
Ariz.	0	-	4.4	0	20	-	24.4
Utah	-	2.5	-	-	30.2	-	32.7
Nev.	0	-	0	-	-	25	25
Idaho	t	0	0	t	27	-	27
Wash.	0	t	0	0	25	-	25
Oregon	0	0	0	0	0.5	30	30.5

COTTON

Estimated reduction in yield of cotton due to anthracnose (Colletotrichum gossypii), angular leafspot (Bacterium malvacearum), wilt (Fusarium vasinfectum), rootknot (Heterodera radicicola), and other diseases, 1924.

State	Production: 1924 Bales (000 omitted)	Estimated reduction in yield due to disease													
		Anthracnose		Angular leafspot		Wilt		Rootknot		Other diseases		Sum of traces and no data		All Diseases	
		%	Bales (000omitted)	%	Bales (000omitted)	%	Bales (000 omitted)	%	Bales (000 omitted)	%	Bales (000 omitted)	%	Bales (000 omitted)	%	Bales (000 omitted)
Va.	30	3	1	1	+	1	+	t	+	t	+	1	1	6	2
N. C.	765	2	17	1	9	2	17	2	17	3	25	0	0	10	85
S. C.	750	t	+	t	+	2	16	-	-	5	41	1	8	8	65
Ga.	1,000	4	46	5	58	2	23	t	+	3	35	0	0	14	162
Fla.	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mo.	146	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tenn.	330	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ala.	990	1.5	16	0.5	5	4	44	t	+	3	33	0	0	9	98
Miss.	1,080	3	35	t	+	5	59	t	+	1	12	0	0	9	106
La.	480	t	+	t	+	3	15	-	-	-	-	5	26	8	41
Texas	4,770	1	57	5	283	1	57	1	57	8	454	0	0	16	908
Okla.	1,450	0	0	3	50	0	0	0	0	10	166	-	-	13	216
Ark.	1,100	t	+	2.5	33	6	78	2	26	5	65	0	0	15.5	202
N. Mex.	56	-	-	1	1	-	-	3	2	5	3	0	0	9	6
Ariz.	100	0	0	3	4	1	1	t	+	8	9	0	0	12	14
Calif.	71	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other states	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
U. S.	13,153	1.14	172	2.94	443	2.06	310	0.68	102	5.60	843	0.23	35	12.65	1,905

BEAN

Estimated percentage reduction in yield of bean due to anthracnose (*Colletotrichum lindemuthianum*), bacterial blight (*Bacterium phaseoli*), mosaic, rootrots (*Fusarium* spp.) and other diseases, 1924.
(Production figures not available)

State	Estimated reduction in yield due to disease						
	Anthracnose	Bacterial blight	Mosaic	Rootrots	Other diseases	Sum of traces & no data	All diseases
	%	%	%	%	%	%	%
N. H.	1	t	-	-	-	1	2
Vt.	2	1	1	-	1	0	5
Mass.	1	t	t	1	-	1	3
Conn.	-	-	-	1	0	2	3
N. Y.	1.5	10	2	5	1.5	0	20
N. J.	2	-	1	-	-	2	5
Pa.	2	2	-	-	2	-	6
Del.	0.5	0.5	-	-	0.5	1	2.5
Md.	1.5	1.5	t	-	-	2	5
Va.	2	4	t	1	1	0	8
W. Va.	5	t	-	t	-	0	6
S. C.	-	1	-	-	2	1	4
Ga.	t	4	t	-	10	0	14
Ohio	2	1	-	-	-	2	5
Ill.	t	1	-	-	-	1	2
Mich.	5	5	5	-	0	0	15
Wis.	1	t	t	t	1	1	3
Minn.	t	1	5	t	t	1	7
Iowa	t	2	5	-	-	1	8
N. Dak.	-	-	-	-	-	t	t
S. Dak.	1	-	t	-	-	1	2
Kans.	t	-	0.3	-	-	1	1.3
Tenn.	t	0	t	t	t	1	1
Ala.	2	3	-	1	2	0	8
Miss.	1	1	1	1	2	0	6
La.	t	t	t	3	-	2	5
Texas	0	1	0	4	5	0	10
Okla.	0	5	5	t	1	-	11
Ark.	-	3	-	-	1	0	4
Mont.	0	1	3	1	-	-	5
N. Mex.	2	2	t	5	-	-	9
Ariz.	0	0.5	0	0	1	0	1.5
Utah	-	-	2.5	-	-	0	2.5
Idaho	0	t	5	2	0.5	0	7.5
Wash.	0	0	2	t	2	0	4
Oregon	t	0	2	-	-	-	2

Estimated reduction in yield of grape due to blackrot (Guignardia bidwellii), and other diseases, 1924.

State	Production: 1924 Tons (000 omitted)	Estimated reduction in yield due to disease							
		Blackrot		Other diseases		Sum of traces and no data		All diseases	
		%	Tons (000 omitted)	%	Tons (000 omitted)	%	Tons (000 omitted)	%	Tons (000 omitted)
Me.	46	-	-	-	-	-	-	-	-
N. H.	84	-	-	-	-	-	-	-	-
Vt.	37	-	-	-	-	-	-	-	-
Mass.	440	t	+	1	4	-	-	1	4
R. I.	289	-	-	-	-	-	-	-	-
Conn.	1,075	0.5	5	0.5	5	-	-	1	10
N. Y.	80,000	0.1	80	0.5	402	0	0	0.6	482
N. J.	2,338	-	-	-	-	-	-	-	-
Pa.	19,750	-	-	-	-	-	-	-	-
Del.	1,400	6	91	2	30	0	0	8	121
Md.	770	10	88	2	17	0	0	12	105
Va.	2,349	-	-	-	-	-	-	-	-
W. Va.	1,539	5	82	1	16	0	0	6	98
N. C.	6,525	9	660	2	146	0	0	11	806
S. C.	1,425	25	488	2	39	0	0	27	527
Ga.	1,638	10	204	10	205	0	0	20	409
Ohio	20,400	5	1,121	4	896	0	0	9	2,017
Ind.	3,185	-	-	-	-	-	-	-	-
Ill.	4,900	1	50	2.5	127	0	0	3.5	177
Mich.	51,000	t	+	4	2,125	0	0	4	2,125
Wis.	279	1	3	1	2	0	0	2	5
Minn.	88	-	-	-	-	-	-	-	-
Iowa	4,658	t	+	3	144	0	0	3	144
Mo.	5,840	-	-	-	-	-	-	-	-
Nebr.	1,068	1	10	t	+	-	-	1	10
Kans.	2,925	1	29	-	-	-	-	1	29
Ky.	1,094	30	489	3	49	-	-	33	538
Tenn.	1,496	-	-	5	78	-	-	5	78
Ala.	825	5	44	1.5	13	0	0	6.5	57
Miss.	281	5	15	2	6	0	0	7	21
La.	36	-	-	-	-	-	-	-	-
Tex.	1,320	6.5	100	8	123	0	0	14.5	223
Okla.	1,875	5	104	5	104	-	-	10	208
Ark.	1,230	2.5	32	1	12	0	0	3.5	44
Colo.	280	-	-	-	-	-	-	-	-
N. Mex.	520	1	5	3	16	0	0	4	21
Ariz.	350	0	0	1	3	0	0	1	3
Utah	615	-	-	-	-	-	-	-	-
Nev.	170	-	-	-	-	-	-	-	-
Idaho	240	-	-	-	-	-	-	-	-
Wash.	1,732	0	0	2	35	0	0	2	35
Oregon	1,350	0	0	1	13	-	-	1	13
Calif.	1,550,000	-	-	-	-	-	-	-	-
U. S.	1,777,462	0.21	3,700	0.26	4,610	0	0	0.47	8,310

APPLE

Estimated reduction in yield of apple due to bitter rot (<u>Glomerella cingulata</u>), blackrot (<u>Physalospora cydoniae</u>), blotch (<u>Phyllosticta solitaria</u>), and cedar rust (<u>Gymnosporangium</u>), 1924.

State	Production: 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease							
		Bitter rot		Blackrot		Blotch		Cedar rust	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Me.	3,241	0	0	-	-	0	0	0	0
N. H.	1,462	t	+	t	+	0	0	t	+
Vt.	924	0	0	1	10	0	0	t	+
Mass.	3,346	t	+	1	37	0	0	t.	+
R. I.	324	-	-	-	-	0	0	-	-
Conn.	1,700	-	-	1	18	0	0	0.5	9
N. Y.	23,800	t	+	1	317	0	0	t	+
N. J.	2,300	t	+	0.8	21	1.5	41	t	+
Pa.	7,267	t	+	2	182	t	+	0.5	45
Del.	1,200	1	16	1.5	23	t	+	0.1	1
Md.	1,749	1.5	32	5	106	1.5	32	1	21
Va.	15,184	1	237	1	237	t	+	8	1,898
W. Va.	7,000	t	+	2	175	2	175	5	438
N. C.	6,500	5	445	3	267	3	267	2	178
S. C.	426	2.5	12	1	4	-	-	1	4
Ga.	1,388	4	68	4	68	t	+	0.5	8
Ohio	8,325	1	107	4	430	3	322	0.5	53
Ind.	2,800	t	+	4	128	2	64	0.5	16
Ill.	6,200	0.5	36	1	72	5	361	1	72
Mich.	7,333	0	0	1	90	0	0	0	0
Wis.	1,378	0	0	0	0	0	0	t	+
Minn.	979	-	-	-	-	-	-	-	-
Iowa	3,000	-	-	3	115	3	115	1	39
Mo.	5,300	-	-	-	-	-	-	-	-
N. Dak.		0	0	-	-	-	-	t	+
S. Dak.	150	1	2	-	-	-	-	1	2
Nebr.	1,162	0	0	t	+	1	15	2.5	37
Kans.	2,812	t	+	t	+	5	155	0.5	15
Ky.	6,075	t	+	t	+	8	771	t	+
Tenn.	4,500	2	114	1	57	10	569	2	114
Ala.	1,190	1	14	0.5	7	10	141	t	+
Miss.	315	2	7	1	3	1	3	t	+
La.	45	-	-	-	-	-	-	-	-
Texas	365	0.1	+	0.1	+	2	9	-	-
Okla.	1,575	0	0	5	114	10	228	1	23
Ark.	3,630	t	+	4	170	1.5	64	1.5	64
Mont.	574	0	0	0	0	0	0	0	0
Wyo.	35	0	0	-	-	0	0	0	0
Colo.	3,024	0	0	-	-	0	0	0	0
N. Mex.	720	0	0	-	-	0	0	0	0
Ariz.	70	0	0	0	0	0	0	0	0
Utah	650	0	0	-	-	0	0	0	0
Nev.	35	0	0	-	-	0	0	0	0
Idaho	2,520	0	0	0	0	0	0	0	0
Wash.	23,000	0	0	0	0	0	0	0	0
Oregon	6,500	0	0	-	-	0	0	0	0
Calif.	7,370	0	0	-	-	0	0	0	0
U. S.	179,443	0.49	1,090	1.20	2,651	1.51	3,332	1.38	3,037

Estimated reduction in yield of apple due to fireblight (Bacillus amylovorus), scab (Venturia inaequalis), and other diseases, 1924.

State	Estimated reduction in yield due to disease									
	Fireblight		Scab		Other diseases		Sum of traces and no data		All diseases	
	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Me.	-	-	-	-	-	-	-	-	-	-
N. H.	t	+	1	15	-	-	5	78	6	93
Vt.	1	10	3	31	5	51	0	0	10	102
Mass.	1	37	5	186	2	74	1	37	10	371
R. I.	-	-	-	-	-	-	8	28	8	28
Conn.	0.5	9	3	54	1	18	0	0	6	108
N. Y.	2	635	20	6,346	2	635	0	0	25	7,933
N. J.	t	+	12	326	1	27	0	0	15.3	415
Pa.	1.5	136	15	1,362	1	91	0	0	20	1,816
Del.	1	16	10	157	10	157	0	0	23.6	370
Md.	5	106	3.5	74	-	-	0	0	17.5	371
Va.	t	+	18	4,271	8	1,898	0	0	36	8,541
W. Va.	t	+	6	525	5	437	0	0	20	1,750
N. C.	3	267	7	624	4	356	0	0	27	2,404
S. C.	1	5	1	5	1.5	7	0	0	8	37
Ga.	2.5	42	6	101	1	17	0	0	18	304
Ohio	2	215	10	1,074	2	215	0	0	22.5	2,416
Ind.	0.2	7	4	128	-	-	2	64	12.7	407
Ill.	2	144	2.5	180	2	144	0	0	14	1,009
Mich.	5	453	12	1,086	-	-	1	91	19	1,720
Wis.	1.5	25	15	250	1	17	0	0	17.5	292
Minn.	4	44	3	33	3	33	1	11	11	121
Iowa	5	192	10	385	-	-	0	0	22	846
Mo.	-	-	-	-	-	-	12	722	12	722
N. Dak.	6	+	1	+	t	+	0	0	7	+
S. Dak.	7	12	4.5	7	t	+	0	0	13.5	23
Nebr.	2	29	5	74	10	148	1	15	21.5	318
Kans.	1.5	47	1.5	47	1	31	0	0	9.5	295
Ky.	5	482	20	1,928	4	386	0	0	37	3,567
Tenn.	5	285	1	57	-	-	0	0	21	1,196
Ala.	2	28	2	28	t	+	0	0	15.5	218
Miss.	5	18	t	+	1	4	0	0	10	35
La.	-	-	-	-	-	-	-	-	-	-
Texas	7	31	0	0	8	35	0	0	17.2	75
Okla.	5	114	5	114	5	114	0	0	31	707
Ark.	4	171	t	+	4	171	0	0	15	640
Mont.	t	+	t	+	-	-	1	5	1	5
Wyo.	-	-	-	-	-	-	-	-	-	-
Colo.	t	+	0	0	0	0	0	0	t	+
N. Mex.	t	+	2	20	25	246	-	-	27	266
Ariz.	2	1	0	0	4	3	-	-	6	4
Utah	-	-	-	-	-	-	-	-	-	-
Nev.	2	+	-	-	-	-	4	2	6	2
Idaho	t	+	t	+	5	134	1	26	6	160
Wash.	t	+	t	+	5	1,210	0	0	5	1,210
Oregon	t	+	t	+	5	342	-	-	5	342
Calif.	-	-	-	-	-	-	-	-	-	-
U. S.	1.61	3,561	8.83	19,488	3.17	7,001	0.49	1,079	18.68	41,239

PEACH

Estimated reduction in yield of peach due to leafcurl (Exoascus deformans), brownrot (Sclerotinia cinerea), yellows and little peach, scab (Cladosporium carpophilum), and other diseases, 1924.

State	Production: 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease													
		Leafcurl		Brownrot		Yellows and little peach		Scab		Other diseases		Sum of traces and no data		All diseases	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
N. H.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mass.	50	2	1	2	1	t	+	t	+	1	+	1	1	6	3
R. I.	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conn.	230	-	-	3	8	1	2	0.5	1	0.5	1	0	0	5	12
N. Y.	2,178	8	192	1	24	t	+	t	+	t	+	0.2	4	9.2	220
N. J.	2,480	5	152	8	242	2	60	1	30	2	60	0	0	18	544
Pa.	1,504	3	50	2.5	41	0.5	8	2	33	-	-	1	16	9	148
Del.	280	1.5	5	1.5	5	0.5	1	2.5	8	5	15	0	0	11	34
Md.	681	3	25	7	57	2	16	2	16	-	-	2	16	16	130
Va.	1,218	1.5	21	6	85	1	14	2	28	3	42	0	0	13.5	190
W. Va.	936	5	51	t	+	t	+	2	20	t	+	1	10	8	81
N. C.	2,070	2	50	8	199	-	-	3	75	4	100	0	0	17	424
S. C.	912	2	30	30	448	-	-	-	-	7	105	0	0	39	583
Ga.	8,342	0.5	47	5	477	0	0	2	191	5	477	0	0	12.5	1,192
Fla.	176	-	-	-	-	0	0	-	-	-	-	-	-	-	-
Ohio	660	3	22	5	38	-	-	2	15	3	23	-	-	13	98
Ind.	175	1	2	-	-	0	0	-	-	-	-	5	9	6	11
Ill.	525	1	6	1	6	0	0	t	+	3	16	0	0	5	28
Mich.	464	10	54	2	11	t	+	1	5	1	6	0	0	14	76
Iowa	2	t	+	t	+	0	0	-	-	-	-	1	+	1	+

State	Production 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease													
		Leafcurl		Brownrot		Yellows and little peach		Scab		Other diseases		Sum of traces and no data		All diseases	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Mo.	910	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kans.	231	3	7	1	2	0	0	t	+	0.5	1	0	0	4.5	10
Ky.	1,134	t	+	4	49	t	+	3	37	-	-	1	12	8	98
Tenn.	1,826	0.1	2	5	97	0	0	0.1	2	-	-	1	19	6.2	120
Ala.	1,425	t	+	10	162	0	0	1	16	1	16	0	0	12	194
Miss.	996	t	+	4	44	0	0	1	11	5	55	0	0	10	110
La.	325	0	0	5	18	0	0	t	+	5	18	0	0	10	36
Texas	3,000	1	34	1.5	51	0	0	3	102	6	203	0	0	11.5	390
Okla.	1,837	1	20	5	98	-	-	1	20	t	+	0	0	7	138
Ark.	2,800	2	65	7	228	-	-	3	97	2	65	0	0	14	455
Colo.	920	0	0	-	-	0	0	0	0	2	18	-	-	2	18
N. Mex.	34	t	+	2	1	0	0	-	-	25	9	0	0	27	10
Ariz.	45	4	2	0	0	0	0	0	0	5	2	0	0	9	4
Utah	750	-	-	-	-	0	0	-	-	-	-	-	-	-	-
Nev.	1	-	-	-	-	0	0	-	-	-	-	-	-	-	-
Idaho	102	t	+	0	0	0	0	0	0	1	2	0.5	+	1.5	2
Wash.	364	t	+	t	+	0	0	0	0	1	4	0.5	2	1.5	6
Oregon	189	1	2	t	+	0	0	0	0	2	3	-	-	3	5
Calif.	11,875	-	-	-	-	0	0	-	-	-	-	-	-	-	-
U. S.	51,679	1.47	840	4.19	2,392	0.18	101	1.24	707	2.14	1,241	0.19	89	9.41	5,370

PEAR

Estimated reduction in yield of pear due to fireblight (*Bacillus amylovorus*), scab (*Venturia pyrina*), leafblight (*Fabraea maculata*), and other diseases, 1924

State	Production 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease											
		Fireblight		Scab		Leafblight		Other diseases		Sum of traces and no data		All diseases	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Me.	12	-	-	-	-	-	-	-	-	-	-	-	-
N. H.	17	t	+	0.5	+	-	-	-	-	2	+	2.5	+
Vt.	12	1	+	2	+	-	-	t	+	0	0	4	+
Mass.	84	1	1	3	2	t	+	-	-	1	1	5	4
R. I.	12	-	-	-	-	-	-	-	-	4	+	4	+
Conn.	62	1	1	2	1	1	+	1	1	0	0	5	3
N. Y.	2,100	1	21	t	+	-	-	1	21	0	0	2	42
N. J.	624	t	+	3	24	20	163	-	-	0.5	4	23.5	191
Pa.	629	1	6	-	-	-	-	-	-	-	-	1	6
Del.	328	1.5	6	-	-	6	24	10	39	0	0	17.5	69
Md.	335	8.5	32	1	4	-	-	-	-	2	7	11.5	43
Va.	430	-	-	-	-	-	-	-	-	-	-	-	-
W. Va.	84	4	4	1	1	t	+	t	+	1	+	6	5
N. C.	273	20	70	-	-	-	-	-	-	2	7	22	77
S. C.	114	50	121	1	2	-	-	2	5	0	0	53	128
Ga.	232	50	257	t	+	0	0	5	26	0	0	55	283
Fla.	55	-	-	-	-	-	-	-	-	-	-	-	-
Ohio	326	3	11	3	10	-	-	2	7	0	0	8	28
Ind.	180	-	-	-	-	-	-	-	-	7	13	7	13
Ill.	410	7	30	t	+	t	+	0	0	0	0	7	30
Mich.	810	2	17	5	43	t	+	t	+	0	0	7	60
Wis.	15	t	+	t	+	0	0	t	+	1	+	1	+
Iowa	40	t	+	-	-	-	-	-	-	t	+	t	+

State	Production: 1924 Bushels (000 omitted)	Estimated reduction in yield due to disease											
		Fireblight		Scab		Leafblight		Other diseases		Sum of traces and no data		All diseases	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Mo.	375	-	-	-	-	-	-	-	-	-	-	-	-
Nebr.	30	2	+	0	0	0	0	-	-	-	-	2	+
Kans.	262	2	5	-	-	t	+	-	-	-	-	2	5
Ky.	117	15	20	t	+	t	+	-	-	0	0	15	20
Tenn.	250	50	255	0	0	1	5	-	-	0	0	51	260
Ala.	224	20	59	t	+	t	+	4	11	0	0	24	70
Miss.	187	35	102	t	+	t	+	1	3	0	0	36	105
La.	65	30	28	-	-	-	-	-	-	2	2	32	30
Texas	483	4	21	0	0	0	0	6	32	0	0	10	53
Okla.	235	5	13	1	2	0	0	-	-	-	-	6	15
Ark.	124	60	212	-	-	-	-	5	18	0	0	65	230
Colo.	550	-	-	-	-	-	-	-	-	-	-	-	-
N. Mex.	28	t	+	-	-	-	-	25	9	0	0	25	9
Ariz.	11	5	1	0	0	0	0	2	+	0	0	7	1
Utah	70	-	-	-	-	-	-	-	-	-	-	-	-
Nev.	6	-	-	-	-	-	-	-	-	-	-	-	-
Idaho	60	t	+	t	+	0	0	-	-	t	+	t	+
Wash.	1,600	t	+	t	+	0	0	4	66	0	0	4	66
Oregon	1,225	1	12	t	+	0	0	t	+	-	-	1	12
Calif.	4,875	-	-	-	-	-	-	-	-	-	-	-	-
U. S.	17,961	6.58	1,305	0.45	89	0.97	192	1.20	238	0.17	34	9.37	1,858

PLUM AND PRUNE

Estimated reduction in yield of plum and prune due to brownrot (*Sclerotinia cinerea*), and other diseases, 1924.

State	Estimated reduction in yield due to disease			
	Brownrot	Other diseases	Sum of traces and no data	All diseases
	%	%	%	%
Vt.	2	-	-	2
Mass.	5	2	-	7
Conn.	2	1	0	3
N. Y.	1	1	0	2
N. J.	15	-	0	15
Pa.	1.5	-	-	1.5
Del.	1	6	0	7
Md.	7	-	-	7
W. Va.	3	2	0	5
Ga.	2	1	0	3
Ohio	11	2	0	13
Ill.	5.5	1	0	6.5
Mich.	15	1	0	16
Wis.	10	t	0	10
Minn.	3	2	0	5
Iowa	25	t	0	25
N. Dak.	1	4	0	5
S. Dak.	2	2	0	4
Nebr.	5	2	0	7
Kans.	3	1	0	4
Ky.	4	2	0	6
Tenn.	5	-	-	5
Ala.	20	-	-	20
Miss.	2	1	0	3
Texas	1	4	0	5
Okla.	5	2	-	7
Ark.	7.5	1	0	8.5
N. Mex.	-	10	0	10
Ariz.	0	4	0	4
Idaho	0	7	0	7
Wash.	t	2	0	2
Oregon	t	3	0	3

CHERRY

Estimated reduction in yield of cherries due to brownrot (<u>Sclerotinia cinerea</u>), leafspot (<u>Coccomyces hiemalis</u>), and other diseases, 1924.

State	Estimated reduction in yield due to disease				
	Brownrot	Leafspot	Other diseases	Sum of traces and no data	All diseases
	%	%	%	%	%
Mass.	5	1	-	-	6
Conn.	4	0	1	0	5
N. Y.	2	2	0.3	0	4.3
N. J.	10	5	-	0	15
Pa.	20	-	-	-	20
Del.	0.5	0.5	4	0	5
W. Va.	t	t	t	1	1
Ga.	4	t	1	0	5
Ohio	3	9	1	0	13
Ill.	5	1.5	0	0	6.5
Mich.	5	5	1	0	11
Wis.	1	t	2	0	3
Iowa	5	5	5	0	15
S. Dak.	-	-	t	-	t
Nebr.	3	5	-	0	8
Kans.	1	3	0.5	0	4.5
Ky.	t	4	-	-	4
Tenn.	2	15	-	0	17
Okla.	2	2	1	-	5
Ark.	2.5	4.5	2	0	10
Mont.	0	t	-	t	t
N. Mex.	1	-	15	0	16
Ariz.	0	0	0	0	0
Idaho	0	0	1	0	1
Wash.	t	t	2	0	2
Oregon	t	t	1	1	2

RASPBERRY

Estimated reduction in yield of raspberries due to mosaic and leafcurl (cause unknown), and other diseases, 1924.

	Estimated reduction in yield due to disease			
State	Mosaic and Leafcurl	Other diseases	Sum of traces and no data	All diseases
	%	%	%	%
Vt.	5	5	0	10
Mass.	15	2	0	17
Conn.	4	2	0	6
N. Y.	15	5	0	20
N. J.	20	6	0	26
Pa.	-	8	10	18
Del.	1	1	0	2
Md.	3	8	0	11
W. Va.	-	4	2	6
Ohio	-	2	4	6
Ind.	-	10	0	10
Ill.	0.75	6	0	6.75
Mich.	10	15	0	25
Wis.	6	10	0	16
Minn.	15	10	0	25
Iowa	8	22	0	30
N. Dak.	2	2	0	4
S. Dak.	t	-	0	t
Kans.	-	15	0	15
Ky.	-	10	0	10
Tenn.	-	10	0	10
Miss.	-	1	-	1
Texas	-	10	-	10
Okla.	-	5	-	5
Ark.	-	25	-	25
Mont.	t	1	t	1
N. Mex.	-	1	0	1
Ariz.	0	0	0	0
Idaho	5	5	0	10
Wash.	10	2	0	12
Oregon	t	2	-	2

THE PLANT DISEASE REPORTER

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Supplement 44

Index to Supplements 39-43

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BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

INDEX OF ORGANISMS AND NON-PARASITIC DISEASES
IN
PLANT DISEASE REPORTER
SUPPLEMENTS XXXIX - XLIII, 1925

Plant Disease Reporter
Supplement 44

November 1, 1925

Prepared by Mary G. Van Meter

ERRATA AND EXPLANATION

Page

34, 94, 100 Read "Septobasidium pedicellatum" instead of "S. pedicillatum".

34 Read "Septobasidium retiforme" instead of "S. retiformis".

85 Read "Nectria ditissima" instead of "N. distissima".

86 Read "Sclerotinia" instead of "Sclerctinia".

88 Read "Exobasidium vaccinii" instead of "E. vaccini".

93 Read "Colletotrichum" instead of "Golletotrichum".

94 Read "Botrytis cinerea" instead of "B. cinera".

101 Read "*Glomerella cingulata*" instead of *Gloeosporium* cingulata."

135 Read "Colletotrichum graminicolum" instead of "C. gramincolum".

140 Read "Epicoccum" instead of "Epiccocum".

190 Read "Chaetochloa" instead of "Chaerochloa".

195 and 285 Peronospora trifoliorum D By. is reported on peas in Wisconsin. This report is an error due to misinterpretation of a statement by Wisconsin collaborators. As far as we know, therefore, there is only one downy mildew, *P. viciae*, on pea in this country.

246 Read "Phaseolus" instead of "Phaseoli".

270 Read "*Bacillus* tracheiphilus" instead of "*Bacterium* tracheiphilus".

317 Read "Cephalotaxus drupacea" instead of "C. dripaceae".

318 Read "Cupressus sempervirens var. pyramidalis" instead of "C. sempervirens var. pryamidalis".

Read "Cupressus sempervirens" instead of "C. sempervirnos".

322 Read "Armillaria mellea" instead of "Armillaria mella".

325 Read "Pinus resinosa" instead of "Pinus rosinosa".

331 Read "Crataegus douglasii" instead of "Cylindrosporium douglasii (Black hawthorn)".

332 Read "Uncinula clintonii" instead of "Unicinula clintoni".

Page	
336	Read "Quercus rubra ambigua" instead of "Q. rubra ambiguii".
338	Read "Pithecollobium" instead of "Pithecollobrium".
339	Read "Cytospora chrysosperma" instead of "C. chrusosperma".
344 and 373	Read "Puccinia helianthi" instead of "P. helanthi".
347	Read "Phyllosticta auerswaldii" instead of "P. suerswaldii".
354	Read "Rhabdadenia" instead of "Rhadbadenia".
366	Read "Symphoricarpos" instead of "Symphoricarpus".
367	Read "Thielavia basicola" instead of "Thielavia basicicola".
368	Read "Tranzschelia" instead of "Tranzschellia".
369	Read "Boerhaavia erecta" instead of "B. errecta".
	Read "Boehmeria" instead of "Boehmeriae".
370	Read "Chamaedaphne" instead of "Chamaedaphine".
371	Read "Ceratonia siliqua" instead of "Ceratoni siliqum".
373	Read "Peronospora pygmaea" instead of "P. pygmea".
374	Read "Melilotus" instead of "Meliotus".
377	Read "Rumex" instead of "Rumux".
379	Read "Thalictrum dioicum" instead of "T. dioicium".
382	Read "Gibberella saubinetii" instead of "G. saubinetti".
398	Read "Bacterium solanacearum" instead of "Bacillus solanacearum".
401	Under Grape, eliminate "000 omitted" under tons. All figures are in tons of grapes rather than in thousands of tons.