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Supplement 83

Crop Losses from Plant Diseases in the United States in

1928, 1929, 1930.

April 1, 1932



BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

ESTIMATES OF CROP LOSSES FROM DISEASES IN THE
UNITED STATES - 1928, 1929, and 1930.

Compiled by

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FOREWORD

The summaries of crop loss estimates for the years 1928 to 1930, inclusive, are presented herewith largely in response to the requests of various pathologists. The limitations of the estimates furnished by collaborators and compiled by the Plant Disease Survey were so obvious that after 1927 their regular publication was discontinued. Since that time, there have been numerous requests for their publication, especially from Extension Pathologists, who felt that, in spite of their admitted inadequacy, they were worth presentation as the best obtainable.

In conformity with previous practice, the estimates are expressed in percentage of loss, or in commercial units - never in dollars, because of complex economic considerations which this would involve.

In general the crop loss estimates as originally furnished by collaborators to the Plant Disease Survey have been computed and issued in tabular form as preliminary estimates. These have been sent back to the collaborators for their revision and suggestions. It is, of course, recognized that most of the figures are estimates in the strict sense of the word, that is, they are usually not the results of counts or calculation but of field observations.

In most cases the losses are presented both in percentage and in commercial units. Those cases, where they are presented only in percentage, are due to lack of satisfactory production figures.

The most serious weakness of these estimates is that many States make no reports. Computations are in all cases based on States reporting, thus where an average is given for "U. S." it should be interpreted as meaning "for the reporting area."

The basis for computation has been the production assumed to have been possible if it were not for disease. The actual production is taken to represent 100% minus the sum of the percentages of loss from all diseases of the crop in question. The possible production is obtained by dividing the actual production by 100% minus the total percentage of loss from all diseases of the crop.

$$\text{Thus: Possible production} = \frac{\text{Actual production}}{100\% - \% \text{ loss from all diseases of crop}}$$

The estimated reduction in yield from a given disease, then, is obtained by multiplying the estimated possible crop production by the estimated percentage loss from the disease.

$$\text{Thus: Estimated crop loss from given disease} = \text{Possible production} \times \% \text{ individual disease loss}$$

The percentage loss for the United States is obtained by dividing the total reduction in yield (sum of the State losses) by the possible production for the country (total actual production plus the total reduction in yield from all diseases of the crop).

The figures for the yield of various crops were taken directly from the statistics of important crops by States given in the publication, "Crops and Markets", issued by the United States Department of Agriculture. These are usually published in the December issue. The method of computation, while somewhat time-consuming, makes possible a percentage loss estimate representing the entire reporting area.

Examples are given below:

EXAMPLES

I. Loss from wheat diseases in Kansas in 1919:

Actual production for State: 151,001,000 bushels.

Total estimated percentage loss from diseases: 15.5.

Possible production: $\frac{151,001,000}{100\% - 15.5\%} = 178,699,000$ bushels.

EXAMPLE I (Continued)

Reduction in yield from all diseases:

$$15.5\% \times 178,699,000 = 27,698,000 \text{ bushels.}$$

Estimated percentage loss from stem rust: 10.

Reduction in yield from stem rust:

$$10\% \times 178,699,000 = 17,869,900 \text{ bushels.}$$

II. Percentage loss from stem rust and from all diseases of wheat in the United States in 1919:

Total actual production for country: 940,987,000 bushels.

Sum of calculated State losses from all diseases (total reduction in yield): 192,275,000 bushels.

Possible total production for country:

$$940,987,000 + 192,275,000 = 1,133,262,000 \text{ bushels.}$$

Percentage loss from all diseases: $\frac{192,275,000}{1,133,262,000} = 17.$

Sum of calculated State losses from stem rust: 71,417,000 bushels.

Percentage loss from stem rust: $\frac{71,417,000}{1,133,262,000} = 6.3$

As already suggested we will be glad to receive suggestions either regarding the material contained herein or the compilation of future estimates.

Neil E. Stevens.

Estimated reduction in yield of wheat due to diseases, 1928.

Estimated reduction in yield of wheat due to diseases											
Production:	Scab	Leaf Rust	Stem Rust	Stinking Smut	Loose Smut	All Diseases					
: 1,000 Bushels	: 1,000 Bushels: %	: 1,000 Bushels: %	: 1,000 Bushels: %	: 1,000 Bushels: %	: 1,000 Bushels: %	: 1,000 Bushels: %					
*Maine	80: -	-	-	-	-	-					
*Vt.	16: -	-	-	-	-	-					
N. Y.	4,702: 5.	264: 5.	-	1.	53: t	+ : 11+ :					
*N. J.	1,200: -	-	-	-	-	-					
Penna.	17,171: 3.5	716: 4.5	t	4.	819: 1.5	307: 16.1:					
Del.	1,836: 1.	19: t	+	2.0	30: t	+ : 3.5:					
Md.	8,745: 6.	681: 0.5	57: 1.5	4	454: 0.5	57: 2.3:					
Va.	9,758: 1.	108: 3.0	325: 0.5	3.0	325: 2.5	271: 10.:					
W. Va.	1,586: 0	0: t	+	0	0: t	+ : 5.:					
N. C.	5,150: 1	57: 2.5	142: t	3	171: 1.	57: 9.5:					
*S. C.	800: -	-	-	-	-	-					
Ohio	9,475: 0.1	10: 0.5	49: 0.25:	1.0	98: 1.0	98: 2.95:					
Ind.	9,59: 15.	1,733: 1.0	116: t	0.5	58: 0.5	53: 17.0:					
Ill.	24,200: 2.2	551: 0.8	200: t	t	+	100: 3.4:					
Mich.	14,202: 1.	150: 1.5	225: t	1.0	150: 2.0	301: 5.5:					
Wis.	2,141: 1.	22: t	+	0.5	11: t	+ : 3.:					
Minn.	23,955: 1.	262: 0.5	131: 2.	1.	262: 1.0	262: 8.5:					
Iowa	8,270: 1.	87: 3.0	262: 0	0: 0.2	17: 1.0	87: 5.2:					
Mo.	19,194: 2.5	497: t	+	t	+	199: 3.5:					
N. Dak.	142,923: 1.25	1,958: t	+	0.5	3,133: 2.0	3,133: 8.75:					
S. Dak.	34,546: -	-	+	t	-	-					
Neb.	69,919: 0	0: t	+	t	2,185: t	+ : 4.:					
Kan.	177,833: t	+	7,984: t	2.9	5,788: t	+ : 10.9:					
*Ky.	920: -	-	-	-	-	-					
*Ga.	1,034: -	-	-	-	-	-					

State	Estimated reduction in yield of wheat due to diseases											
	Production: : 1,000 : Bushels	Scab : 1,000 : Bushels	Leaf Rust : 1,000 : Bushels	Stem Rust : 1,000 : Bushels	Stinking : 1,000 : Bushels	Loose Smut : 1,000 : Bushels	All Diseases : 1,000 : Bushels					
*Tenn.	3,714	-	-	-	-	-	-	-	-	-	-	-
*Ala.	44	-	-	-	-	-	-	-	-	-	-	-
*Miss.	60	-	-	-	-	-	-	-	-	-	-	-
Tex.	22,176	-	0.5	122	0.5	122	487	9.	-	-	-	2,193
*Okla.	59,576	-	-	-	-	-	-	-	-	-	-	-
*Ark.	253	-	-	-	-	-	-	-	-	-	-	-
Mont.	77,218	0	1.	821	0.1	82	82	6.	-	-	-	4,928
Wyo.	4,098	0	-	-	2.	84	-	-	-	-	-	84
Colo.	18,564	0	t	-	t	574	t	3.0	-	-	-	574
*N. Mex.	2,054	0	-	-	-	-	-	-	-	-	-	-
Ariz.	1,269	0	t	-	11.0	163	44	0.3	-	-	-	211
Utah	6,861	0	t	-	2.	14	217	2	-	-	-	376
*Nev.	482	0	-	-	-	-	-	-	-	-	-	-
Idaho	28,792	0	-	-	-	-	1,212	1	-	-	-	1,515
Wash.	46,644	0	t	-	t	+	1,003	t	-	-	-	1,504
Ore.	23,310	0	t	-	0	0	721	t	-	-	-	721
Calif.	16,380	0	1	179	2	358	90	t	-	-	-	1,522
U. S.	902,749	0.8	1.4	11,798	0.3	2,511	18,449	0.7	-	-	-	67,637

1929 - WHEAT

Estimated reduction in yield of wheat due to diseases

State	Estimated reduction in yield due to diseases											
	Produc- tion	Scab	Leaf Rust	Stem Rust	Bunt	Loose Smut	All Diseases					
	: 1,000	: Bushels	: %	: Bushels	: %	: Bushels	: %	: Bushels	: %	: Bushels	: %	: Bushels
*Maine	92	-	-	-	-	-	-	-	-	-	-	-
*Vt.	18	-	-	-	-	-	-	-	-	-	-	-
*N. Y.	4,564	-	-	-	-	-	-	-	-	-	-	-
*N. J.	1,178	-	-	-	-	-	-	-	-	-	-	-
Pa.	20,138	0.5	132:15.	3,964	0.5	132: 2.	529: 1.8	476:23.8	6,290	476:23.8	6,290	476:23.8
Del.	1,919	t	+	+	0	0: 0.5	10: t	+	1.5	+	1.5	+
Md.	9,468	1.5	159: 0.5	53	t	+	4.	423: 0.5	1,111	53:10.5	1,111	53:10.5
Va.	8,960	2.	201: 3.	302	0.5	50: 3.	302: 2.5	252:11.	1,107	252:11.	1,107	252:11.
*W. Va.	1,762	-	-	-	-	-	-	-	-	-	-	-
N. C.	5,347	0.5	30: 3.5	211	0.5	30: 4.	241: 1.5	91:11.5	694	91:11.5	694	91:11.5
S. C.	768	t	+	+	3.	+	0	+	3.	+	3.	+
*Ga.	850	-	-	-	-	-	-	-	-	-	-	-
Ohio	33,770	1.	357: 0.5	179	1.5	536: 1.5	536: 1.	357: 5.5	1,965	357: 5.5	1,965	357: 5.5
Ind.	27,723	3.	929: 4.	1,239	0.5	155: 0.5	155: 0.5	155:10.5	3,252	155:10.5	3,252	155:10.5
Ill.	36,537	2.5	958: 0.5	192	0.5	192: t	+	0.7	1,802	268: 4.7	1,802	268: 4.7
Mich.	16,810	1.5	259: 1.	172	t	+	t	+	2.5	+	2.5	+
Wis.	2,190	0.5	12: 1.5	36	4.5	106: 0.4	9: t	+	7.5	+	7.5	+
Minn.	19,944	0.5	122: 0.5	122:15.	3,671	1.5	367: t	+	18.5	+	18.5	+
Iowa	8,794	0.4	39: 8.	779	0.3	29: t	+	1.0	944	97: 9.7	944	97: 9.7
Mo.	17,300	4.	771: 1.	193	t	+	t	+	10.2	771:10.2	1,966	771:10.2
N. D.	93,396	1.	1,017: t	+	1.	1,017: 1.5	1,526: 2.5	2,543: 8.2	8,341	2,543: 8.2	8,341	2,543: 8.2

Estimated reduction in yield due to diseases											
State	Production	Scab	Leaf Rust	Stem Rust	Bunt	Loose Smut	All Diseases				
: 1,000	: %	: Bushels	: %	: Bushels	: %	: Bushels	: %				
: Bushels	: %	: Bushels	: %	: Bushels	: %	: Bushels	: %				
S. D.	30,247	-	-	-	-	-	-	-	-	-	-
Nebr.	55,555	t	t	935	3.	1,749	0	0:3.	0:3.	1,749	935
Kans.	130,060	2.	3,156: 3.	4,733: 1.	1,578: 3.	4,733: t	t	+12.5	+12.5	19,722	19,722
*Ky.	2,832	-	-	-	-	-	-	-	-	-	-
Tenn.	3,645	2.	76: t	+ t	+ t	+ 0.5	0.5	19: 4.	19: 4.	152	152
*Ala.	40	-	-	-	-	-	-	-	-	-	-
*Miss.	68	-	-	-	-	-	-	-	-	-	-
Tex.	37,800	0.5	198: 0.5	198: 0.5	198: 1.	396: 1.	1.	396: 4.5	396: 4.5	1,782	1,782
*Okla.	44,478	-	-	-	-	-	-	-	-	-	-
*Ark.	312	t	+ t	+ t	+ t	+ t	-	-	-	-	-
Mont.	40,098	-	-	-	-	-	-	-	-	-	-
*Wyo.	3,331	-	-	-	-	-	-	-	-	-	-
Colo.	18,012	0	0: t	+ t	+ 0.2	36: t	t	+ 0.2	+ 0.2	36	36
*N. Mex.	5,742	-	-	-	-	-	-	-	-	-	-
*Ariz.	1,134	-	-	-	-	-	-	-	-	-	-
*Utah	6,403	-	-	-	-	-	-	-	-	-	-
*Nev.	404	-	-	-	-	-	-	-	-	-	-
Idaho	25,515	-	-	-	-	-	-	-	-	-	-
Wash.	44,910	-	-	-	-	-	-	-	-	-	-
Ore.	23,114	0	0: t	+ 0	0: 3.	730: t	t	+ 5.	+ 5.	1,217	1,217
Calif.	12,240	0	0: t	+ t	+ 0.5	62: t	t	+ 0.5	+ 0.5	62	62
U. S.	806,508	1.1	8,416: 1.6	12,397: 1.1	8,629: 2.1	16,444: 0.7	5,657: 8.2	64,532	64,532		

Estimated reduction in yield due to diseases													
State	Production	Scab	Leaf Rust	Stem Rust	Bunt	Loose Smut	All Diseases						
	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :						
	: Bushels :	: Bushels :	: Bushels :	: Bushels :	: Bushels :	: Bushels :	: Bushels :						
	%	%	%	%	%	%	%						
*Maine	66	-	-	-	-	-	-						
*Vt.	20	-	-	-	-	-	-						
N. Y.	4,800	-	-	-	-	-	-						
*N. J.	1,222	-	-	-	-	-	-						
Pa.	25,236	-	-	t	+	2.	523: 1.5						
Ohio	28,716	1.	301: 0.5	150: 0.5	150: 1.5	451: 1.	301: 4.5						
Ind.	29,058	0	0: t	+	t	+	593: 2.						
Ill.	41,952	-	1.5	644: t	+	-	129: 2.3						
Mich.	19,336	t	+	+	+	202: 2.6	40: 4.1						
Wisc.	2,331	0.1	2: 0.1	2: 0.7	17: 1.5	36: 0.1	2: 4.						
Minn.	21,525	1.	238: t	+	882: 3.5	834: t	+						
*Iowa	8,937	-	-	0	0	-	+						
Mo.	19,830	1.5	317: 0.5	106: t	+	4.	846: 6.						
N. D.	99,807	-	-	+	1,551: 2.	2,069: -	+						
S. D.	40,840	0.5	220: t	+	1,318: 2.03	892: 1.5	659: 7.03						
Nebr.	73,275	t	+	380: 1.	759: 2.	1,519: t	+						
Kans.	158,862	t	+	5,281: 1.5	2,640: 2.	3,520: 0.25	440: 9.75						
Del.	2,067	t	+	10: -	0.5	10: t	+						
Md.	11,707	1.	126: 0.5	63: t	+	4.	63: 7.						
Va.	9,982	1.5	165: 2.	219: 0.5	55: 3.	329: 2.	219: 9.						
W. Va.	2,345	-	-	-	-	-	62: 5.5						
N. C.	4,208	0.5	23: 4.	186: t	+	2.	+						
*S. C.	538	-	-	-	-	-	+						

Estimated reduction in yield due to diseases													
State	Production	Scab	Leaf Rust	Stem Rust	Bunt	Loose Smut	All Diseases						
: Bushels:	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: Bushels:	: Bushels:	: Bushels:	: Bushels:	: Bushels:	: Bushels:
%	%	%	%	%	%	%	%	%	%	%	%	%	%
Ga.	58:	-	10.	66:	-	-	1.5:	10:11.5:	-	-	-	-	76
Ky.	3,284:	t	+	+	+	+	+	+	+	+	+	+	33
*Tenn.	3,542:	-	-	-	-	-	-	-	-	-	-	-	-
*Ala.	40:	-	-	-	-	-	-	-	-	-	-	-	-
*Miss.	68:	-	-	-	-	-	-	-	-	-	-	-	-
Ark.	351:	-	t	+	+	+	0.5:	2: 0.5:	-	-	-	-	2
*Okla.	33,696:	0	0:	-	-	-	-	-	-	-	-	-	-
Tex.	28,270:	0.5	151: 0.1:	30: 1.	301: 0.5:	151: 1.	1.:	301: 6.2:	1,000:	1,000:	1,000:	1,000:	1,868
Mont.	33,698:	0	0: 0.1:	35:	+	+	1.5:	530: 0.5:	177:	4.7:	1,661:	1,661:	1,661
*Idaho	28,223:	0	0:	-	-	-	-	-	-	-	-	-	-
*Wyo.	3,565:	0	0:	-	-	-	-	-	-	-	-	-	-
Colo.	21,780:	0	0:	-	+	+	2.	444:	+	2.	444:	444:	444
*N. Mex.	1,921:	0	0:	-	-	-	-	-	-	-	-	-	-
*Ariz.	1,268:	0	0:	-	-	-	-	-	-	-	-	-	-
*Utah	6,999:	0	0:	-	-	-	-	-	-	-	-	-	-
*Nev.	386:	0	0:	-	-	-	-	-	-	-	-	-	-
*Wash.	40,065:	0	0:	-	-	-	-	-	-	-	-	-	-
*Ore.	23,391:	0	0:	-	-	-	-	-	-	-	-	-	-
*Calif.	13,020:	0	0:	-	-	-	-	-	-	-	-	-	-
U. S.	850,965:	0.2:	1,543: 1.	7,172: 1.1:	7,875: 1.7:	12,429: 0.6:	5.7:	4,309:	5.7:	41,433:	41,433:	41,433:	41,433

Estimated reduction in yield of barley due to diseases													
State	Production:	Stripe	Loose Smut	Covered Smut	Leaf Rust	Stem Rust	All Disease						
	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000						
	: Bushels	: Bushels	: Bushels	: Bushels	: Bushels	: Bushels	: Bushels						
	%	%	%	%	%	%	%						
N. D.	55,564 : 0.5	286 : 1.	573 : 1.	573 :	-	t	1,718						
S. D.	35,675 :	-	-	-	-	0.5	179						
Neb.	14,018 : t	+ : t	+ :	+ :	0	t	+						
Kans.	17,661 : 1.0	183 : 1.	183 :	183 :	0	0	641						
*Ky.	50 :	-	-	-	-	-	-						
*Tenn.	420 :	-	-	-	-	-	-						
Tex.	3,276 : 0.1	4 : 1.	36 : 1.	36 :	-	-	368						
*Okla.	506 :	-	-	-	-	-	-						
Mont.	6,374 : 2.	136 : 1.	68 : 3.	203 :	0	0	407						
*Wyo.	2,310 :	-	-	-	-	t	-						
Colo.	13,128 : 0.5	67 : 1.	134 :	-	-	t	268						
*N. Mex.	228 :	-	-	-	-	-	-						
Ariz.	646 : t	+ : 0.5	3 : 1.5	10 :	0	0.5	16						
Utah	1,666 : 5.	89 :	-	18 :	-	t	107						
*Nev.	440 :	-	-	-	-	-	-						
Idaho	6,192 :	-	+ : 1.	63 :	-	-	94						
Wash.	1,952 : 0.3	6 : -	- : 0.2	4 :	-	-	20						
Ore.	3,675 : 0.2	8 : t	+ : 2.	75 :	t	t	94						
Calif.	31,842 : 3.	1,137 : 0.5	190 : 5.0	1,895 :	0.5	190 : t	6,065						
U. S.	356,868 : 1.3	4,763 : 0.6	2,225 : 5.2	4,164 :	0.1	394 : 0.1	20,699						

* Omitted from calculations for U. S. percentage losses.

Estimated reduction in yield due to diseases													
State	Introdu- tion	Stripe	Loose Smut	Covered Smut	Leaf Rust	Stem Rust	All Diseases						
	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000						
: Bushels	: Bushels	: Bushels	: Bushels	: Bushels	: Bushels	: Bushels	: Bushels	%	%	%	%	%	%
Nebr.	18,892:	0:	0:	+	+	0:	0:	0:	0:	0:	0:	0:	+
Kans.	12,464:	1.5:	199:	133:	2.5:	332:	-	-	-	-	-	6:	797
*Ky.	206:	-	-	-	-	-	-	-	-	-	-	-	-
Tenn.	480:	t	+	8:	1.5:	8:	-	-	-	-	-	4.5:	24
Tex.	5,075:	2:	109:	55:	1:	55:	1:	55:	-	-	-	7:	383
*Okla.	1,425:	-	-	-	-	-	-	-	-	-	-	-	-
Mont.	4,016:	1:	42:	42:	2:	84:	0:	0:	0:	0:	0:	4:	168
*Wyo.	3,348:	-	-	-	-	-	-	-	-	-	-	-	-
Colo.	13,671:	t	+	+	t	+	0:	0:	t	+	0.1:	-	14
*N. Mex.	325:	-	-	-	-	-	-	-	-	-	-	-	-
*Ariz.	630:	-	-	-	-	-	-	-	-	-	-	-	-
*Utah	1,560:	-	-	-	-	-	-	-	-	-	-	-	-
*Nev.	363:	-	-	-	-	-	-	-	-	-	-	-	-
Idaho	5,732:	t	+	29:	0.5:	29:	-	-	-	-	-	1.5:	87
Wash.	2,142:	t	+	-	t	+	-	-	-	-	-	t	+
Ore.	4,292:	t	+	+	3:	136:	t	+	t	+	5:	226	
Calif.	29,363:	3:	908:	+	t	+	t	+	t	+	3:	908	
U. S.	307,105:	1.7:	4,525:	2,334:	0.5:	1,488:	t	195:	1.1:	3,067:	5:	13,457	

[illegible]

Estimated reduction in yield of oats due to diseases, 1928.

State	:Produced-: Estimated reduction in yield due to disease									
	: tion	: Loose and	:	:	:	:	:	:	:	:
	: 1,000	: Covered Smuts:	Stem Rust	:	Leaf Rust	:	All Diseases	:	:	:
	: Bushels:	: 1,000	: 1,000	:	: 1,000	:	: 1,000	:	:	:
	:	: %	: Bushels:	%	: Bushels:	%	: Bushels:	%	: Bushels	:
*Maine	: 4,200:	-	: -:	-	: -:	-	: -:	-	: -	:
*N. H.	: 390:	-	: -:	-	: -:	-	: -:	-	: -	:
*Vt.	: 2,686:	-	: -:	-	: -:	-	: -:	-	: -	:
Mass.	: 224:	10.	: 25:	1.	: 3:	.05:	: +:	12.05:	: 31	:
*R. I.	: 56:	-	: -:	-	: -:	-	: -:	-	: -	:
*Conn.	: 405:	-	: -:	-	: -:	-	: -:	-	: -	:
N. Y.	: 33,660:	7.	: 2,561:	t	: +:	t	: +:	8	: 2,927	:
*N. J.	: 1,500:	-	: -:	-	: -:	-	: -:	-	: -	:
Penna.	: 34,678:	8.	: 3,065:	0.5	: 192:	t	: +:	9.5	: 3,640	:
Del.	: 120:	0.5	: 1:	-	: -:	t	: +:	1.0	: 2	:
Md.	: 1,701:	5.0	: 95:	t	: +:	t	: +:	10.	: 190	:
Va.	: 4,641:	4.0	: 195:	t	: +:	1.	: 49:	5.	: 244	:
W. Va.	: 5,712:	10.	: 714:	0	: 0:	0	: 0:	20.	: 1,428	:
N. C.	: 4,202:	8.	: 365:	-	: -:	-	: -:	8.	: 365	:
S. C.	: 7,751:	5.	: 407:	-	: -:	-	: -:	5.	: 407	:
Ga.	: 5,300:	5.	: 280:	t	: +:	0.5	: 28:	5.5	: 308	:
Fla.	: 191:	3.	: 8:	0	: 0:	20.	: 53:	28.	: 74	:
Ohio	: 89,281:	5.	: 4,749:	0.5	: 474:	0.5	: 474:	6.	: 5,697	:
Ind.	: 93,684:	3.	: 3,022:	t	: +:	1.	: 1,007:	7.	: 7,051	:
*Ill.	: 174,338:	-	: -:	t	: +:	t	: +:	t	: +	:
Mich.	: 56,461:	1.	: 570:	t	: +:	t	: +:	1.	: 570	:
Wis.	: 108,532:	8.	: 9,647:	0.5	: 603:	1.	: 1,206:	10.	: 12,059	:
Minn.	: 153,338:	5.	: 8,156:	t	: +:	0	: 0:	6.	: 9,787	:
Iowa	: 240,040:	7.0	: 18,165:	0	: 0:	0	: 0:	7.5	: 19,463	:
Mo.	: 44,968:	6.0	: 2,870:	-	: -:	t	: +:	6.	: 2,870	:
N. D.	: 59,954:	2.	: 1,246:	0.8	: 499:	1.	: 623:	3.8	: 2,368	:
*S. D.	: 59,211:	-	: -:	t	: +:	0	: 0:	-	: -	:
Nebr.	: 78,936:	1.	: 797:	t	: +:	t	: +:	1.	: 797	:
Kans.	: 37,729:	5.2	: 2,185:	t	: +:	1.	: 420:	10.2	: 4,285	:
*Ky.	: 7,930:	-	: -:	-	: -:	-	: -:	-	: -	:
*Tenn.	: 4,042:	-	: -:	-	: -:	-	: -:	-	: -	:
*Ala.	: 1,225:	-	: -:	-	: -:	-	: -:	-	: -	:
Miss.	: 820:	3.	: 26:	t	: +:	1.	: 9:	5.	: 44	:
La.	: 1,078:	1.	: 13:	0	: 0:	10.	: 127:	15.	: 191	:
Tex.	: 35,751:	2.	: 781:	1.	: 391:	0.5	: 195:	8.5	: 3,321	:
*Okla.	: 23,140:	-	: -:	-	: -:	-	: -:	-	: -	:
Ark.	: 3,410:	2.	: 70:	-	: -:	t	: +:	2.	: 70	:

1928 - Oats Continued

State	Estimated reduction in yield due to diseases									
	: Production :		: Loose and :		: Covered Smuts :		: Stem Rust :		: Leaf Rust :	
	: 1,000 :		: 1,000 :		: 1,000 :		: 1,000 :		: 1,000 :	
	: Bushels :		: Bushels :		: Bushels :		: Bushels :		: Bushels :	
	:	%	:	%	:	%	:	%	:	%
Mont.	20,221	6.	1,444	0	0	0	0	0	16.	3,851
*Wyo.	4,092	-	-	t	+	-	-	-	-	-
Colo.	5,983	4.0	249	t	+	-	-	-	4.	249
*N. Mex.	720	-	-	-	-	-	-	-	-	-
Ariz.	532	2.0	11	t	+	0	0	2.	11	11
Utah	2,475	7.	186	-	-	-	-	7.	186	186
*Nev.	80	-	-	-	-	-	-	-	-	-
Idaho	6,439	3.	199	-	-	-	-	3.	199	199
Wash.	9,447	1.	95	t	+	t	+	1.	95	95
Ore.	10,944	5.	579	t	+	0.1	12	5.5	637	637
Calif.	5,313	t	+	5.	286	t	+	7.	400	400
	:	:	:	:	:	:	:	:	:	:
U. S.	1,449,531	5.	62,776	0.2	2,448	0.3	4,203	6.7	83,817	83,817

Estimated reduction in yield of oats due to diseases

State	Estimated reduction in yield due to diseases							
	: Produc-	Loose and						All
	: tion :	Covered	Smut:	Stem Rust	:	Leaf Rust:	:	Diseases
	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	:	: 1,000 :	: 1,000 :	: 1,000
	:Bushels:	%	:Bushels:	%	:Bushels:	%	:Bushels:	%
Maine	4,880: 5.	:	257: -	:	-: t	:	+: 5.	: 257
*N. H.	400: -	:	-: -	:	-: -	:	-: -	: -
*Vt.	2,738: -	:	-: -	:	-: -	:	-: -	: -
Mass.	266: 8.	:	23: t	:	+: t	:	+: 8.	: 23
*R. I.	60: -	:	-: -	:	-: -	:	-: -	: -
*Conn.	420: -	:	-: -	:	-: -	:	-: -	: -
*N. Y.	24,626: -	:	-: -	:	-: -	:	-: -	: -
*N. J.	1,410: -	:	-: -	:	-: -	:	-: -	: -
Pa.	29,313: 10.	:	3,438: 0.5	:	172: 1.	:	344: 13.	: 4,470
Del.	84: t	:	+: -	:	-: t	:	+: 1.	: 1
Md.	1,333: 5.	:	70: t	:	+: 0.5	:	7: 5.5	: 77
Va.	3,841: 4.	:	162: t	:	+: 0	:	0: 5.	: 202
*W. Va.	5,616: -	:	-: -	:	-: -	:	-: -	: -
N. C.	6,192: 9.	:	612: -	:	-: -	:	-: 9.	: 612
S. C.	11,016: 1.5	:	177: -	:	-: 5.	:	589: 6.5	: 766
*Ga.	9,540: -	:	-: -	:	-: -	:	-: -	: -
Fla.	168: 5.	:	17: -	:	-: 40.	:	134: 50.	: 168
Ohio	49,826: 4.	:	2,091: 0.5	:	261: 0.2	:	105: 4.7	: 2,457
Ind.	54,008: 3.	:	1,687: t	:	+: 1.	:	563: 4.	: 2,250
Ill.	141,738: 6.5	:	10,180: t	:	+: t	:	+: 9.5	: 14,879
Mich.	40,886: t	:	+: 1.	:	426: t	:	+: 4.	: 1,704
Wisc.	85,215: 2.	:	1,909: 6.7	:	6,393: 2.	:	1,909: 10.7	: 10,211
Minn.	153,738: 6.	:	10,249: 3.	:	5,125: t	:	+: 10.	: 17,082
Iowa	219,928: 4.	:	9,359: t	:	+: 2.	:	4,679: 6.	: 14,038
Mo.	33,770: 11.	:	4,221: t	:	+: 1.	:	384: 12.	: 4,605
N. D.	34,812: 2.	:	710: t	:	+: t	:	+: 2.	: 710
*S. D.	64,382: -	:	-: -	:	-: -	:	-: -	: -
*Nebr.	86,304: t	:	+: t	:	+: t	:	+: -	: -
Kans.	28,249: 5.2	:	1,618: t	:	+: 3.	:	933: 9.2	: 2,862
*Ky.	6,235: -	:	-: -	:	-: -	:	-: -	: -
Tenn.	3,546: 2.	:	74: t	:	+: t	:	+: 3.5	: 129
*Ala.	2,320: -	:	-: -	:	-: -	:	-: -	: -
Miss.	1,210: 1.5	:	19: -	:	-: 1.5	:	19: 3.	: 38
La.	1,200: 1.	:	14: 0	:	0: 10.	:	141: 15.	: 211
Tex.	47,096: 2.	:	1,018: 0.5	:	255: 3.	:	1,527: 7.5	: 3,818
*Okla.	20,592: -	:	-: -	:	-: -	:	-: -	: -
Ark.	4,836: 2.	:	99: -	:	-: t	:	+: 2.	: 99
Mont.	9,418: 6.	:	657: -	:	-: -	:	-: 14.	: 1,533
*Wyo.	4,205: -	:	-: -	:	-: -	:	-: -	: -
Colo.	6,572: 0.1	:	7: t	:	+: 0	:	0: 0.1	: 7
*N. Mex.	1,151: -	:	-: -	:	-: -	:	-: -	: -
*Ariz.	480: -	:	-: -	:	-: -	:	-: -	: -
*Utah	2,436: -	:	-: -	:	-: -	:	-: -	: -
*Nev.	70: -	:	-: -	:	-: -	:	-: -	: -
Idaho	6,040: 1.5	:	92: t	:	+: -	:	-: 2.	: 123
Wash.	8,977: 1.	:	91: t	:	+: t	:	+: 1.	: 91
*Ore.	12,464: 5.	:	659: t	:	+: t	:	+: 5.5	: 725
*Calif.	4,437: -	:	-: t	:	+: t	:	+: -	: -
U. S.	1,238,654: 4.6	:	49,510: 1.2	:	12,632: 1.	:	11,334: 7.8	: 84,148

OATS - 1930

Estimated reduction in yield due to diseases

State	Estimated reduction in yield due to diseases									
	: : : : : : : : : :									
	: Produc-: Loose and :									
	: tion : Covered Smut: Stem Rust : Leaf Rust : All Diseases									
	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :
	: Bushels:	% :	: Bushels:	% :	: Bushels:	% :	: Bushels:	% :	: Bushels:	% :
Maine	5,002:	7. :	389:	- :	- :	2. :	111:	10. :	556	
*N. H.	352:	- :	- :	- :	- :	- :	- :	- :	-	
*Vt.	2,652:	- :	- :	- :	- :	- :	- :	- :	-	
Mass.	354:	10. :	36:	t :	+	t :	+	16. :	58	
*R. I.	70:	- :	- :	- :	- :	- :	- :	- :	-	
Conn.	416:	- :	- :	1. :	4:	t :	+	1.5 :	6	
N. Y.	45,234:	4. :	1,885:	- :	- :	- :	- :	4. :	1,885	
*N. J.	1,554:	- :	- :	- :	- :	- :	- :	- :	-	
*Pa.	40,312:	- :	- :	- :	- :	- :	- :	- :	-	
Ohio	64,440:	4. :	2,696:	0.2 :	135:	0.1 :	67:	4.4 :	2,965	
Ind.	57,420:	2. :	1,172:	0 :	0:	- :	- :	2. :	1,172	
*Ill.	153,062:	- :	- :	- :	- :	- :	- :	- :	-	
Mich.	56,316:	2. :	1,161:	0.5 :	290:	t :	+	3. :	1,741	
Wisc.	108,680:	3. :	3,407:	t :	+	0.3 :	341:	4.3 :	4,884	
Minn.	171,351:	3. :	5,411:	0.5 :	902:	t :	+	5. :	9,019	
Iowa	239,655:	- :	- :	0.2 :	480:	- :	- :	0.2 :	480	
Mo.	48,978:	8. :	4,282:	t :	+	0.5 :	268:	8.5 :	4,550	
N. D.	38,598:	- :	- :	t :	+	- :	- :	- :	-	
S. D.	64,844:	2.5 :	1,664:	t :	+	t :	+	2.6 :	1,731	
Nebr.	80,017:	2. :	1,633:	t :	+	t :	+	2. :	1,633	
Kans.	42,104:	6. :	2,871:	t :	+	1. :	478:	12. :	5,741	
*Del.	120:	t :	+	- :	- :	t :	+	- :	-	
Md.	1,592:	5. :	84:	t :	+	0.5 :	8:	5.5 :	92	
Va.	3,800:	4. :	160:	t :	+	1. :	40:	5. :	200	
W. Va.	4,428:	2. :	91:	t :	+	1. :	46:	3. :	137	
*N. C.	6,521:	t :	+	- :	- :	- :	- :	- :	-	
S. C.	9,996:	2. :	205:	0.3 :	31:	0.3 :	31:	2.6 :	267	
Ga.	8,280:	0.1 :	9:	- :	- :	3. :	256:	3.1 :	265	
Fla.	180:	5. :	15:	- :	- :	30. :	90:	40. :	120	
*Ky.	3,488:	- :	- :	- :	- :	- :	- :	- :	-	
*Tenn.	4,340:	- :	- :	- :	- :	- :	- :	- :	-	
*Ala.	1,908:	- :	- :	- :	- :	- :	- :	- :	-	
*Miss.	594:	- :	- :	- :	- :	- :	- :	- :	-	
Ark.	4,875:	10. :	548:	t :	+	t :	+	11. :	603	
*La.	820:	- :	- :	- :	- :	- :	- :	- :	-	
*Okla.	25,732:	- :	- :	- :	- :	- :	- :	- :	-	
Tex.	46,640:	2. :	1,014:	1. :	507:	2. :	1,014:	8. :	4,056	
Mont.	9,205:	6. :	621:	t :	+	- :	- :	11. :	1,138	
*Idaho	6,149:	- :	- :	- :	- :	- :	- :	- :	-	
*Wyo.	3,402:	- :	- :	t :	+	- :	- :	- :	-	
Colo.	7,102:	1. :	71:	0 :	0:	- :	- :	1. :	71	
*N. Mex.	987:	- :	- :	- :	- :	- :	- :	- :	-	
*Ariz.	700:	- :	- :	- :	- :	- :	- :	- :	-	
*Utah	2,310:	- :	- :	- :	- :	- :	- :	- :	-	
*Nev.	72:	- :	- :	- :	- :	- :	- :	- :	-	
*Wash.	10,080:	- :	- :	- :	- :	- :	- :	- :	-	
*Ore.	11,849:	- :	- :	- :	- :	- :	- :	- :	-	
*Calif.	5,495:	- :	- :	- :	- :	- :	- :	- :	-	
U. S.	1,402,026:	2.5 :	29,425:	0.2 :	2,349:	0.2 :	2,750:	3.7 :	43,370	

Estimated reduction in yield of corn due to diseases, 1928.

State	Production: 1,000 Bushels	Estimated reduction in yield due to diseases									
		Smut		Leaf Rust		Root Rot		Ear Rots		All Diseases	
		%	1,000 Bushels	%	1,000 Bushels	%	1,000 Bushels	%	1,000 Bushels	%	1,000 Bushels
*Maine	520	-	-	-	-	-	-	-	-	-	-
*N. H.	560	-	-	-	-	-	-	-	-	-	-
*Vt.	3,520	-	-	-	-	-	-	-	-	-	-
Mass.	1,890	2.	39	t	20	1.	20	t	+	4.	79
*R. I.	390	-	-	-	-	-	-	-	-	-	-
*Conn.	2,310	-	-	-	-	-	-	-	-	-	-
N. Y.	22,100	1.25	285	-	-	1.	228	t	+	3.	684
*N. J.	6,968	-	-	-	-	-	-	-	-	-	-
Penna.	50,037	2.5	1,332	0	0	3.	1,659	3.5	1,935	9.5	5,252
Del.	4,488	0.5	23	-	-	1.5	70	1.5	70	3.5	163
Md.	19,345	0.3	66	t	+	5.	1,103	7.	1,544	12.3	2,713
Va.	45,155	3.	1,489	0	0	3.	1,439	3.	1,489	9.	4,467
W. Va.	16,524	0.5	96	0	0	5.	955	2.	382	13.5	2,579
N. C.	42,642	2.5	1,152	t	+	3.	1,383	2.	922	7.5	3,457
S. C.	17,064	2.	367	-	-	5.	917	-	-	7.6	1,284
Ga.	33,010	t	+	t	+	1.	411	-	-	7.6	3,126
Fla.	7,891	1.	96	t	+	5.	481	5.	481	18.	1,731
Ohio	136,725	4.	5,849	-	-	1.	1,462	1.	1,462	6.5	9,504
Ind.	161,322	0.3	519	-	-	1.	1,731	5.5	9,520	6.8	11,770
*Ill.	367,488	-	-	-	-	-	-	-	-	-	-
Mich.	51,135	1.	517	t	+	t	+	t	+	1.	517
Wis.	91,203	1.5	1,479	t	+	1.	986	1.	986	7.5	7,395
Minn.	143,115	2.	2,951	0	0	t	+	1.	1,475	3.	4,426
Iowa	476,012	4.	22,587	0.2	1,129	0	0	11.5	64,936	15.7	88,652
Mo.	181,540	2.5	4,728	t	+	1.5	2,836	t	+	4.	7,564

State	Production: : 1,000	Estimated reduction in yield due to diseases									
		Smut	Leaf Rust	Root Rot	Ear Rots	All Diseases					
		: 1,000	: 1,000	: 1,000	: 1,000	: 1,000					
		% : Bushels	% : Bushels	% : Bushels	% : Bushels	% : Bushels					
N. D.	24,426	4.0 : 1,018	t	+	-	-	4.	1,018			
*S. D.	93,849	-	-	-	-	-	-	-			
Nebr.	212,701	5. : 11,949	0	0: 1.	2,390 : 5.	11,949 : 11.	11.	26,208			
Kans.	179,118	6. : 12,948	0	0: 5.	10,790 : 4.	8,632 : 17.	17.	36,686			
*Ky.	66,638	-	-	-	-	-	-	-			
*Tenn.	56,842	-	-	-	-	-	-	-			
*Ala.	30,475	-	-	-	-	-	-	-			
Miss.	22,945	0.5 : 132	0.5	132: 5.	1,319 : 2.	527 : 13.	13.	3,429			
La.	21,114	0.5 : 126	t	+: 5.	1,264 : 5.	1,264 : 16.5	16.5	4,171			
Tex.	99,162	0.5 : 542	-	-: 1.	1,004 : 5.	5,419 : 6.5	6.5	9,212			
*Okla.	70,150	-	-	-	-	-	-	-			
*Ark.	33,033	t	+	-	-	-	t	+			
*Mont.	5,206	t	+	0: t	+	0	t	+			
*Wyo.	3,006	-	-	-	-	-	-	-			
*Colo.	18,694	t	+	-	-	-	t	+			
*N. Mex.	3,482	-	-	-	-	-	-	-			
Ariz.	1,014	5. : 53	0	0: 0	0 : 0	0 : 5.	5.	53			
Utah	522	1.5 : 8	-	-	-	-	1.5	8			
*Nev.	44	-	-	-	-	-	-	-			
*Idaho	2,438	-	-	-	-	-	-	-			
*Wash.	1,994	t	+	-: t	+	t	+	+			
*Ore.	2,952	0	0	0: t	+	0	t	+			
Calif.	2,400	15. : 480	t	+: 0	0	-	25.	800			
U. S.	2,839,959	3.1 : 70,881	t	1,261: 1.4	32,578 : 5.	112,993 : 10.3	237,028				

1929 - CORN

Estimated reduction in yield of corn due to diseases

		Estimated reduction in yield due to diseases											
State	: Product--	Smut		Leaf Rust		Brown Spot		Root Rot		Ear Rots		All Diseases	
		: 1,000	: Bushels	: 1,000	: Bushels	: 1,000	: Bushels	: 1,000	: Bushels	: 1,000	: Bushels	: 1,000	: Bushels
* Maine	: 520	-	-	-	-	-	-	-	-	-	-	-	-
* N. H.	: 574	-	-	-	-	-	-	-	-	-	-	-	-
* Vt.	: 3,608	-	-	-	-	-	-	-	-	-	-	-	-
Mass.	: 1,638	1.5	25	t	-	0	-	-	-	-	-	2.5	42
* R. I.	: 420	-	-	-	-	-	-	-	-	-	-	-	-
* Conn.	: 2,365	-	-	-	-	-	-	-	-	-	-	-	-
N. Y.	: 21,024	1.	212	t	-	-	-	-	-	-	-	1.	212
N. J.	: 6,588	0.5	33	-	-	-	-	-	-	-	-	0.5	33
Pa.	: 46,470	3.	1,540	t	-	0	-	0	2.	1,027	4.	2,054	4,878
Del.	: 4,224	0.5	21	-	-	-	-	0.5	0.5	21	0.5	21	63
Md.	: 19,162	0.3	64	t	-	-	-	9.	9.	1,923	1.	214	2,201
Va.	: 44,138	3.	1,455	0	-	0	-	3.	3.	1,455	3.	1,455	4,365
W. Va.	: 13,892	-	-	-	-	-	-	5.	5.	731	-	-	731
N. C.	: 48,568	2.	1,062	0.5	-	0.5	-	3.	3.	1,592	2.5	1,327	4,511
S. C.	: 23,321	1.	248	t	-	t	-	5.	5.	1,240	-	-	1,488
* Ga.	: 50,453	-	-	-	-	-	-	-	-	-	-	-	-
Fla.	: 8,438	2.5	264	t	-	5.	-	4.	4.	422	6.5	686	2,110
Ohio	: 128,407	5.	6,941	-	-	-	-	0.5	0.5	694	2.	2,776	10,411
Ind.	: 131,968	0.3	419	t	-	-	-	2.	2.	2,790	2.1	2,930	7,534
Ill.	: 311,500	3.5	12,319	-	-	0	-	3.	3.	10,560	5.	17,599	40,478
Mich.	: 32,928	2.	6,720	-	-	-	-	-	-	-	-	-	6,720
Wisc.	: 81,440	1.5	1,321	t	-	0	-	1.	1.	880	1.	880	6,603
Minn.	: 148,855	2.	3,181	0	-	0	-	1.	1.	1,590	0.4	636	10,178
Iowa	: 437,760	5.	25,304	-	-	-	-	-	-	-	8.5	43,017	68,321

		Estimated reduction in yield due to diseases											
States	Production : 1,000 : : Bushels :	Smut		Leaf Rust		Brown Spot		Root Rot		Ear Rots		All Diseases	
		: 1,000 : : Bushels :	%	: 1,000 : : Bushels :	%	: 1,000 : : Bushels :	%	: 1,000 : : Bushels :	%	: 1,000 : : Bushels :	%	: 1,000 : : Bushels :	%
Mo.	126,524 : 0.5	649 :	t	+	0 :	0 :	t	+	2 :	2,595 :	2.5 :	3,244 :	2.5 :
N. D.	16,384 : 2.	334 :	t	+	- :	- :	-	-	- :	- :	2 :	334 :	2 :
*S. D.	112,085 :	- :	-	-	- :	- :	-	-	- :	- :	-	- :	-
Nebr.	237,744 : 5.	12,646 :	0	0 :	- :	- :	-	-	1 :	2,529 :	6 :	15,175 :	6 :
Kans.	106,802 : 3.	3,355 :	-	-	+	+	t	+	1 :	1,118 :	4.5 :	5,032 :	4.5 :
*Ky.	80,795 :	- :	-	-	- :	- :	-	-	- :	- :	-	- :	-
Tenn.	73,600 : 1.	771 :	-	-	- :	- :	2.	1,541 :	0.5 :	385 :	4.5 :	3,467 :	4.5 :
*Ala.	37,464 :	- :	-	-	- :	- :	-	-	- :	- :	-	- :	-
Miss.	35,300 : 1.	397 :	-	-	3 :	1,190 :	4.	1,587 :	3 :	1,190 :	11 :	4,364 :	11 :
La.	21,476 : 0.5	129 :	t	+	2.5 :	647 :	5.	1,294 :	5 :	1,294 :	17 :	4,399 :	17 :
Tex.	86,127 : 0.5	451 :	t	+	- :	- :	1.	902 :	2 :	1,804 :	4.5 :	4,059 :	4.5 :
*Okla.	48,320 :	- :	-	-	- :	- :	-	-	- :	- :	-	- :	-
Ark.	26,348 : 1.	272 :	t	+	t	+	-	-	- :	- :	3 :	815 :	3 :
*Mont.	3,612 : t	+	-	-	- :	- :	t	+	- :	- :	t	+	t
*Wyo.	2,832 :	- :	-	-	- :	- :	-	-	- :	- :	-	- :	-
Colo.	23,222 : t	+	0	0 :	0 :	0 :	0	0 :	0 :	0 :	t	+	t
*N. M.	4,180 :	- :	-	-	- :	- :	-	-	- :	- :	-	- :	-
*Ariz.	1,148 :	- :	-	-	- :	- :	-	-	- :	- :	-	- :	-
*Utah	589 :	- :	-	-	- :	- :	-	-	- :	- :	-	- :	-
*Nev.	56 :	- :	-	-	- :	- :	-	-	- :	- :	-	- :	-
*Idaho	1,944 : t	+	-	-	- :	- :	t	+	- :	- :	t	+	t
*Wash.	1,824 : t	+	-	-	- :	- :	-	-	- :	- :	t	+	t
Ore.	3,010 : t	+	-	-	- :	- :	-	-	- :	- :	0.5 :	15 :	0.5 :
Calif.	2,542 : t	+	0	0 :	0 :	0 :	t	+	t	+	1 :	26 :	1 :
U. S.	2,622,189 : 3.2	80,133 :	t	265 :	0.1 :	2,629 :	1.2 :	30,249 :	3.4 :	84,510 :	8.5 :	211,809 :	8.5 :

1930 - CORN
Estimated reduction in yield due to diseases

State	Estimated reduction in yield due to diseases									
	Production: 1,000 Bushels	Smut : 1,000 Bushels : %	Rust : 1,000 Bushels : %	Root Rot : 1,000 Bushels : %	Ear Rots : 1,000 Bushels : %	Diseases : 1,000 Bushels : %	All : 1,000 Bushels : %			
*Maine	546:	-	-	-	-	-	-	-	-	-
*N. H.	505:	-	-	-	-	-	-	-	-	-
*Vt.	2,752:	-	-	-	-	-	-	-	-	-
Mass.	1,794:	2.2	44: t	-	-	-	-	-	-	221
*R. I.	378:	-	-	-	-	-	-	-	-	-
Conn.	2,268:	2.	46:	-	-	-	-	-	-	46
N. Y.	19,710:	2.	402: t	-	-	-	-	-	-	402
*N. J.	6,300:	-	-	-	-	-	-	-	-	-
*Pa.	29,084:	-	-	-	-	-	-	-	-	-
Ohio	88,816:	2.	1,841: t	-	0.5	460: 1.	920: 3.5	3,221		
Ind.	110,197:	0.5	589: t	-	1.5	1,768: 4.	4,714: 6.5	7,660		
Ill.	238,298:	3.	8,826: t	-	2.	5,884: 7.	20,594: 19.	55,898		
Mich.	28,372:	t	+	t	-	+	0.5	143		
Wisc.	79,365:	1.5	1,229: t	-	0.5	410: 0.1	82: 3.1	2,540		
Minn.	135,780:	1.5	2,068: -	-	-	-	-	2,068		
*Iowa	360,750:	-	-	-	-	-	-	-		
Mo.	72,841:	0.5	371: -	-	t	+	1.3	964: 1.8	1,335	
*N. D.	19,058:	-	-	-	-	-	-	-		
S. D.	76,958:	3.	2,405: -	-	0.5	401: 0.5	401: 4.	3,207		
Nebr.	235,695:	3.	7,365: 0	-	t	+	1.	2,455: 4.	9,820	
Kans.	76,164:	3.	2,457: t	-	3.	2,457: 1.	819: 7.	5,733		
Del.	2,815:	1.	29: -	-	1.	29: 1.	29: 3.	87		
Md.	7,791:	0.3	26: t	-	7.	601: 2.	172: 9.3	799		

#2 - 1930 Corn (Cont.)

State.	Estimated reduction in yield due to diseases											
	Production:						All					
	1,000 Bushels	%	Smuts	Rust	Root Rot	Ear Rots	Diseases	1,000 Bushels	%	1,000 Bushels	%	Diseases
Va.	18,032	3.	594	+	3.	594	2.	594	2.	594	2.	1,782
W. Va.	5,865	5.	312	-	-	-	-	-	-	-	-	374
N. C.	51,865	t	+	+	5.	2,850	2.	1,140	2.	1,140	2.	5,130
S. C.	26,978	t	+	+	1.	287	5.	1,435	6.	1,435	6.	1,722
Ga.	45,494	3.	1,447	0.1	48	48	1.	482	5.7	482	5.7	2,749
Fla.	7,500	1.	90	t	5.	452	5.	452	17.	452	17.	1,536
*Ky.	31,417	-	-	-	-	-	-	-	-	-	-	-
*Tenn.	41,102	-	-	-	-	-	-	-	-	-	-	-
*Ala.	29,505	-	-	-	-	-	-	-	-	-	-	-
*Miss.	19,895	-	-	-	-	-	-	-	-	-	-	-
Ark.	8,404	1.	85	t	-	-	-	-	-	-	-	85
La.	12,199	t	+	t	-	-	-	787	7.	787	7.	918
*Okla.	36,436	-	-	-	-	-	-	-	-	-	-	-
Tex.	91,408	1.	1,051	t	2.	2,101	8.	8,405	13.	8,405	13.	13,658
*Mont.	3,252	t	+	-	-	-	-	-	-	-	-	-
*Idaho	2,301	-	-	-	-	-	-	-	-	-	-	-
*Wyo.	3,570	-	-	-	-	-	-	-	-	-	-	-
Colo.	37,142	2.	774	2.	-	-	-	-	4.	-	4.	1,545
*N. Mex.	3,010	-	-	-	-	-	-	-	-	-	-	-
*Ariz.	1,353	-	-	-	-	-	-	-	-	-	-	-
*Utah	620	-	-	-	-	-	-	-	-	-	-	-
*Nev.	44	-	-	-	-	-	-	-	-	-	-	-
*Wash.	1,900	-	-	-	-	-	-	-	-	-	-	-
*Ore.	2,739	-	-	-	-	-	-	-	-	-	-	-
*Calif.	2,700	-	-	-	-	-	-	-	-	-	-	-
U. S.	2,081,048	2.	32,051	t	822	1.1	18,342	2.8	44,445	7.6	122,682	

Estimated reduction in yield of potato due to diseases, 1928.

State	Estimated reduction in yield due to diseases									
	: Produc-		: Mosaic		: Leaf Roll		: Late Blight		: Rhizoctonia	
	: 1,000		: 1,000		: 1,000		: 1,000		: 1,000	
	: Bushels:	%	: Bushels:	%	: Bushels:	%	: Bushels:	%	: Bushels	
Maine	37,840:	5.	2,557:	7.	3,579:	9.	4,602:	1.	511	
N. H.	1,656:	10.	224:	10.	224:	5.	112:	-	-	
*Vt.	2,982:	-	-:	-	-:	-	-:	-	-	
Mass.	1,620:	-	-:	10.	324:	30.	972:	t	+	
*R. I.	244:	-	-:	-	-:	-	-:	-	-	
*Conn.	2,210:	-	-:	-	-:	-	-:	-	-	
N. Y.	32,376:	5.	3,238:	7.	4,533:	20.	12,950:	5.	3,238	
N. J.	9,120:	3.	367:	8.	979:	0.8	98:	3.	367	
Pa.	31,980:	t	+	10.	4,264:	8.	3,411:	1.	426	
Del.	658:	t	+	t	+	-	-:	-	-	
Md.	5,405:	4.	275:	2.	138:	4.	275:	4.	275	
Va.	21,593:	-	-:	-	-:	-	-:	-	-	
W. Va.	7,500:	t	+	t	+	10.	893:	t	+	
N. C.	10,545:	5.	651:	2.	260:	2.	260:	2.	260	
S. C.	4,068:	t	+	t	+	t	+	10.	468	
Ga.	1,682:	5.	109:	4.	87:	1.	22:	t	+	
Fla.	3,875:	t	+	t	+	t	+	t	+	
Ohio	12,054:	2.	304:	5.	760:	t	+	2.	304	
Ind.	6,649:	2.	145:	4.	289:	-	-:	-	-	
*Ill.	7,700:	-	-:	-	-:	-	-:	-	-	
Mich.	35,802:	1.	442:	1.	442:	2.	884:	1.	442	
Wis.	31,970:	t	+	0	0:	5.	1,757:	1.	351	
Minn.	38,940:	2.	972:	0	0:	8.	3,886:	2.	972	
Iowa	10,935:	1.	129:	0	0:	1.	129:	2.	257	
Mo.	10,285:	0	0:	t	+	0	0:	2.	229	
N. D.	14,805:	1.5	245:	t	+	0	0:	3.	491	
*S. D.	6,030:	-	-:	-	-:	-	-:	-	-	
*Neb.	10,080:	-	-:	-	-:	-	-:	-	-	
Kans.	7,560:	t	+	-	-:	-	-:	7.	615	
Ky.	5,985:	25.	2,302:	-	-:	0	0:	5.	460	
Tenn.	4,085:	2.	100:	+	+	15.	747:	-	-	
*Ala.	2,812:	-	-:	-	-:	-	-:	-	-	
Miss.	1,330:	15.	281:	5.	94:	t	+	0.5	9	
La.	2,870:	8.	250:	-	-:	-	-:	-	-	
Tex.	2,691:	0.5	14:	-	-:	-	-:	3.	87	
*Okla.	5,040:	-	-:	-	-:	-	-:	-	-	
Ark.	2,700:	10.	450:	t	+	-	-:	t	+	
Mont.	4,255:	7.	355:	0	0:	0	0:	3.	152	
*Wyo.	2,352:	-	-:	-	-:	-	-:	-	-	
Colo.	13,420:	t	+	t	+	-	-:	3.	479	
N. Mex.	132:	-	-:	-	-:	-	-:	-	-	
Ariz.	222:	1.	3:	6.	18:	0	0:	8.	24	
Utah	3,312:	10.1	450:	1.	45:	-	-:	3.	134	
*Nev.	841:	-	-:	-	-:	-	-:	-	-	
Idaho	19,720:	6.	1,376:	2.	459:	-	-:	2.	459	
Wash.	9,045:	6.	617:	2.	206:	t	+	2.	206	
Ore.	6,240:	10.	832:	2.	166:	0	0:	10.	832	
*Calif.	7,728:	-	-:	-	-:	-	-:	-	-	
U. S.	462,943:	3.1	16,688:	3.2	16,867:	5.8	30,998:	2.3	12,048	

Estimated reduction in yield of potato due to diseases, 1928

	Estimated reduction in yield due to diseases							
	Tipburn and:				All			
State	Black Leg	Fusarium Wilt	Hopperburn	Early Blight	Diseases			
	:1,000	:1,000	:1,000	:1,000	:1,000	:	:	:
	% :Bushels:	% :Bushels:	% :Bushels:	% :Bushels:	% :Bushels:	%	%	%
Maine	1. :	511: - :	- : - :	- : - :	3. :	1,534:26.	:	13,294
N. H.	1. :	22: - :	- : t :	+ : t :	t :	+26.	:	582
*Vt.	- :	- : - :	- : - :	- : - :	- :	- :	:	-
Mass.	- :	- : t :	+ : t :	+ : - :	- :	-50.	:	1,620
*R. I.	- :	- : - :	- : - :	- : - :	- :	- :	:	-
*Conn.	- :	- : - :	- : - :	- : - :	- :	- :	:	-
N. Y.	t :	+ : - :	- : 7. :	4,533: 1. :	648:50.	:	:	32,378
N. J.	t :	+ : - :	- : 5.5:	6,763: 0.2:	24:25.5	:	:	3,130
Pa.	t :	+ : - :	- : t :	+ : t :	+25.	:	:	10,659
Del.	- :	- : - :	- : 0.5:	3: 0.5:	3: 2.	:	:	13
Md.	0 :	0: 1. :	69: 0.5:	34: 0.5:	34:21.5	:	:	1,479
Va.	1.5:	350: - :	- : - :	- : - :	- : 7.5	:	:	1,757
W. Va.	- :	- : t :	+ : 5. :	446: t :	+16.	:	:	1,428
N. C.	2. :	260: - :	- : 0.5:	65: 1.5:	195:19.	:	:	2,472
S. C.	- :	- : - :	- : - :	- : 3. :	140:13.	:	:	608
Ga.	t :	+ : 0.5:	11: 5. :	109: 1. :	22:22.5	:	:	491
Fla.	t :	+ : 0 :	0: 0 :	0: 2. :	80: 3.5	:	:	140
Ohio	1.5:	228: t :	+ : 9. :	1,368: 1. :	152:20.7	:	:	3,146
Ind.	- :	- : - :	- : 2. :	145: - :	- : 8.	:	:	579
*Ill.	- :	- : - :	- : - :	- : - :	- : - :	:	:	-
Mich.	1. :	442: - :	- : 5. :	2,210: 1. :	442:19.	:	:	8,398
Wis.	t :	+ : 0 :	0: 2. :	703: t :	+ : 9.	:	:	3,162
Minn.	3. :	1,457: 0 :	0: 3. :	1,457: 1. :	486:20.	:	:	9,716
Iowa	10. :	1,286: - :	- : t :	+ : t :	+15.	:	:	1,930
Mo.	2. :	229: 2. :	229: 1. :	114: 1. :	114:10.	:	:	1,144
N. D.	2.5:	409: - :	- : 2. :	327: 0.5:	82: 9.5	:	:	1,554
*S. D.	- :	- : - :	- : - :	- : - :	- : - :	:	:	-
*Neb.	- :	- : - :	- : - :	- : - :	- : - :	:	:	-
Kans.	3. :	264: t :	+ : - :	- : - :	-:14.	:	:	1,231
Ky.	0 :	0: t :	+ : 5. :	460: - :	-:35.	:	:	3,222
Tenn.	- :	- : - :	- : - :	- : - :	-:18.	:	:	897
*Ala.	- :	- : - :	- : - :	- : - :	- : - :	:	:	-
Miss.	- :	- : - :	- : 6. :	112: t :	+29.	:	:	543
La.	- :	- : - :	- : - :	- : - :	- : 8.	:	:	250
Tex.	- :	- : 1. :	29: 0.5:	14: 0.1:	3: 7.1	:	:	205
*Okla.	- :	- : - :	- : - :	- : - :	- : - :	:	:	-
Ark.	t :	+ : - :	-:30. :	1,350: t :	+40.	:	:	1,800
Mont.	2. :	101: 4. :	203: 0 :	0: t :	+16.	:	:	811
*Wyo.	- :	- : - :	- : - :	- : - :	- : - :	:	:	-
Colo.	5. :	799: 1. :	160: - :	- : - :	-:16.	:	:	2,557
*N.Mex.	- :	- : - :	- : - :	- : - :	- : - :	:	:	-
Ariz.	2. :	6: 1. :	3: 0 :	0: 1.0:	3:25.	:	:	75
Utah	0.5:	22: 2. :	89: - :	- : 0.1:	4:25.7	:	:	1,145
*Nev.	- :	- : - :	- : - :	- : - :	- : - :	:	:	-
Idaho	2. :	459: - :	- : - :	- : - :	-:14.	:	:	3,212
Wash.	1. :	103: t :	+ : - :	- : - :	-:12.	:	:	1,235
Ore.	3. :	250: - :	- : - :	- : - :	-:25.	:	:	2,000
*Calif.	- :	- : - :	- : - :	- : - :	- : - :	:	:	-
U. S.	1.3:	7,198: 0.1:	793: 2.6:	14,123: 0.7:	3,966:22.3	:	:	118,927

Estimated reduction in yield of potatoes due to diseases

State	Estimated reduction in yield due to diseases							
	:Product-:				Estimated reduction in yield due to diseases			
	: tion :	Mosaic	: Leaf Roll	:Late Blight	: Rhizoctonia			
	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	
	:Bushels:	%	:Bushels:	%	:Bushels:	%	:Bushels:	%
Maine	47,644	4.	2,296	4.	2,296	2.	1,148	6.
*N. H.	1,826	-	-	-	-	-	-	-
*Vt.	2,850	-	-	-	-	-	-	-
Mass.	1,862	t	+	3.	80	t	+	1.
*R. I.	250	-	-	-	-	-	-	-
*Conn.	2,080	-	-	-	-	-	-	-
N. Y.	24,840	4.	1,370	8.	2,741	t	+	-
N. J.	6,032	1.5	105	3.	209	-	-	-
*Pa.	25,740	-	-	-	-	-	-	-
Del.	546	t	+	t	+	-	-	-
Md.	4,000	3.5	168	2.5	120	2.	96	5.
Va.	17,461	4.	803	1.	201	t	+	2.
W. Va.	6,555	-	-	-	-	t	+	-
N. C.	8,130	4.5	486	2.	216	2.	216	2.
S. C.	2,354	t	+	-	-	10.	266	-
*Ga.	1,572	-	-	-	-	-	-	-
Fla.	2,714	t	+	-	-	1.	27	-
Ohio	11,126	2.	279	5.	698	t	+	2.
Ind.	4,620	2.	99	5.	248	-	-	-
*Ill.	5,040	-	-	-	-	-	-	-
*Mich.	18,410	-	-	-	-	-	-	-
Wisc.	20,240	t	+	-	-	t	+	1.
Minn.	25,896	**5.	1,671	-	-	t	+	5.
Iowa	7,650	2.	179	2.	179	-	-	2.
Mo.	5,508	t	+	t	+	0	0	2.
N. D.	6,960	1.5	110	t	+	0	0	t
*S. D.	4,422	-	-	-	-	0	0	-
*Nehr.	8,924	-	-	-	-	0	0	-
Kans.	4,375	t	+	-	-	0	0	9.
*Ky.	4,400	-	-	-	-	-	-	-
*Tenn.	3,585	-	-	-	-	-	-	-
*Ala.	2,408	-	-	-	-	-	-	-
*Miss.	1,222	-	-	-	-	-	-	-
*La.	1,977	-	-	-	-	-	-	-
Tex.	2,393	2.	53	t	+	-	-	2.
*Okla.	3,294	-	-	-	-	-	-	-
Ark.	2,697	11.	512	t	+	t	+	t
Mont.	1,980	5.	115	t	+	0	0	3.
*Wyo.	2,090	-	-	-	-	0	0	-
*Colo.	12,320	-	-	-	-	0	0	-
*N. M.	182	-	-	-	-	0	0	-
*Ariz.	240	-	-	-	-	0	0	-
*Utah	3,330	-	-	-	-	0	0	-
*Nev.	850	-	-	-	-	0	0	-
Idaho	17,136	5.	974	2.	389	0	0	0.5
Wash.	8,680	6.	579	2.	193	t	+	2.
Ore.	3,780	8.	420	3.	158	0	0	10.
*Calif.	5,250	-	-	-	-	-	-	-
U. S.	357,451	3.6	10,219	2.6	7,728	0.6	1,753	2.8

** All virus diseases.

#2 - 1929 Potatoes

State	Estimated reduction in yield due to diseases									
	: Tipburn and :									
	: Black Leg :		: Fusarium Wilt :		: Hopperburn :		: Early Blight :		: All Diseases :	
	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :
	%	: Bushels :	%	: Bushels :	%	: Bushels :	%	: Bushels :	%	: Bushels :
Maine	1.	574:	-	-	-	-	-	-	17.	9,758
*N. H.	-	-	-	-	-	-	-	-	-	-
*Vt.	-	-	-	-	-	-	-	-	-	-
Mass.	-	-	-	-	10.	266:	-	-	30.	799
*R. I.	-	-	-	-	-	-	-	-	-	-
*Conn.	-	-	-	-	-	-	-	-	-	-
N. Y.	t	+ 0.5	171:	15.	5,139:	t	+ 27.5	9,421		
N. J.	t	+ 1.	70:	8.	558:	t	+ 13.5	942		
*Pa.	-	-	-	-	-	-	-	-	-	-
Del.	-	-	-	0.5	2:	t	+ 0.5	2		
Md.	0.5	24:	1.	48:	t	+ 0.5	24:	16.5	792	
Va.	t	+ 2.	402:	t	+ 4.	803:	13.	2,611		
W. Va.	0.5	39:	-	-	15.	1,164:	t	+ 15.5	1,203	
N. C.	1.	108:	t	+ 8.	865:	1.3	141:	24.8	2,681	
S. C.	-	-	-	-	-	1.5	40:	11.5	306	
*Ga.	-	-	-	-	-	-	-	-	-	-
Fla.	-	-	-	-	-	-	-	1.	27	
Ohio	0.5	70:	0.5	70:	9.	1,256:	1.	140:	20.3	2,834
Ind.	-	-	-	-	-	-	-	7.	347	
*Ill.	-	-	-	-	-	-	-	-	-	-
*Mich.	-	-	-	-	-	-	-	-	-	-
Wisc.	t	+ -	-	2.	422:	t	+ 4.	844		
Minn.	0.5	167:	t	+ 10.	3,341:	t	+ 22.5	7,518		
Iowa	1.	89:	0.5	45:	-	-	-	14.5	1,297	
Mo.	1.	58:	t	+ t	+ t	+ t	+ 4.5	260		
N. D.	1.5	110:	t	+ 1.	74:	t	+ 5.5	404		
*S. D.	-	-	-	-	-	-	-	-	-	-
*Nebr.	-	-	-	-	-	-	-	-	-	-
Kans.	3.	156:	t	+ t	+ t	+ t	+ 16.	833		
*Ky.	-	-	-	-	-	-	-	-	-	-
*Tenn.	-	-	-	-	-	-	-	-	-	-
*Ala.	-	-	-	-	-	-	-	-	-	-
*Miss.	-	-	-	-	-	-	-	-	-	-
*La.	-	-	-	-	-	-	-	-	-	-
Tex.	-	-	1.	26:	1.	26:	1.	26:	9.	237
*Okla.	-	-	-	-	-	-	-	-	-	-
Ark.	-	-	-	31.	1,442:	t	+ 42.	1,954		
Mont.	2.	46:	4.	92:	t	+ t	+ 14.	322		
*Wyo.	-	-	-	-	-	-	-	-	-	-
*Colo.	-	-	-	-	-	-	-	-	-	-
*N. Mex.	-	-	-	-	-	-	-	-	-	-
*Ariz.	-	-	-	-	-	-	-	-	-	-
*Utah	-	-	-	-	-	-	-	-	-	-
*Nev.	-	-	-	-	-	-	-	-	-	-
Idaho	2.	389:	0.5	97:	-	-	t	+ 12.	2,335	
Wash.	t	+ t	+ t	+ t	-	-	t	+ 10.	965	
Ore	6.	315:	t	+ t	+ t	+ t	+ t	+ 28.	1,471	
*Calif.	-	-	-	-	-	-	-	-	-	-
U. S.	0.7	2,145:	0.3	1,021:	4.9	14,555:	0.4	1,174:	17.1	50,163

Estimated reduction in yield of potato due to diseases

States	Estimated reduction in yield due to diseases							
	Mosaic				Leaf Roll			
	Late Blight				Rhizoctonia			
	1,000	%	1,000	%	1,000	%	1,000	%
Product	Bushels	%	Bushels	%	Bushels	%	Bushels	%
Maine	45,120	2.	1,157	4.	2,314	8.	4,628	2.
*N. H.	2,365	-	-	-	-	-	-	-
*Vt.	3,400	-	-	-	-	-	-	-
Mass.	2,400	10.	348	5.	174	t	+	1.
*R. I.	380	-	-	-	-	-	-	-
Conn.	2,660	-	-	-	-	0	0	t
N. Y.	29,116	4.	1,834	7.	3,210	t	+	5.
N. J.	8,260	1.5	150	2.5	250	0	0	2.
Pa.	23,166	-	-	12.5	3,643	0	0	4.5
Ohio	9,450	2.	241	5.	602	t	+	2.
Ind.	4,984	2.	106	4.	212	0	0	-
*Ill.	5,226	-	-	-	-	-	-	-
Mich.	15,254	1.	202	1.	202	0	0	0.5
Wisc.	18,056	t	+	t	+	0	0	1.5
Minn.	21,350	**5.	1,504	-	-	0	0	4.
*Iowa	4,550	-	-	-	-	-	-	-
Mo.	8,692	-	-	-	-	-	-	2.
*N. D.	7,192	-	-	-	-	-	-	-
S. D.	3,445	-	-	-	-	0	0	-
Nebr.	9,400	1.	102	0	0	0	0	2.
Kans.	4,955	-	-	-	-	0	0	7.
Del.	250	0.5	1	0.5	1	-	-	t
Md.	2,430	2.5	83	2.5	83	1.	33	6.
*Va.	14,583	-	-	-	-	0	0	t
W. Va.	4,200	2.5	175	1.	70	0	0	2.5
N. C.	8,839	2.	218	2.	218	0	0	2.
S. C.	2,973	t	+	t	+	0	0	10.
Ga.	1,624	-	-	-	-	1.	16	-
Fla.	2,560	t	+	t	+	15.	492	1.
Ky.	2,831	-	-	-	-	0	0	-
*Tenn.	2,887	-	-	-	-	-	-	-
*Ala.	2,875	-	-	-	-	-	-	-
*Miss.	970	-	-	-	-	-	-	-
Ark.	2,869	15.	782	t	+	0	0	t
La.	2,655	5.	148	t	+	0	0	t
*Okla.	3,893	-	-	-	-	-	-	-
Tex.	3,674	0.5	20	0.1	4	0	0	2.
Mont.	2,204	5.	133	0.1	3	0	0	3.
*Idaho	25,038	-	-	-	-	0	0	-
*Wyo.	2,550	-	-	-	-	0	0	-
*Colo.	15,050	-	-	-	-	0	0	-
*N. Mex.	210	-	-	-	-	0	0	-
*Ariz.	320	-	-	-	-	0	0	-
*Utah	3,600	-	-	-	-	0	0	-
*Nev.	525	-	-	-	-	0	0	-
*Wash.	9,984	-	-	-	-	-	-	-
*Ore.	6,300	-	-	-	-	-	-	-
*Calif.	5,775	-	-	-	-	-	-	-
U. S.	361,090	2.3	7,204	3.5	10,986	1.7	5,169	2.8

**All virus diseases.

State	Estimated reduction in yield due to diseases									
	Fusarium		Tipburn and		Early		All			
	Blackleg	Wilt	Hopperburn	Blight	Scab	Diseases				
	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :
	% : Bushels :	% : Bushels :	% : Bushels :	% : Bushels :	% : Bushels :	% : Bushels :	% : Bushels :	% : Bushels :	% : Bushels :	% : Bushels :
Maine	:3. : 1,735:	- : - :	- : - :	- :2. : 1,157:	- : - :	- :22. :12,726				
*N. H.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
*Vt.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
Mass.	- : - :	- :15. : 522:	t : - :	- : - :	- : - :	- :31. : 1,079				
*R. I.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
Conn.	- : - :	- :3. : 84:	t : - :	- : - :	- : - :	- :5. : 140				
N. Y.	: t : +: t :	+ :15. : 6,878:	t : - :	+ :5. : 2,293:	36.5:16,737					
N. J.	- : - :	- :0.5: 50:	8. : 801:	t : - :	+ :3. : 300:	17.5: 1,751				
Pa.	- : - :	- :3.5: 1,020:	- : - :	- : - :	- : - :	- :20.5: 5,974				
Ohio	:0.5: 60:	0.5: 60:	10. : 1,204:	1. : 120:	0.5 : 60:	21.5: 2,588				
Ind.	- : - :	- : - :	- : - :	- : - :	- : - :	- :6. : 318				
*Ill.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
Mich.	:1. : 202:	- : - :	- :6. : 1,214:	0.1: 20:	- : - :	- :24.6: 4,976				
Wisc.	:0.5: 101:	t : - :	+ :4. : 812:	t : - :	+ :5. : 1,014:	11. : 2,231				
Minn.	:1. : 301:	t : - :	+ :15. : 4,511:	t : - :	+ :4. : 1,203:	29. : 8,722				
*Iowa	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
Mo.	:0.4: 37:	t : - :	+ : - :	- : - :	- :2. : 186:	6.4: 595				
*N. D.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
S. D.	: t : +: t :	- : - :	- : - :	- : t : +:4. :	145: 5. : 181					
Nebr.	: t : +:1. :	102: 0 :	0: t : +:4. :	409: 8. : 817						
Kans.	:2. : 114:	- : - :	- : - :	- : - :	- :2. : 114:	13. : 741				
Del.	- : - :	- : t : +: 0.5:	1: t : +: - :	- :1.5: 3						
Md.	: t : +:2. :	66:10. : 331:	0.5: 17:	2. : 66:	26.5: 877					
*Va.	- : - :	- : - :	- : - :	- : t : +: - :	- : - :	- : - :				
W. Va.	: t : +: - :	- :25. : 1,750:	- : - :	- :8.5 : 595:	40. : 2,800					
N. C.	: t : +: - :	- :3. : 327:	- : - :	- : - :	- :19. : 2,072					
S. C.	- : - :	- : - :	- : - :	- :1.5: 51:	- :12.5: 425					
Ga.	- : - :	- : - :	- : - :	- : - :	- :1. : 16					
Fla.	:1. : 33:	t : - :	+ : - :	- :3. : 98:	t : +:22. : 722					
Ky.	:1. : 29:	- : - :	- : t : +: t :	- : - :	- :1. : 29					
*Tenn.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
*Ala.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
*Miss.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
Ark.	: t : +: - :	- :30. : 1,565:	t : - :	+: - : - :45. : 2,347						
La.	: t : +: - :	- :1. : 30:	3. : 89:	- : - :	- :10. : 297					
*Okla.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
Tex.	: t : +:1. :	39: - :	- :0.1: 4:	0.1 : 4:	5.8: 227					
Mont.	:2. : 53:	4. : 106:	0.5: 13:	0.1 : 3:	- :17. : 452					
*Idaho	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
*Wyo.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
*Colo.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
*N. Mex.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
*Ariz.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
*Utah	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
*Nev.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
*Wash.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
*Ore.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
*Calif.	- : - :	- : - :	- : - :	- : - :	- : - :	- : - :				
U. S.	:0.9: 2,665:	0.5: 1,443:	6.4: 20,043:	0.5: 1,559:	2. : 6,389:	22.4:69,843				

Estimated reduction in yield of tomato due to diseases, 1928.

State	Estimated reduction in yield due to diseases, 1928.						
	Fusarium:		Bacterial:		Early		Western
	Blight:	Wilt:	Wilt:	Blight:	(Yellow)	Blight:	All Diseases
	%	%	%	%	%	%	%
Mass.	-	-	t	10.	0		20.
N. Y.	2.	t	-	-	0		2
N. J.	7.	3.	-	1.	0		12.5
Pa.	t	-	-	-	0		-
Del.	1.	t	-	2.	0		5.
Md.	5.	2.	t	15.	0		25.
Va.	3.	5.	-	8.	0		16.
W. Va.	15.	t	0	t	0		17
N. C.	2.5	4.	2.5	1.5	0		13.5
S. C.	t	10.	t	2.	0		22
Ga.	t	5.	1.	8.	0		30
Fla.	0	10.	t	1.	0		26
Ohio	0.5	2.	t	3.	0		9.5
Ind.	8.7	-	-	2.	0		10.7
Mich.	1.	t	t	-	0		11
Wis.	4.	t	0	t	0		5
Minn.	t	0.	0	t	0		5
Iowa	3.	t	-	-	0		5.5
Mo.	4.	5.	0	5.	0		15.
N. D.	-	-	-	-	0		1.
Kans.	10.	3.	-	-	0		16.
Ky.	10.	2.	-	-	0		37.
Tenn.	5.	10.	-	5.	0		35.
Miss.	t	10.	t	5.	0		20.
La.	-	12.	-	10.	0		22.
Tex.	2.	10.	-	-	0		17.
Okla.	-	-	-	-	0		-
Ark.	1.	15.	-	1.	0		20.
Mont.	0	0	0	t	0		2.
Ariz.	0	9.	-	0	25.		40.6
Utah	8.	2.	1.	0	7.		19.
Idaho	-	-	-	-	10.		12.
Wash.	0	t	0	0	15.		15.
Ore.	0	0	0	0	10.		10.

1929 - TOMATO

Estimated percentage reduction in yield due to diseases

: Estimated percentage loss due to diseases							
:Septoria:Fusarium:Bacterial:Early :Western : All							
State	:Blight	: Wilt	: Wilt	:Blight:(Yellow)	:Blight	:Diseases	
:	: %	: %	: %	: %	: %	: %	: %
Maine	: -	: 1.	: -	: -	: 0	: 1.	
Mass.	: -	: -	: -	: 3.	: 0	: 5.	
N. J.	: 4.	: 6.	: -	: 1.5	: 0	: 11.5	
Del.	: 0.5	: t	: -	: 0.5	: 0	: 2.	
Md.	: 1.	: 1.	: t	: 5.	: 0	: 13.	
Va.	: 5.	: 0.5	: -	: 6.	: 0	: 12.5	
W. Va.	: 5.	: -	: -	: -	: 0	: 5.	
N. C.	: 5.	: 2.	: 2.5	: 1.	: 0	: 18.5	
S. C.	: 1.5	: 5.	: t	: 1.5	: 0	: 8.	
Ga.	: -	: 10.	: t	: 8.	: 0	: 18.	
Ohio	: 3.	: 1.	: 0.5	: -	: 0	: 6.5	
Ind.	: 6.	: 0.5	: -	: 1.	: 0	: 7.5	
Wisc.	: 4.	: t	: 0	: t	: 0	: 5.	
Minn.	: t	: 0	: 0	: t	: 0	: 4.	
Iowa	: 3.	: t	: -	: -	: 0	: 5.	
Mo.	: 2.	: 2.	: 0	: 2.	: 0	: 11.	
Kans.	: 10.	: 2.	: -	: -	: 0	: 14.	
Tenn.	: 2.	: 2.	: -	: 0.5	: 0	: 4.5	
Miss.	: t	: 10.	: -	: 4.	: 0	: 14.	
Tex.	: 5.	: 5.	: -	: 1.	: 0	: 13.	
Ark.	: 1.	: 15.	: -	: 2.	: 0	: 21.	
Mont.	: -	: -	: -	: t	: -	: -	
Idaho	: -	: -	: -	: -	: 1.	: 1.5	
Wash.	: -	: t	: -	: -	: 5.	: 5.	
Ore.	: -	: -	: t	: -	: 2.	: 12.	

1930 - TOMATO

Estimated reduction in yield of tomato due to diseases

State	: Iroduc- tion :	: Septoria Blight :	: Fusarium Wilt :	: Bacterial Wilt :	: Early Blight :	: Blossom-end Rot :	: All Diseases
	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :
	: Bushels :	: Bushels :	: Bushels :	: Bushels :	: Bushels :	: Bushels :	: Bushels :
*Maine	: 3. :	: - :	: - :	: 9. :	: - :	: - :	: -14. :
*Mass.	: 1. :	: -1. :	: -1. :	: -10. :	: -1. :	: -1. :	: +16. :
*Conn.	: t :	: + :	: - :	: - :	: t :	: 1. :	: -2. :
N. Y.	: 3,336 :	: - :	: - :	: 0 :	: 4. :	: 164. :	: 164.18.5 :
N. J.	: 11,243 :	: 2.5 :	: 337.4.5 :	: 606. t :	: +0.5 :	: 67.2. :	: 269.16.5 :
*Pa.	: 525 :	: - :	: - :	: - :	: - :	: - :	: - :
Ohio	: 2,860 :	: - :	: - :	: - :	: - :	: 5. :	: 151.5. :
Ind.	: 14,726 :	: t :	: +5. :	: 828. :	: 0.1 :	: 17.5. :	: 828.11.1 :
*Ill.	: 1,064 :	: - :	: - :	: - :	: - :	: - :	: - :
Mich.	: 599 :	: t :	: +3. :	: 23. :	: - :	: - :	: -23. :
*Wisc.	: 2. :	: t :	: -1. t :	: +0.0 :	: t :	: +.5. :	: -3. :
*Minn.	: t :	: t :	: +. - :	: -0.0 :	: -0.0 :	: -5. :	: -5. :
*Iowa	: 1,215 :	: - :	: -1. - :	: -0.0 :	: -0.0 :	: -0.0 :	: -12. :
Mo.	: 2,680 :	: 2. :	: 61.2. :	: 0.0 :	: 0.0 :	: 0.0 :	: +1. :
*Nebr.	: 1. :	: 1. :	: -2. :	: 0.0 :	: 0.0 :	: 0.0 :	: -5. :
*Kans.	: 2. :	: 2. :	: -10. t :	: +. - :	: -10.0. :	: 193. - :	: -11. :
Del.	: 1,721 :	: 0.5 :	: 10. t :	: +. - :	: -10.0. :	: 44.7. :	: 308.12. :
Md.	: 3,871 :	: t :	: +.0.5 :	: 22. t :	: +.1. :	: -25. :	: 382.28. :
Va.	: 830 :	: t :	: +.3. :	: 46. - :	: -. - :	: -. - :	: -. - :

Estimated reduction in yield due to diseases													
State	Production	Septoria	Fusarium	Bacterial	Early Blight	Blossom-end	All						
	1,000	1,000	1,000	1,000	1,000	1,000	1,000						
	Bushels	%	Bushels	%	Bushels	%	Bushels	%	Bushels	%	Bushels	%	Bushels
W. Va.		t	+	-	-	-	-	-	-	-	-	-	-
N. C.	58	t	+	1.	1: 3.	2: t	+	t	+	-	-	-	9
S. C.	220	1.	2: 5.	12: 0.1	12: 0.1	+	1.	2:	2:	-	-	-	16
Ga.	75	-	-	-	-	-	-	-	-	-	-	-	-
Fla.	2,371	0	0: 3.	84: t	84: t	+	2.	56:	56:	-	-	-	419
*Ky.	876	t	+	t	+	-	-	-	-	-	-	-	-
*Tenn.	1,943	-	-	-	-	-	-	-	-	-	-	-	-
*Miss.	1,719	-	-	-	-	-	-	-	-	-	-	-	-
Ark.	2,276	1.	26: 10.	259: -	259: -	-	1.	26:	26:	-	-	-	311
La.	148	t	+	5.	9: t	+	2.	4:	4:	-	-	-	31
Tex.	3,293	0.5	22: 5.	221: 0.5	221: 0.5	22: 0.5	22: 0.5	22: 0.5	22: 0.5	22: 25.5	22: 25.5	22: 25.5	1,127
*Colo.	902	-	-	-	-	-	-	-	-	-	-	-	-
*Utah	1,936	-	-	-	-	-	-	-	-	-	-	-	-
*Wash.	269	-	-	-	-	-	-	-	-	-	-	-	-
*Ore.	48	-	-	-	-	-	-	-	-	-	-	-	-
*Calif.	14,447	-	-	-	-	-	-	-	-	-	-	-	-
*Other													
States	900	-	-	-	-	-	-	-	-	-	-	-	-
U. S.	76,151	0.8	458: 3.7	2,172: t	24: 1.	59: 3.6	2,124: 14.6	8,597					

**Under other States is included production for manufacture in Connecticut, Kansas, Louisiana, Nebraska, New Mexico, Oklahoma, Oregon, South Carolina, Texas, Washington, West Virginia, and Wisconsin.

1928 - SWEET POTATO

Estimated reduction in yield of sweet potato due to diseases, 1928

State	Estimated reduction in yield due to diseases									
	Produce- tion	Stem Rot	Black Rot	Pox	All Diseases	Storage Rot				
	1,000	1,000	1,000	1,000	1,000	1,000				
	Bushels	%	%	%	%	%	Bushels	%	Bushels	%
N. J.	2,175:10.		259: 3.	78: 1.5	39:16.	415: -				
Del.	980: 2.		21: 3.	31: t	+ 6.	62: 5.				49
Md.	1,500: 1.5		23: 1.5	23: 0.5	8: 3.5	54:20.				300
Va.	6,336: -		-: -	-: -	-: -	-: 7.				444
W. Va.	204: -		-: -	-: -	-: -	-: -				-
N. C.	7,840: 1.		85: 5.	426: t	+ 8.	681:30.				2,352
S. C.	4,214: t		+ 5.	222: -	-: 5.	222:25.				1,054
Ga.	10,234:10.		1,204: 3.	361: -	-:15.	1,806:13.				1,330
Fla.	2,464: t		+ t	+ t	+ 1.	25:18.				444
Ohio	360: -		-: -	-: -	-: -	-: -				-
Ind.	232: -		-: -	-: -	-: -	-: -				-
Ill.	980: -		-: -	-: -	-: -	-: -				-
Iowa	369: 7.		28: 0.5	2: -	-: 7.5	30: -				-
Mo.	1,155: 3.		37: 2.	25: 0	0: 6.	74: 2.				23
Kans.	260: 5.		14: 2.	6: -	-: 9.	26:13.				34
Ky.	1,246: -		-: t	+ t	-: 5.	66: -				-
Tenn.	3,895: 2.		84: 5.	209: t	+ 7.	293: -				-
Ala.	6,510: -		-: -	-: -	-: -	-: -				-
Miss.	6,050: 3.		199: 5.	332: -	-: 9.	597:11.				666
La.	6,660: -		-: -	-: -	-: -	-: -				-
Tex.	8,284: 0.1		9: 5.	446: 0.1	9: 7.2	643: 8.				663
Okla.	1,780: -		-: -	-: -	-: -	-: -				-
Ark.	2,520: 2.		56: 5.	140: t	+ 10.	280:15.				378
N. Mex.	119: -		-: -	-: -	-: -	-: -				-
Ariz.	142: t		+ 1.	2: 0	0: 14.	23:11.				16
Calif.	1,152: -		-: -	-: -	-: -	-: -				-
U. S.	77,661: 3.4		2,019: 3.9	2,303: 0.1	56: 9.	5,297:14.9				7,753

*+ Omitted from calculations for

U. S. percentage loss.

+ for storage rots

* for the other Estimated reduction in yield of sweet potato due to diseases

Estimated reduction in yield due to diseases											
State	Production	Stem Rot	Foot Rot	Black Rot	Pox	All Diseases	Storage Rot				
	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :	: 1,000 :				
	: Bushels :	: Bushels :	: Bushels :	: Bushels :	: Bushels :	: Bushels :	: Bushels :	%	%	%	: Bushels :
	: % :	: % :	: % :	: % :	: % :	: % :	: % :				: Bushels :
+N. J.	2,100:18.	518:	-	4.5	129: 1.	29:27.	777:	-	-	-	-
Del.	1,160: 4.	49:	-	2.	25: t	+ 6.	74: 3.	-	-	-	36
Md.	1,250: 1.	13:	t	1.5	19: 0.5	6: 3.5	44:15.	-	-	-	188
Va.	6,705: 4.	285:	-	2.	143:	- 6.	428: 2.	-	-	-	134
+W. Va.	240: -	-:	-	-	-	-	-	-	-	-	-
N. C.	9,126: 3.	330:	t	2.	220:	-:17.	1,869:15.	-	-	-	1,370
*S. C.	5,750: t	+	-	-	+	-	-	-	-	-	1,150
*+Ga.	11,780: -	-:	-	-	-	-	-	-	-	-	-
*+Fla.	3,190: -	-:	-	-	-	-	-	-	-	-	-
*+Ohio	375: -	-:	-	-	-	-	-	-	-	-	-
*+Ind.	250: -	-:	-	-	-	-	-	-	-	-	-
+Ill.	1,020: 1.2	12:	-	-	-	-: 1.2	-	-	-	-	-
+Iowa	315: 7.	24:	-	0.5	2:	-: 7.5	-	-	-	-	-
+Mo.	1,320: 1.5	20:	0	0: t	+	0: 1.5	20:	-	-	-	-
Kans.	240: 5.	13:	-	2.	5: 0.5	1: 7.5	19:13.	-	-	-	31
*+Ky.	1,365: -	-:	-	-	-	-	-	-	-	-	-
Tenn.	4,400: 0.5	23:	0	0: 3.	139: 1.	46: 5.	231:10.	-	-	-	440
*+Ala.	7,622: -	-:	-	-	-	-	-	-	-	-	-
+Miss.	7,670: 3.	250:	-	5.	417:	- 8.	667:	-	-	-	-
*+La.	7,440: -	-:	-	-	-	-	-	-	-	-	-
Tex.	7,384: 2.	170:	-	-:10.	849: t	+:13.	1,104:10.	-	-	-	738
*+Okla.	990: -	-:	-	-	-	-	-	-	-	-	-
Ark.	1,716: 2.	38:	-	5.	95: t	+:10.	190:15.	-	-	-	257
*+N. Mex.	123: -	-:	-	-	-	-	-	-	-	-	-
*+Ariz.	140: -	-:	-	-	-	-	-	-	-	-	-
Wash.	-	-:	-	5.	+	-: 5.	-	-	-	-	-
*+Calif.	990: -	-:	-	-	-	-	-	-	-	-	-
U. S.	84,661: 3.5	1,745:	t	+ 4.1	2,043: 0.2	82:11.	5,461:11.5	-	-	-	4,344

1930 - SWEET POTATO

Estimated reduction in yield due to diseases

State	Estimated reduction in yield due to diseases							
	Production		Stem Rot		Black Rot		All Diseases	
	1,000		Bushels		Bushels		Bushels	
	%		%		%		%	
N. J.	1,995	12.	303	5.	126	21.	530	-
*+Ohio	270	-	-	-	-	-	-	-
+Ind.	270	1.	3	-	-	1.	3	-
*+Ill.	960	-	-	-	-	-	-	-
*+Iowa	300	-	-	-	-	-	-	-
+Mo.	1,045	1.5	16	1.5	16	3.	32	-
+Kans.	315	5.	18	8.	29	14.	51	-
Del.	675	5.	36	2.	15	7.	51	5.
Md.	660	1.	7	1.5	10	3.5	23	15.5
+Va.	3,760	-	-	t	+	1.	38	-
*+W. Va.	150	-	-	-	-	-	-	-
N. C.	9,506	2.	224	3.	336	15.	1,678	15.
S. C.	5,200	t	+	2.	107	3.	161	20.
*+Ga.	9,430	-	-	-	-	-	-	-
Fla.	2,380	t	+	1.	25	5.	125	15.
*+Ky.	952	t	+	-	-	-	-	-
*+Tenn.	3,740	-	-	-	-	-	-	-
*+Ala.	6,290	-	-	-	-	-	-	-
*+Miss.	5,035	-	-	-	-	-	-	-
Ark.	1,904	5.	106	5.	106	10.	212	20.
*+La.	6,232	-	-	-	-	-	-	-
*+Okla.	915	-	-	-	-	-	-	-
Tex.	7,630	1.	88	10.	878	13.1	1,151	10.
*+N. Mex.	80	-	-	-	-	-	-	-
*+Ariz.	140	-	-	-	-	-	-	-
*+Calif.	1,320	-	-	-	-	-	-	-
U. S.	71,154	2.	801	4.2	1,648	10.3	4,055	14.7

*+Omitted from calculations for U. S. percentage losses.

+For storage rots.

*For other diseases.

Estimated reduction in yield of cotton due to diseases, 1920³

Estimated reduction in yield due to diseases													
State	Produc- tion	Anthracnose		Angular Leaf		Wilt		Root Knot		Diseases		All	
		%	Bales	%	Bales	%	Bales	%	Bales	%	Bales		
Va.	44:	2.	+	t	+	-	-	-	-	-	+	82	
N. C.	840:	2.	18:	1.5	14:	2.5	23:	1.	9:	9.	319	319	
S. C.	725:	2.5	26:	3.5	37:	2.	21:	t	+	30.5:	340	340	
Ga.	1,020:	3.	41:	4.	54:	3.	41:	1.	14:	25.	3	3	
Fla.	20:	2.	1:	t	+	10.	2:	t	+	12.	-	-	
Mo.	146:	t	+	-	-	t	+	t	+	-	-	-	
Tenn.	420:	10.	60:	10.	60:	-	-	-	-	30.	180	180	
Ala.	1,090:	-	-	-	-	-	-	-	-	-	-	-	
Miss.	1,470:	10.	176:	1.5	26:	3.	53:	t	+	16.5:	290	290	
La.	685:	1.3	9:	-	-	2.3	17:	-	-	5.9:	43	43	
Tex.	5,150:	-	-	1.	62:	1.	62:	-	-	17.	1,055	1,055	
Okla.	1,180:	-	-	-	-	-	-	-	-	-	-	-	
Ark.	1,215:	t	+	0.5	7:	4.5	59:	2.	26:	8.	105	105	
N. Mex.	70:	-	-	-	-	-	-	-	-	-	-	-	
Ariz.	134:	0	0:	0.5	1:	t	+	t	+	10.1:	15	15	
Calif.	155:	-	-	-	-	-	-	-	-	-	-	-	
All													
Others:	9:	-	-	-	-	-	-	-	-	-	-	-	
U. S.	14,373:	2.3	331:	1.8	261:	2.	276:	0.3	49:	17.2:	2,432	2,432	

Estimated reduction in yield of cotton due to diseases

[illegible]

1930 - COTTON

Estimated reduction in yield of cotton due to diseases

State	Estimated reduction in yield due to diseases									
	Produc- tion	Anthrac- nose	Angular Leaf Spot	Wilt	Root Knot	Diseases	All			
	1,000	1,000	1,000	1,000	1,000	1,000	1,000	Bales	%	Bales
	Bales	%	Bales	%	Bales	%	Bales	%	Bales	%
No.	160	8.	14	-	-	-	-	-	-	14
*Va.	42	-	-	-	-	-	-	-	-	-
N. C.	795	t	9	3.	26	4.	35	9.	-	79
S. C.	1,040	0.5	6	1.	11	-	-	5.5	-	61
Ca.	1,625	-	-	0.1	2	0.1	2	0.2	-	4
Fla.	50	2.	1	2.	1	1.	1	8.	-	4
*Tenn.	400	-	-	-	-	-	-	-	-	-
*Ala.	1,495	-	-	-	-	-	-	-	-	-
*Miss.	1,500	-	-	-	-	-	-	-	-	-
Ark.	910	t	+	t	24	2.	19	4.5	-	43
La.	710	2.	16	t	24	-	+	10.	-	79
*Okla.	900	-	-	-	-	-	-	-	-	-
Tex.	4,100	-	-	97	3.	146	0.5	24	15.5	752
*N. Mex.	100	-	-	-	-	-	-	-	-	-
*Ariz.	160	-	-	-	-	-	-	-	-	-
*Calif.	250	-	-	-	-	-	-	-	-	-
*All	-	-	-	-	-	-	-	-	-	-
Other	6	-	-	-	-	-	-	-	-	-
U. S.	14,243	0.4	37	1.2	120	2.2	233	0.7	78	9.9
										1,036

*States from which no estimates received not included in calculations for United States losses.

Estimated reduction in yield of beans due to diseases

State	Estimated reduction in yield due to diseases									
	Produc- tion	Anthracnose	Bacterial Blight	Mosaic	Root Rots	Diseases	All			
	1,000	1,000	1,000	1,000	1,000	1,000	1,000			
	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels	%	%	Bushels
Maine	90	12	-	-	-	-	-	14	-	14
N. H.		25	-	-	-	-	-	25	-	-
*Vt.	70	-	-	-	-	-	-	-	-	-
Mass.		10	t	t	5	5	17	17	-	-
N. Y.	1,160	7	98	42	t	t	70	17	238	238
Del.		t	t	+	-	-	-	0.5	+	+
Md.		1.5	-	-	t	t	+	3.5	-	-
W. Va.		t	+	+	0	t	+	2	-	-
*N. C.	9	-	-	-	-	-	-	-	-	-
Ga.		1	-	-	t	2	-	37	-	-
Fla.		3	-	-	t	t	+	18	-	-
Ohio		3	-	-	t	1	-	7	-	-
Mich.	5,918	1.5	93	62	t	+	-	4.5	279	279
Wisc.	54	5	3	2	1	t	+	10	6	6
Minn.	45	5	3	3	-	-	-	10	-	-
N. D.		t	+	-	-	-	-	1	-	-
Ineb.	87	t	+	+	0	-	-	-	-	-
Kans.		t	+	-	5	-	-	7	-	-
Ky.		t	+	+	-	20	-	20	-	-

#2 - 1928 Beans (Continued)

State	Production 1,000 Bushels	Estimated reduction in yield due to diseases									
		Anthracnose	Bacterial	Blight	Mosaic	Root Rots	Diseases	All			
		: 1,000 : : Bushels : %	: 1,000 : : Bushels : %	: 1,000 : : Bushels : %	: 1,000 : : Bushels : %	: 1,000 : : Bushels : %	: 1,000 : : Bushels : %	: 1,000 : : Bushels : %			
Tenn.		: 5. : : 5. : : 5. :	: + : : + : : + :	: + : : + : : + :	: + : : + : : + :	: 5. : : 5. : : 5. :	: 10. : : 10. : : 10. :	: 10. : : 10. : : 10. :			
Miss.		: 3. : : 3. : : 3. :	: 3. : : 3. : : 3. :	: 3. : : 3. : : 3. :	: 3. : : 3. : : 3. :	: 1. : : 1. : : 1. :	: 14.5 : : 14.5 : : 14.5 :	: 14.5 : : 14.5 : : 14.5 :			
La.		: 1. : : 1. : : 1. :	: 10. : : 10. : : 10. :	: 10. : : 10. : : 10. :	: 10. : : 10. : : 10. :	: 1. : : 1. : : 1. :	: 11. : : 11. : : 11. :	: 11. : : 11. : : 11. :			
Tex.		: - : : - : : - :	: 5. : : 5. : : 5. :	: 5. : : 5. : : 5. :	: 5. : : 5. : : 5. :	: - : : - : : - :	: 15. : : 15. : : 15. :	: 15. : : 15. : : 15. :			
Mont.	624	: 0 : : 0 : : 0 :	: 4. : : 4. : : 4. :	: 4. : : 4. : : 4. :	: 4. : : 4. : : 4. :	: 27 : : 27 : : 27 :	: 1. : : 1. : : 1. :	: 7. : : 7. : : 7. :			
*Wyo.	352	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :			
Colo.	1,390	: - : : - : : - :	: 2. : : 2. : : 2. :	: 2. : : 2. : : 2. :	: 2. : : 2. : : 2. :	: 31 : : 31 : : 31 :	: - : : - : : - :	: 10. : : 10. : : 10. :			
*N. Mex.	856	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :			
Ariz.	42	: 0 : : 0 : : 0 :	: 1. : : 1. : : 1. :	: 1. : : 1. : : 1. :	: 1. : : 1. : : 1. :	: + : : + : : + :	: 3. : : 3. : : 3. :	: 6.5 : : 6.5 : : 6.5 :			
Utah		: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: 1. : : 1. : : 1. :	: 9. : : 9. : : 9. :			
Idaho	1,476	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: 131 : : 131 : : 131 :	: 10. : : 10. : : 10. :			
Wash.		: 0 : : 0 : : 0 :	: t : : t : : t :	: t : : t : : t :	: t : : t : : t :	: + : : + : : + :	: 5. : : 5. : : 5. :	: 6. : : 6. : : 6. :			
Ore.		: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: + : : + : : + :	: - : : - : : - :	: - : : - : : - :			
*Calif.	4,425	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :	: - : : - : : - :			
U. S.	16,598	: 1.8 : : 1.8 : : 1.8 :	: 209 : : 209 : : 209 :	: 1.4 : : 1.4 : : 1.4 :	: 167 : : 167 : : 167 :	: 1.4 : : 1.4 : : 1.4 :	: 161 : : 161 : : 161 :	: 0.1 : : 0.1 : : 0.1 :	: 77 : : 77 : : 77 :	: 7.9 : : 7.9 : : 7.9 :	: 926 : : 926 : : 926 :

**Production figures for
dry beans only.

Estimated reduction in yield of beans due to diseases

**	Estimated reduction in yield due to diseases									
State	Produce- tion	Anthracnose	Bacterial	Blight	Mosaic	Root Rots	All Diseases			
	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000
	: Bushels	: Bushels	: Bushels	: Bushels	: Bushels	: Bushels	: Bushels	: Bushels	: Bushels	: Bushels
Maine	99: 2.	2:	-	-	2:	-	-	4.	4	
*Vt.	90: -	-	-	-	-	-	-	-	-	
Mass.	-: 3.	-	t	-	1:	5:	-	-: 11.	-	
N. Y.	1,250: t	3:	43: 10.	-	144:	-	-	-: 13.	187	
Del.	-: t	+	+	+	0:	0:	-	0: 0.5	-	
Md.	-: t	+	2:	-	1:	+	t	+	2.	
Va.	-: 4.	-	1:	-	1:	2:	-	-: 9.	-	
N. C.	8: 10.	1: 10.	1:	-	-	-	-	-: 25.	3	
S. C.	-: 10.	-	10:	-	-	-	-	-: 30.	-	
Ga.	-: 1.	-	3:	-	-	-	-	-: 4.	-	
Ohio	-: 0.5	-	0.5	-	1:	0.5	-	-: 3.5	-	
Mich.	5,691: t	+	1.5	-	88: 1.	58:	-	-: 2.5	146	
Wisc.	76: 3.	3: 4.	-	-	3: 1.	1: t	-	+	8.	7
Minn.	54: t	+	10:	-	6: 1.	1: t	-	+	11.	7
Iowa	-: t	+	t	-	+	+	-	-	-	-
Mo.	-: 3.	-	0:	-	0: 0	0: 0	-	0: 3.	-	-
*Nebr.	85: -	-	-	-	-	-	-	-	-	-
Kans.	140: t	+	t	-	5:	7: t	-	+	5.	7
Tenn.	-: 5.	-	1:	-	-	0.5	-	-	8.	-
Miss.	-: 5.	-	4:	-	3:	-	-	-: 12.	-	-
Tex.	-: -	-	10:	-	2:	1:	-	-: 18.	-	-
Mont.	525: 0	0: 2.	-	-	11: 4:	23: 1.	-	6: 7.	40	-
*Wyo.	481: -	-	-	-	-	-	-	-	-	-
*Colo.	1,911: -	-	-	-	-	-	-	-	-	-
*N. Mex.	1,688: -	-	-	-	-	-	-	-	-	-
*Ariz.	48: -	-	-	-	-	-	-	-	-	-
Idaho	2,116: -	-	-	-	4:	91: 3.	-	68: 7.	159	-
Wash.	-: -	-	-	-	5:	t	-	+	5.	-
Ore.	-: -	-	t	-	5:	2:	-	-	9.	-
*Calif.	5,075: -	-	-	-	-	-	-	-	-	-
150 71 727.07 74.5.7 560										

1930 - DRY BEANS

Estimated reduction in yield of dry beans due to diseases

State	: Produc- tion : 1,000 : Bushels	Estimated reduction in yield due to diseases									
		: Anthracnose : 1,000 : Bushels	: Bacterial Blight : 1,000 : Bushels	: Mosaic : 1,000 : Bushels	: Root Rots : 1,000 : Bushels	: All Diseases : 1,000 : Bushels					
Maine	119: 1.	1: 6.	8: 2.	3:	-	-: 10.	13				
*Vt.	84: -	-	-	-	-	-	-				
N. Y.	1,116: -	-: 4.	55: 10.	138: 5.	-	69: 17.	262				
Mich.	4,832: t	+: 2.	263: t	+	t	+: 6.	421				
Wisc.	60: 1.	1: 5.	3: 1.	1: 1.	-	+: 7.	5				
Minn.	51: t	+: 5.	3: 2.	1: 1.	-	+: 7.	4				
*Nebr.	113: -	-	-	-	-	-	-				
*Kans.	144: -	-	-	-	-	-	-				
Mont.	690: 0	0: 2.	15: 4.	30: 1.	-	7: 7.	52				
*Idaho	2,415: 0	0: -	-	-	-	-	-				
*Wyo.	726: 0	0: -	-	-	-	-	-				
*Colo.	3,927: 0	0: -	-	-	-	-	-				
*N. Mex.	726: 0	0: -	-	-	-	-	-				
*Ariz.	68: 0	0: -	-	-	-	-	-				
*Ore.	12: 0	0: -	-	-	-	-	-				
*Calif.	7,049: 0	0: -	-	-	-	-	-				
U. S.	22,137: t.	2: 4.6	347: 2.3	173: 1.	-	76: 10.	757				

1930 - SNAP BEANS

Estimated reduction in yield of snap beans due to diseases

Estimated reduction in yield due to diseases									
State	Production	Anthracnose	Bacterial	Blights	Mosaic	Root Rots	All Diseases		
	1,000	1,000	1,000	1,000	1,000	1,000	1,000		
	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels		
Maine	292: 1.	3: 6.	19: 2.		6:	-	-: 10.	31	
Mass.		+	+	+	+	+	+: 13.5	+	
Corn.		-	-	-	-	-	-: 1.	+	
N. Y.	1,225: -	-: 4.	60: 10.		151: 5.		76: 19.	287	
*N. J.	1,210: -	-: -	-: -	-: -	-: -	-: -	-: -	-	
*Pa.	225: -	-: -	-: -	-: -	-: -	-: -	-: -	-	
*Ind.	183: -	-: -	-: -	-: -	-: -	-: -	-: -	-	
*Ill.	40: -	-: -	-: -	-: -	-: -	-: -	-: -	-	
Mich.	467: t	+	25: t		+	t	+: 3.	40	
Wisc.	575: 1.	6: 5.	31: 1.		6: t		+: 7.	43	
Mo.		+	-	-	-	-	-: 3.	+	
Del.	162: t	+	+	+	-	-	-: 0.5	1	
Md.	1,058: 0.5	6: 1.	11: 0.5		6: 3.		34: 5.5	63	
Va.	579: t	+	+	+	7: 5.		37: 22.	163	
V. Va.		+	+	+	-	-	-: 1.	+	
N. C.	566: t	+	+	+	+	-	-: 2.	12	
S. C.	503: 0.5	3: 1.	6: t		+	10.	57: 11.5	66	
*Ga.	187: -	-: -	-: -	-: -	-: -	-: -	-: -	-	
Fla.	2,499: 2.	53: 1.	26: t		+	t	+: 5.	132	
*Tenn.	366: -	-: -	-: -	-: -	-: -	-: -	-: -	-	
*Ala.	65: -	-: -	-: -	-: -	-: -	-: -	-: -	-	
*Miss.	513: -	-: -	-: -	-: -	-: -	-: -	-: -	-	
*Ark.	206: t	+	+	+	-	-	-: -	-	
La.	1,241: 0.5	7: 10.	147: t		+	5.	73: 15.5	227	
Tex.	630: 0.1	1: 2.	15: 2.		15: 5.		37: 14.1	105	
*Colo.	824: -	-: -	-: -	-: -	-: -	-: -	-: -	-	
*Utah	392: -	-: -	-: -	-: -	-: -	-: -	-: -	-	
*Wash.	258: -	-: -	-: -	-: -	-: -	-: -	-: -	-	
*Ore.	258: -	-: -	-: -	-: -	-: -	-: -	-: -	-	
*Calif.	737: -	-: -	-: -	-: -	-: -	-: -	-: -	-	
*Other St.	442: -	-: -	-: -	-: -	-: -	-: -	-: -	-	
U. S.	15,705: 0.7	79: 3.1	340: 1.7		191: 2.9		314: 10.7	1,170	

*Includes snap beans for manufacture in Alabama, Georgia, Idaho, Illinois, Iowa, Kansas, Kentucky, Minnesota, Missouri, Montana, Nebraska, New Jersey, Ohio, Oklahoma, Texas,

Vermont, Virginia and Wyoming.

1928 - PEAR

Estimated reduction in yield of pear due to diseases

State	Estimated reduction in yield due to diseases									
	Production		Fire Blight		Scab		Leaf Blight		All Diseases	
	per 1,000		per 1,000		per 1,000		per 1,000		per 1,000	
	Bushels	%	Bushels	%	Bushels	%	Bushels	%	Bushels	%
Maine	10:	-	-	-	-	-	-	-	-	-
N. H.	9:	t	+	10.	1:	-	-	10.	1	1
Vt.	6:	-	-	-	-	-	-	-	-	-
Mass.	56:	1.	1:	1.	1:	t	+	7.	5	5
R. I.	7:	-	-	-	-	-	-	-	-	-
Conn.	42:	-	-	-	-	-	-	-	-	-
N. Y.	1,800:	1.	19:	1.	19:	t	+	3.	57	57
N. J.	502:	-	-	-	-	-	-	-	-	-
Pa.	620:	-	-	-	-	-	-	-	-	-
Del.	108:	0.5	1:	t	+	5.	6:	6.	8	8
Md.	193:	6.	1:	0.5	+	7.	2:	13.5	3	3
Va.	230:	2.5	6:	t	+	t	+	4.	10	10
W. Va.	63:	10.	7:	-	-	4.	3:	15.	11	11
N. C.	234:	20.	58:	-	-	-	-	20.	58	58
S. C.	133:	20.	33:	-	-	-	-	20.	33	33
Ga.	245:	75.	919:	-	-	-	-	80.	980	980
Fla.	52:	50.	70:	t	+	10.	14:	63.	68	68
Ohio	395:	1.5	1:	0.5	+	-	-	2.5	1	1
Ind.	288:	-	-	-	-	-	-	-	-	-
Ill.	540:	-	-	-	-	-	-	-	-	-
Mich.	819:	1.5	1:	3.	3:	t	+	5.5	5	5
Wis.	:	t	+	5.	-	0	0:	5.	+	+
Iowa	47:	5.	2:	-	-	-	-	5.	2	2
Mo.	171:	11.	21:	t	+	-	-	11.	21	21
Neb.	12:	-	-	-	-	-	-	-	-	-
Kans.	51:	1.	1:	1.	1:	-	-	3.	3	3
Ky.	116:	-	-	-	-	-	-	-	-	-
Tenn.	255:	25.	127:	0	0:	25.	127:	50.	254	254
Ala.	234:	-	-	-	-	-	-	-	-	-
Miss.	194:	12.	28:	t	+	t	+	17.	40	40
La.	69:	10.	8:	-	-	-	-	10.	8	8
Tex.	390:	2.	9:	-	-	-	-	12.	53	53
Okla.	72:	-	-	-	-	-	-	-	-	-
Ark.	102:	-	-	-	-	-	-	-	-	-
Colo.	105:	-	-	-	-	-	-	-	-	-
N. Mex.	27:	-	-	-	-	-	-	-	-	-
Ariz.	15:	3.5	+	0	0:	0	0:	10.5	1	1
Utah	87:	10.	10:	-	-	0	0:	10.	10	10
Nev.	6:	-	-	-	-	0	0:	-	-	-
Idaho	72:	t	+	t	+	0	0:	t	+	+
Wash.	3,500:	-	-	-	-	0	0:	2.	72	72
Ore.	2,700:	-	-	5.	142:	0	0:	5.	142	142
Calif.	9,126:	-	-	2.	186:	-	-	2.	186	186
U. S.	23,783:	5.7	1,323:	1.5	353:	0.7	152:	8.9	2,052	2,052

Estimated reduction in yield of pears due to diseases

Estimated reduction in yield due to diseases									
State	Production	Blight		Scab		Leaf-Blight		All Diseases	
	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000
	: Bushels	%	: Bushels	%	: Bushels	%	: Bushels	%	: Bushels
*Maine	13	-	-	-	-	-	-	-	-
*N. H.	15	-	-	-	-	-	-	-	-
*Vt.	12	-	-	-	-	-	-	-	-
Mass.	74	1.	1	t	+	-	3.	-	3
*R. I.	11	-	-	-	-	-	-	-	-
*Conn.	52	-	-	-	-	-	-	-	-
*N. Y.	1,152	-	-	-	-	-	-	-	-
*N. J.	338	-	-	-	-	-	-	-	-
*Pa.	272	-	-	-	-	-	-	-	-
Del.	248	1.	3	-	-10.	-	28:11.5	-	32
Md.	254	7.	20	-	-4.	-	11:11.	-	31
Va.	330	6.	24	4.5	18	2.5	10:17.	-	68
* W. Va.	49	-	-	-	-	-	-	-	-
N. C.	205	18.	46	-	-t	-	+:19.	-	49
S. C.	104	25.	35	-	-	-	-:25.	-	35
Ga.	174	80.	696	-	-	-	-:80.	-	696
*Fla.	51	-	-	-	-	-	-	-	-
Ohio	175	1.	2	1.	2	-	-: 2.5	-	5
*Ind.	209	-	-	-	-	-	-	-	-
Ill.	711	2.	15	-	-: 1.	-	7: 3.	-	22
Mich.	468	4.	22	10.	55	t	+:15.	-	83
Iowa	52	6.	3	-	-	-	-: 6.	-	3
Mo.	445	5.	23	0	0	0	0: 5.	-	23
*Nebr.	40	-	-	-	-	-	-	-	-
Kans.	234	-	-	2.	5	-	-: 2.	-	5
*Ky.	129	-	-	-	-	-	-	-	-
Tenn.	242	50.	250	-	-: 1.5	-	8:51.5	-	258
*Ala.	142	-	-	-	-	-	-	-	-
Miss.	132	25.	44	-	-	-	-:25.	-	44
*La.	59	-	-	-	-	-	-	-	-
Tex.	455	1.	6	-	-	-	-:21.	-	121
*Okla.	190	-	-	-	-	-	-	-	-
*Ark.	104	-	-	-	-	-	-	-	-
*Colo.	650	-	-	-	-	-	-	-	-
*N. Mex.	63	-	-	-	-	-	-	-	-
*Ariz.	16	-	-	-	-	-	-	-	-
*Utah	70	-	-	-	-	-	-	-	-
*Nev.	3	-	-	-	-	-	-	-	-
Idaho	53	t	+	-	-: 0.5	-	+: 0.5	-	+
*Wash.	2,800	t	+	t	+	-	-	-	-
Ore.	2,356	2.	50	2.	50	-	-: 5.	-	125
*Calif.	7,751	-	-	-	-	-	-	-	-
U. S.	20,903	14.9	1,240	1.6	130	0.8	64:19.3	-	1,603

Estimated reduction in yield due to diseases

Estimated reduction in yield due to diseases										
State	Production	Blight		Scab		Leaf Blight		All Diseases		
	1,000			1,000		1,000		1,000		
	Bushels:	%	Bushels:	%	Bushels:	%	Bushels:	%	Bushels:	
*Maine	10:	-	-	-	-	-	-	-	-	-
*N. H.	15:	-	-	-	-	-	-	-	-	-
*Vt.	10:	-	-	-	-	-	-	-	-	-
Mass.	93:	1.	+	-	-	-	-	3.	-	1
*R. I.	13:	-	-	-	-	-	-	-	-	-
Conn.	69:	0.5	+	0.5	+	0.5	+	1.5	-	1
*N. Y.	3,168:	-	-	-	-	-	-	-	-	-
*N. J.	488:	-	-	-	-	-	-	-	-	-
*Pa.	620:	-	-	-	-	-	-	-	-	-
Ohio	190:	1.	2:	t	+	-	-	1.	-	2
*Ind.	136:	-	-	-	-	-	-	-	-	-
Ill.	315:	10.	35:	-	2:	-	-	10.	-	35
Mich.	805:	3.	25:	t	+	t	+	4.	-	33
Wisc.	:	t	+	5.	+	0	0:	5.	-	+
*Iowa	33:	-	-	-	-	-	-	-	-	-
*Mo.	177:	-	-	-	-	-	-	-	-	-
*Neb.	27:	-	-	-	-	-	-	-	-	-
*Kans.	103:	-	-	-	-	-	-	-	-	-
Del.	142:	1.5	2:	-	3:	1:	4:	4.5	-	6
Md.	180:	4.	8:	2:	4:	3.	6:	9.	-	18
Va.	80:	10.	9:	t	+	t	+	11.	-	10
*W. Va.	15:	-	-	-	-	-	-	-	-	-
N. C.	115:	18.	26:	-	-	0	0:	20.	-	29
S. C.	102:	15.	19:	-	-	-	20.	-	-	25
*Ga.	174:	-	-	-	-	-	-	-	-	-
Fla.	56:	15.	12:	-	-	5.	4:	30.	-	24
*Ky.	29:	t	+	-	-	-	-	-	-	-
*Tenn.	124:	-	-	-	-	-	-	-	-	-
*Ala.	200:	-	-	-	-	-	-	-	-	-
*Miss.	162:	-	-	-	-	-	-	-	-	-
*Ark.	65:	-	-	-	-	-	-	-	-	-
La.	57:	5.	3:	-	-	-	-	6.	-	4
*Okla.	40:	-	-	-	-	-	-	-	-	-
Tex.	350:	15.	60:	-	-	-	20.	-	-	88
*Idaho	66:	-	-	-	-	-	-	-	-	-
*Colo.	173:	-	-	-	-	-	-	-	-	-
*N. Mex.	30:	-	-	-	-	-	-	-	-	-
*Ariz.	14:	-	-	-	-	-	-	-	-	-
*Utah	87:	-	-	-	-	-	-	-	-	-
*Nev.	6:	-	-	-	-	-	-	-	-	-
*Wash.	4,500:	-	-	-	-	-	-	-	-	-
*Ore.	3,200:	-	-	-	-	-	-	-	-	-
Calif.	9,459:	15.	1,669:	-	-	0	0:	15.	-	1,669
U. S.	25,703:	13.4	1,876:	t	4:	0.1	14:	13.9	-	1,945

Estimated reduction in yield of apple due to diseases

State	Production: : 1,000 : Bushels	Estimated reduction in yield due to diseases									
		Bitter Rot:	Black Rot:	Blotch:	Cedar Rust:	Fire Blight:	Scab:	All Diseases			
		: 1,000 : : Bushels : : % :	: 1,000 : : Bushels : : % :	: 1,000 : : Bushels : : % :	: 1,000 : : Bushels : : % :	: 1,000 : : Bushels : : % :	: 1,000 : : Bushels : : % :	: 1,000 : : Bushels : : % :			
Maine	1,400:	0 :	- :	0 :	- :	-:16.	:	267:16.	:	267	:
N. H.	1,000:	0 :	+:	0 :	+:	4:25.	:	333:25.	:	333	:
*Vt.	560:	0 :	- :	0 :	- :	-:	:	-:	:	-	:
Mass.	2,700:	t :	+:	0 :	62:	8.	:	248:13.	:	403	:
*R. I.	230:	- :	- :	0 :	- :	-:	:	-:	:	-	:
*Conn.	1,500:	- :	- :	0 :	- :	-:	:	-:	:	-	:
N. Y.	21,900:	- :	- :	0 :	327:1.	327:30.	:	9,806:33.	:	10,787	:
N. J.	3,290:	0.1 :	+:	0.3 :	11: t	-:	:	304:13.4	:	509	:
Pa.	8,460:	- :	+:	t :	106:	-:	:	1,586:20.	:	2,115	:
Del.	1,520:	t :	8:	- :	-:	+:	1.	16:3.5	:	56	:
Md.	2,190:	1. :	133:	1. :	13:1.	27:3.	:	80:17.5	:	466	:
Va.	16,100:	0.8 :	200:	t :	998: t	+:	2.5	499:19.3	:	3,852	:
W. Va.	8,750:	t :	+:	t :	+:	288:1.	:	96:9.	:	864	:
N. C.	5,040:	4.2 :	281:3.	3.7 :	181:4.2	281:6.	:	402:24.8	:	1,661	:
S. C.	480:	5. :	27:1.	t :	5:3.5	19:1.	:	5:11.5	:	61	:
Ga.	1,400:	5. :	100:	- :	-:	-:25.	:	500:30.	:	600	:
Ohio	5,880:	0.1 :	6:0.5	1.5 :	6:0.5	31:2.5	:	155:5.2	:	322	:
Ind.	2,520:	2. :	57:0.5	4. :	14:1.	29:3.	:	86:12.	:	344	:
*Ill.	7,150:	- :	-:	- :	-:	-:	:	-:	:	-	:
Mich.	5,400:	- :	-:	- :	+:	14:20.	:	1,106:17.	:	1,106	:
Wisc.	2,160:	0 :	0:	t :	+:	543:20.5	:	-:	:	557	:
*Minn.	1,230:	0 :	0:	0 :	-:	-:	:	-:	:	-	:
Iowa	2,740:	- :	-:	1. :	167:5.	167:7.	:	234:18.	:	601	:
Mo.	3,360:	3. :	122:4.	4.5 :	+:	20:1.	:	41:17.	:	692	:

Estimated reduction in yield due to diseases													
State	Production: 1,000 Bushels	Bitter Rot % Bushels	Black Rot % Bushels	Blotch % Bushels	Cedar Rust % Bushels	Fire Blight % Bushels	Scab % Bushels	All Diseases % Bushels					
N. D.		-	-	-	t	+	5.	-	-	2.	-	-	8.
*S. D.	230	-	-	-	-	-	-	-	-	-	-	-	-
*Neb.	270	-	-	-	-	-	-	-	-	-	-	-	-
Kans.	320	-	1.	9: 4.	36: 2.	19:	-	-	-	2.	-	-	-
Ky.	5,700	t	+	5.	335: t	+	t	-	-	+	10.	-	19:13.
Tenn.	3,700	7.	395: 5.	283: 4.	226: 2.	113: 5.	-	-	-	283:10.	-	-	671:15.
*Ala.	885	-	-	-	-	-	-	-	-	-	-	-	566:33.
Miss.	250	5.	15: t	+	3.	9: 0.5	-	-	-	15: 0.5	-	-	-
*La.	30	-	-	-	-	-	-	-	-	-	-	-	1:14.
Tex.	216	-	-	-	1.	-	1.	-	-	2:	-	-	-:12.
*Okla.	350	-	-	-	-	-	-	-	-	-	-	-	-
Ark.	2,200	1.	25: 1.	25: 1.	25: 2.	50: t	-	-	-	+	1.5	-	37:11.5
Mont.	516	0	0: 0	0: 0	0: 0	0: t	-	-	-	+	2.	-	11: 2.
*Wyo.	48	0	0: -	0: 0	0: -	-	-	-	-	-	-	-	-
Colo.	3,020	0	0: 0	0: 0	0: 0	-	1.	-	-	31: t	-	-	-
*N. Mex.	675	0	0: 0	0: 0	0: 0	0: -	-	-	-	-	-	-	+
Ariz.	76	0	0: 0	0: 0	0: 0	0: 1.5	-	-	-	1: 0	-	-	0:10.
Utah	380	0	0: 0	0: 0	0: 0	0: 1.	-	-	-	9:	-	-	-: 3.
*Nev.	52	0	0: 0	0: 0	0: 0	0: -	-	-	-	-	-	-	-
Idaho	5,000	0	0: 0	0: 0	0: 0	0: t	-	-	-	+	t	-	+
Wash.	33,500	0	0: 0	0: 0	0: 0	0: t	-	-	-	+	t	-	+
Ore.	6,950	0	0: 0	0: 0	0: 0	0: t	-	-	-	+	-	-	-:15.
*Calif.	12,282	0	0: 0	0: 0	0: 0	0: -	-	-	-	-	-	-	-
U. S.	184,920	0.6	1,219: 0.6	1,072: 0.7	1,345: 1.1	2,052: 0.8	1,544: 9.2	17,612: 16.5	31,472				

1929 - APPLE

Estimated reduction in yield of apple due to diseases

52

Estimated reduction in yield due to diseases														
State	Production	Bitter Rot	Black Rot	Blotch	Cedar Rust	Blight	Scab	All Diseases						
	: 1,000 Bushels	: 1,000 Bushels	: 1,000 Bushels	: 1,000 Bushels	: 1,000 Bushels	: 1,000 Bushels	: 1,000 Bushels	: 1,000 Bushels						
	%	%	%	%	%	%	%	%						
Maine	3,360	-	-	0	0	+	4	140	4	140				
*N. H.	974	-	-	0	0	-	-	-	-	-				
*Vt.	1,029	-	-	0	0	-	-	-	-	-				
Mass.	2,650	t	+	0	0	1.5	43	5	144	8	230			
*R. I.	253	-	-	0	0	-	-	-	-	-				
*Conn.	990	-	-	0	0	-	-	-	-	-				
N. Y.	16,520	-	-	-	-	-	17.5	3,504	17.5	3,504				
N. J.	1,860	t	+	0.3	6	t	9	137	9.7	201				
*Pa.	5,973	-	-	-	-	-	-	-	-	-				
Del.	1,012	t	+	-	-	-	5	16	4	42				
Md.	2,200	1	25	0.5	13	0.5	13	25	3	314				
Va.	13,000	0.5	80	1.3	208	2.5	400	80	4	3,009				
W. Va.	5,600	-	-	1	63	t	+	+	5	693				
N. C.	2,628	3	103	2	69	2	5	172	6	808				
S. C.	308	10	36	3	11	t	+	4	t	51				
Ga.	680	5	49	0	0	0	10	97	10	292				
Ohio	2,660	0.2	6	1	29	0.1	3	14	5	201				
Ind.	1,170	-	-	0.5	7	1.5	20	1	8	161				
Ill.	4,725	t	+	-	107	t	+	+	10	644				
Mich.	7,020	-	-	0.5	43	-	+	88	16	1,754				
Wisc.	1,749	0	0	t	+	t	+	11	18	411				
*Minn.	726	-	-	-	-	-	-	-	-	-				
Iowa	2,120	-	-	-	+	t	+	27	12	597				
Mo.	2,800	3	106	1.5	54	5	71	5	21	745				

		Estimated reduction in yield due to diseases											
State	Production	Bitter Rot	Black Rot	Blotch	Cedar Rust	Blight	Scab	All Diseases					
	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
	Bushels	%	Bushels	%	Bushels	%	Bushels	%	Bushels	%	Bushels	%	Bushels
*S. D.	140	-	-	0	0	-	-	-	-	-	-	-	-
Nebr.	868	-	-	-	+	1.	9	1.	-	-	9	2.	18
Kans.	1,310	-	1.	3.	15	6.	91	3.	-	-	45	13.5	204
*Ky.	2,000	-	-	-	-	-	-	-	-	-	-	-	-
Tenn.	2,000	5.	129	0.2	5	0.5	13	8.	206	5.	129	22.2	572
*Ala.	500	-	-	-	-	-	-	-	-	-	-	-	-
Miss.	185	5.	11	0.5	1	3.	1	5.	11	0.5	1	14.5	31
*La.	25	-	-	-	-	-	-	-	-	-	-	-	-
Tex.	230	-	-	t	-	-	-	-	-	-	-	20.	57
*Okla.	634	-	-	-	-	-	-	-	-	-	-	-	-
Ark.	1,400	1.	16	t	+	t	+	t	+	5.	80	13.	208
Mont.	420	0	0	0	0	0	0	0	+	0.5	2	0.5	2
*Wyo.	35	0	0	0	0	0	0	0	-	-	-	-	-
*Colo.	2,460	0	0	0	0	0	0	0	-	-	-	-	-
*N. Mex.	1,035	0	0	0	0	0	0	0	-	-	-	-	-
*Ariz.	104	0	0	0	0	0	0	0	-	-	-	-	-
*Utah	500	0	0	0	0	0	0	0	-	-	-	-	-
*Nev.	25	0	0	0	0	0	0	0	-	-	-	-	-
Idaho	2,200	0	0	0	0	0	0	0	+	t	+	1.5	84
*Wash.	26,656	0	0	0	0	0	0	0	+	t	+	-	-
Ore.	4,000	0	0	0	0	0	0	0	50	7.	350	20.	1,000
*Calif.	7,700	0	0	0	0	0	0	0	-	-	-	-	-
U. S.	139,754	0.5	561	0.5	545	0.7	689	0.7	733	1.1	1,106	8.7	9,022
													15,973

Estimated reduction in yield of apples due to diseases

State	Estimated reduction in yield due to diseases							
	: Production :		: Bitter Rot :		: Black Rot :		: Blotch :	
	: 1,000 :		: 1,000 :		: 1,000 :		: 1,000 :	
	: Bushels :	%	: Bushels :	%	: Bushels :	%	: Bushels :	%
Maine	3,024	0	0	-	-	0	0	0
*N. H.	1,419	0	0	-	-	0	0	0
*Vt.	762	0	0	-	-	0	0	0
Mass.	4,750	t	+	0	0	t	+	+
*R. I.	396	-	-	-	-	-	-	-
Conn.	1,936	-	-	1.	20	0	0	0
N. Y.	27,683	0	0	-	-	0	0	0
N. J.	3,713	t	+	t	+	t	+	+
Pa.	9,774	-	-	-	-	-	-	-
Ohio	3,500	t	+	0.1	4	0.1	4	4
Ind.	1,240	0	0	-	-	0.1	1	1
Ill.	4,932	t	+	0.2	11	5.	279	279
Mich.	5,223	0	0	t	+	t	+	+
Wis.	928	0	0	t	+	t	+	+
Minn.	315	t	+	1.	3	t	+	+
*Iowa	1,272	-	-	-	-	-	-	-
Mo.	1,992	1.	24	1.	24	2.	47	47
S. D.	90	-	-	t	+	t	+	+
Nebr.	462	0	0	t	+	-	-	-
Kans.	601	-	-	-	-	3.	19	19
Del.	1,748	-	-	0.5	10	t	+	+
Md.	1,650	1.	19	5.	94	0.5	9	9
Va.	7,700	t	+	1.	83	t	+	+
W. Va.	3,944	-	-	-	-	t	+	+
N. C.	2,555	t	+	t	+	3.	98	98
S. C.	454	5.	25	1.	5	t	+	+
Ga.	1,126	0.1	1	0.1	1	0.1	1	1
*Ky.	1,212	t	+	-	-	-	-	-
*Tenn.	1,653	-	-	-	-	-	-	-
*Ala.	760	-	-	-	-	-	-	-
*Miss.	206	-	-	-	-	-	-	-
Ark.	1,700	t	+	t	+	t	+	+
*La.	30	-	-	-	-	-	-	-
*Okla.	310	-	-	-	-	-	-	-
Tex.	150	0.1	+	0.5	1	2.	4	4
*Mont.	410	0	0	0	0	0	0	0
*Idaho	5,000	0	0	0	0	0	0	0
*Wyo.	32	0	0	0	0	0	0	0
*Colo.	1,130	0	0	0	0	0	0	0
*N. Mex.	420	0	0	0	0	0	0	0
*Ariz.	97	0	0	0	0	0	0	0
*Utah	1,100	0	0	0	0	0	0	0
*Nev.	50	0	0	0	0	0	0	0
*Wash.	37,850	0	0	0	0	0	0	0
*Ore.	6,600	0	0	0	0	0	0	0
*Calif.	11,644	0	0	0	0	0	0	0
U. S.	163,543	0.1	69	0.2	256	0.4	462	462

State	Estimated reduction in yield due to diseases							
	Rust		Blight		Scab		All Diseases	
	1,000		1,000		1,000		1,000	
	%	Bushels	%	Bushels	%	Bushels	%	Bushels
Maine	t	+	-	-	29.	1,309	33.	1,490
*N. H.	-	-	-	-	-	-	-	-
*Vt.	-	-	-	-	-	-	-	-
Mass.	2.	116	t	+	5.	290	18.	1,043
*R. I.	-	-	-	-	-	-	-	-
Conn.	0.5	10	0.5	10	2.	41	4.5	91
N. Y.	0.5	151	0.5	151	7.5	2,269	8.5	2,571
N. J.	0.5	21	1.5	64	10.	427	13.	555
Pa.	-	-	-	-	15.	1,725	15.	1,725
Ohio	-	-	2.	72	1.	36	3.2	116
Ind.	-	-	2.	27	3.	40	6.7	89
Ill.	t	+	2.5	140	3.	168	11.7	654
Mich.	t	+	1.	56	5.	281	7.	393
Wis.	t	+	1.	11	12.	128	13.	139
Minn.	5.	18	2.	7	2.	7	10.	35
*Iowa	-	-	-	-	-	-	-	-
Mo.	2.	47	5.	118	2.	47	15.5	366
S. D.	4.	4	2.	2	1.	1	7.	7
Nebr.	1.	5	1.	5	t	+	2.	10
Kans.	-	-	-	-	-	-	3.	19
Del.	t	+	t	+	1.	20	11.5	228
Md.	0.5	9	1.	19	2.	38	12.5	235
Va.	t	+	0.2	17	0.5	42	7.7	643
W. Va.	t	+	-	-	t	+	10.	438
N. C.	2.	66	10.	328	2.	66	22.	722
S. C.	t	+	0.5	2	t	+	8.	39
Ga.	0.1	1	15.	202	1.	13	16.4	219
*Ky.	-	-	-	-	t	+	-	-
*Tenn.	-	-	-	-	-	-	-	-
*Ala.	-	-	-	-	-	-	-	-
*Miss.	-	-	-	-	-	-	-	-
Ark.	0.5	9	5.	90	t	+	5.5	99
*La.	-	-	-	-	-	-	-	-
*Okla.	-	-	-	-	-	-	-	-
Tex.	-	-	10.	18	-	-	18.	32
*Mont.	-	-	t	+	t	+	-	-
*Idaho	-	-	-	-	-	-	-	-
*Wyo.	-	-	-	-	-	-	-	-
*Colo.	-	-	-	-	-	-	-	-
*N. Mex.	-	-	-	-	-	-	-	-
*Ariz.	-	-	-	-	-	-	-	-
*Utah	-	-	-	-	-	-	-	-
*Nev.	-	-	-	-	-	-	-	-
*Wash.	-	-	-	-	-	-	-	-
*Ore.	-	-	-	-	-	-	-	-
*Calif.	-	-	-	-	-	-	-	-
U. S.	0.4	457	1.3	1,339	6.7	6,948	11.5	11,958

1928 - PEACH

Estimated reduction in yield of peach due to disease

State	Estimated reduction in yield due to diseases									
	Production	Leaf Curl		Brown Rot		Scab		All Diseases		
	: 1,000 :	: Bushels :	% :	: Bushels :	% :	: Bushels :	% :	: Bushels :	% :	: Bushels :
	:	:	:	:	:	:	:	:	:	:
*N. H.	25:	-	:	-	-	-	-	-	-	-
Mass.	189:	2.	:	5:	10.	23:	1.	2:	18.	41
*R. I.	27:	-	:	-	-	-	-	-	-	-
*Conn.	239:	-	:	-	-	-	-	-	-	-
N. Y.	2,400:	2.	:	53:	5.	133:	t	4:	10.	266
N. J.	1,625:	-	:	-	6.5:	119:	1.5	27:	11.	201
Penna.	1,867:	t	:	+	4.	81:	0.5	10:	8.	162
Del.	155:	-	:	-	0.5:	1:	1.	2:	3.5:	6
Md.	465:	t	:	+	4.	21:	0.5	3:	13.	70
Va.	880:	2.	:	19:	3.	29:	2.	19:	9.	86
W. Va.	810:	t	:	+	1.	8:	1.	8:	3.	24
N. C.	2,590:	1.5	:	52:	8.	278:	4.	139:	25.5:	886
S. C.	1,363:	t	:	+	3.	52:	3.	52:	21.	363
Ga.	10,000:	5.	:	704:	15.	2,113:	5.	704:	29.	4,084
Fla.	112:	t	:	+	t	+	2.	2:	4.	4
Ohio	1,742:	0.1	:	1:	10.	20:	1.	2:	14.6:	30
Ind.	605:	-	:	-	0.5:	3:	-	-	6.5:	42
Ill.	1,638:	-	:	-	1.	17:	-	-	1.	17
Mich.	1,156:	t	:	+	5.	67:	5.	67:	14.	188
Iowa	50:	-	:	-	-	-	-	-	0.1:	+
Mo.	655:	t	:	+	5.	37:	1.	7:	11.	81
*Neb.	6:	-	:	-	-	-	-	-	-	-
Kans.	84:	-	:	-	4.	4:	2.	2:	8.	8
Ky.	1,035:	t	:	+	15.	225:	6.	90:	31.	465
Tenn.	2,190:	-	:	-	40.	1,752:	2.	88:	50.	2,190
*Ala.	1,350:	-	:	-	-	-	-	-	-	-
Miss.	635:	1.	:	8:	15.	117:	2.	16:	19.	149
*La.	211:	-	:	-	-	-	-	-	-	-
Tex.	1,612:	0	:	0:	1.	19:	2.	37:	13.	241
*Okla.	480:	-	:	-	-	-	-	-	-	-
Ark.	3,000:	t	:	+	1.	32:	t	+	6.	192
*Colo.	600:	-	:	-	-	-	-	-	-	-
* N. Mex:	46:	-	:	-	-	-	-	-	-	-
Ariz.	66:	0	:	0:	0	0:	0	0:	8.	6
*Utah	612:	-	:	-	-	-	-	-	-	-
*Nev.	5:	-	:	-	-	-	-	-	-	-
Idaho	335:	t	:	+	-	-	0	0:	2.	7
Wash.	1,470:	t	:	+	t	+	0	0:	1.	15
Ore.	292:	2.	:	7:	10.	34:	0	0:	15.	51
*Calif.	25,752:	-	:	-	-	-	-	-	-	-
U. S.	68,374:	1.7	:	849:	10.6:	5,185:	2.6	1,277:	20.2:	9,875

Estimated reduction in yield due to diseases

Estimated reduction in yield due to diseases									
State	Production 1,000 Bushels	Leaf Curl %	Bushels	Brown Rot %	Bushels	Scab %	Bushels	All Diseases %	Bushels
N. H.	26	-	-	-	-	-	-	-	-
Mass.	165	1	2	10	20	t	16		32
R. I.	25	-	-	-	-	-	-	-	-
Conn.	177	-	-	-	-	-	-	-	-
N. Y.	1,470	20	368	t	+	t	20		368
N. J.	2,600	-	-	5	139	1.5	42	6.5	181
Pa.	1,157	t	+	-	-	-	-	-	-
Del.	378	-	-	0.5	2	1	4	4.5	18
Md.	532	t	+	5	31	1	6	13.5	83
Va.	928	1	11	5	53	3	32	13	139
W. Va.	580	t	+	1	6	-	-	1	6
N. C.	1,400	0.5	10	9	184	3	61	31.5	643
S. C.	552	-	-	5	32	3	19	13	83
Ga.	2,880	0	0	5	166	3	99	13	431
Fla.	94	-	-	-	-	-	-	-	-
Ohio	494	2	11	5	27	1	5	8.1	44
Ind.	726	-	-	1	9	t	+	16	139
Ill.	3,600	1	38	5	192	-	-	6	230
Mich.	816	6	58	4	38	1	10	15	144
Iowa	55	3	2	1	1	-	-	4	3
Mo.	1,261	1	14	6	83	1	14	8.5	118
Nebr.	68	-	-	-	-	-	-	-	-
Kans.	385	4	17	2	8	2	8	8	33
Ky.	600	-	-	-	-	-	-	-	-
Tenn.	1,225	2	30	15	224	t	+	18	269
Ala.	504	-	-	-	-	-	-	-	-
Miss.	444	t	+	12	63	3	16	15	79
La.	154	-	-	-	-	-	-	-	-
Tex.	1,953	t	+	5	106	1	21	8	169
Okla.	1,100	-	-	-	-	-	-	-	-
Ark.	2,635	t	+	1	27	t	+	3	81
Colo.	1,000	-	-	-	-	-	-	-	-
N. Mex.	94	-	-	-	-	-	-	-	-
Ariz.	60	-	-	-	-	-	-	-	-
Utah	542	-	-	-	-	-	-	-	-
Nev.	5	-	-	-	-	-	-	-	-
Idaho	238	0.5	1	-	-	-	-	1	2
Wash.	1,259	t	+	t	+	-	-	-	-
Wyo.	232	1	3	3	8	-	-	9	24
Calif.	13,543	-	-	-	-	-	-	-	-
U. S.	45,998	2	565	4.9	1,419	1.2	337	11.5	3,319

1930 - PEACH

Estimated reduction in yield of peach due to diseases

State	Estimated reduction in yield due to diseases									
	Production	Leaf Curl	Brown Rot	Yellows	Scab	Bacterial	Spot	Diseases	All	
	: 1,000 Bushels	: 1,000 Bushels	: 1,000 Bushels	: 1,000 Bushels	: 1,000 Bushels	: 1,000 Bushels	: 1,000 Bushels	: 1,000 Bushels	: 1,000 Bushels	: 1,000 Bushels
	%	%	%	%	%	%	%	%	%	%
*N. H.	37	-	-	-	-	-	-	-	-	-
Mass.	232	t	+12	32	t	+	0	0	13	35
*R. I.	28	-	-	-	-	-	-	-	-	-
Conn.	276	-	-	3	-	-	0.5	1	2	5
N. Y.	2,158	t	+	+	-	-	t	+	+	-
N. J.	1,708	t	+	57	-	-	0.5	9	19	104
*Pa.	936	-	-	-	-	-	-	-	-	-
Ohio	400	3	13	8	0	0	0.5	2	5.7	24
Ind.	12	Crop Winter Killed								
Ill.**		Crop Winter Killed								
Mich.	629	t	+	2		13	t	+	2.5	16
Iowa	7	-	-	-	-	-	-	-	-	-
Mo.	24	-	-	-	-	-	-	-	0.3	+
*Nebr.	31	-	-	-	-	-	-	-	-	-
*Kans.	35	-	-	-	-	-	-	-	-	-
Del.	162	-	-	1	t	+	0.5	1	1	2
Md.	231	t	+	8	0.5	1	1	3	7.5	20
Va.	240	t	+	+	t	+	t	+	-	-
*W. Va.	122	-	-	-	-	-	-	-	-	-
N. C.	1,800	1	20	2		40	-	-	10	200
S. C.	952	t	+	31	0	0	2	21	9	94

**Production too small to estimate.

#2 - 1930 Teach (Cont.)

Estimated reduction in yield due to diseases													
State	Production	Leaf Curl	Brown Rot	Yellows	Scab	Spot	Bacterial	All					
	1,000 Bushels	1,000 Bushels	1,000 Bushels	1,000 Bushels	1,000 Bushels	1,000 Bushels	1,000 Bushels	1,000 Bushels					
	%	%	%	%	%	%	%	%					
Ga.	4,698	0.1	5	0.5	24	0.1	5	0.7					34
Fla.	102	1	1	4	5	10	13	21					27
Ky.	75	Crop Winter Killed											
*Tenn.	630	-	-	-	-	-	-	-					-
*Ala.	1,105	-	-	-	-	-	-	-					-
*Miss.	490	-	-	-	-	-	-	-					-
Ark.	84	t	t	t	+	t	t	+					-
*La.	112	-	-	-	-	-	-	-					-
*Okla.	80	-	-	-	-	-	-	-					-
Tex.	750	0.1	1	0.5	4	4	35	13					113
*Idaho	32	-	-	-	-	-	-	0					-
*Colo.	817	-	-	-	-	-	-	0					-
*N. Mex.	51	-	-	-	-	-	-	0					-
*Ariz.	88	-	-	-	-	-	-	0					-
*Utah	355	-	-	-	-	-	-	0					-
*Nev.	6	-	-	-	-	-	-	0					-
*Wash.	615	-	-	-	-	-	-	0					-
*Ore.	280	-	-	-	-	-	-	0					-
*Calif.	32,836	-	-	-	-	-	-	0					-
U. S.	53,286	0.3	40	1.8	273	0.4	54	0.6	90	0.3	49	4.5	674

1928 - GRAPE

Estimated reduction in yield of grapes
due to diseases (in States east of the Great Plains)

State	Estimated reduction in yield due to diseases					
	Production		Black Rot		All Diseases	
	1,000 tons	%	1,000 Tons	%	1,000 Tons	
*Maine	76	-	-	-	-	-
*N. H.	91	-	-	-	-	-
*Vt.	36	-	-	-	-	-
Mass.	476	1.	5	9.		47
* R. I.	190	-	-	-	-	-
*Conn.	1,314	-	-	-	-	-
N. Y.	85,470	2.5	2,757	22.5		24,814
*N. J.	2,822	-	-	-	-	-
*Pa.	22,680	-	-	-	-	-
Del.	1,600	0.5	8	1.		16
Md.	1,200	3.	37	3.5		43
Va.	2,560	10.	289	11.5		332
W. Va.	1,422	10.	160	11.		176
N. C.	6,000	6.	396	9.		594
S. C.	1,724	5.	94	8.		150
Ga.	1,672	5.	98	15.		294
Fla.	900	5.	52	13.		135
Ohio	28,700	1.	296	3.		888
*Ind.	4,280	-	-	-	-	-
*Ill.	6,800	-	-	-	-	-
Mich.	72,800	5.	3,872	6.		4,646
Wisc.	495	2.	10	3.		15
*Minn.	198	-	-	-	-	-
*Iowa	6,225	t	+	-	-	-
Mo.	14,000	1.	143	2.5		358
*Nebr.	1,920	-	-	-	-	-
Kans.	3,465	2.	72	4.		144
Ky.	1,200	10.	133	10.		133
Tenn.	1,368	40.	912	40.		912
*Ala.	759	-	-	-	-	-
Miss.	259	6.	17	11.		32
*La.	38	-	-	-	-	-
Tex.	1,440	2.	35	22.		384
Okla.	2,100	-	-	-	-	-
Ark.	17,000	2.	358	5.		895
Report-						
ing Area	293,981	3.	9,744	10.7		35,008

1929 - GRAPE

Estimated reduction in yield of grapes due to diseases
East of the Great Plains

State	Estimated reduction due to diseases					
	Black Rot			All Diseases		
	Production					
	: 1,000 : : Bushels :	%	: 1,000 : Bushels	%	: 1,000 : Bushels	
*Maine	: 81:	-	-	-	-	-
*N. H.	: 130:	-	-	-	-	-
*Vt.	: 56:	-	-	-	-	-
Mass.	: 714:	t	+	: 8.	:	62
*R. I.	: 239:	-	-	-	-	-
*Conn.	: 1,620:	-	-	-	-	-
*N. Y.	: 81,030:	-	-	-	-	-
*N. J.	: 2,652:	-	-	-	-	-
*Penna.	: 16,200:	-	-	-	-	-
Del.	: 1,710:	0.5	: 9	: 1.	:	18
Md.	: 1,314:	5.	: 70	: 5.5	:	77
Va.	: 2,336:	8.	: 206	: 9.5	:	245
*W. Va.	: 954:	-	-	-	-	-
N. C.	: 5,320:	5.	: 289	: 8.	:	462
S. C.	: 1,495:	20.	: 374	: 20.	:	374
Ga.	: 1,430:	5.	: 84	: 15.	:	252
*Fla.	: 888:	-	-	-	-	-
Ohio	: 17,150:	6.	: 1,095	: 6.	:	1,095
*Ind.	: 3,780:	-	-	-	-	-
Ill.	: 6,160:	5.	: 324	: 5.	:	324
Mich.	: 68,870:	5.	: 3,644	: 5.5	:	4,008
Wisc.	: 434:	2.	: 9	: 3.	:	13
*Minn.	: 166:	-	-	-	-	-
Iowa	: 6,675:	t	+	: t	:	+
Mo.	: 12,045:	2.	: 251	: 4.	:	502
*Nebr.	: 2,125:	-	-	-	-	-
Kans.	: 3,375:	2.	: 69	: 2.	:	69
*Ky.	: 912:	-	-	-	-	-
Tenn.	: 1,254:	20.	: 334	: 25.	:	418
*Ala.	: 759:	-	-	-	-	-
Miss.	: 245:	5.	: 13	: 5.	:	13
*La.	: 36:	-	-	-	-	-
Tex.	: 1,520:	10.	: 217	: 30.	:	651
*Okla.	: 2,070:	-	-	-	-	-
Ark.	: 13,800:	20.	: 3,494	: 21.	:	3,669
Report--:	:	:	:	:	:	:
ing	: 253,545:	6.6	: 10,482	: 7.7	:	12,252
Area	:	:	:	:	:	:

1930 - GRAPE
East of Great Plains

Estimated reduction in yield of grape due to diseases

State	Estimated reduction					
	Black Rot			All Diseases		
	Production					
	1,000	%	Tons	%	Tons	
*Maine	79	-	-	-	-	-
*N. H.	116	-	-	-	-	-
*Vt.	64	-	-	-	-	-
Mass.	765	1.	8	6.	49	
*R. I.	221	-	-	-	-	-
Conn.	1,620	1.	16	1.5	24	
*N. Y.	76,670	-	-	-	-	-
N. J.	2,890	5.	152	5.	152	
*Pa.	18,630	-	-	-	-	-
Ohio	26,000	2.	533	2.5	666	
*Ind.	4,140	-	-	-	-	-
Ill.	4,320	t	+	t	+	
Mich.	77,600	t	+	1.	784	
Wisc.	385	1.	4	2.	8	
Minn.	108	t	+	t	+	
*Iowa	4,563	-	-	-	-	-
*Mo.	10,335	-	-	-	-	-
Nebr.	1,825	1.	18	1.	18	
*Kans.	2,475	-	-	-	-	-
Del.	1,596	0.5	8	1.	16	
Md.	1,368	3.	43	3.5	50	
Va.	2,030	t	+	t	+	
*W. Va.	900	-	-	-	-	-
N. C.	5,548	1.	59	6.	354	
S. C.	1,840	10.	204	10.	204	
Ga.	1,606	0.1	2	0.1	2	
Fla.	1,241	5.	83	25.	414	
*Ky.	832	-	-	-	-	-
*Tenn.	1,292	-	-	-	-	-
*Ala.	814	-	-	-	-	-
*Miss.	262	-	-	-	-	-
Ark.	12,650	0.5	64	0.5	64	
*La.	36	-	-	-	-	-
*Okla.	1,710	-	-	-	-	-
Tex.	1,280	3.	42	8.	112	
U. S.	267,861	0.8	1,236	1.9	2,917	

1928 - CHERRY

Estimated percentage reduction in yield due to
sease

State	Estimated percentage loss due to disease		
	Brown Rot	Leaf Spot	All Diseases
	%	%	%
N. H.	30.	-	30.
Mass.	20.	-	25.
N. Y.	5.	5.	10.
N. J.	5.	-	5.
Del.	t	0.5	1.
Md.	1.	10.	11.
Va.	3.5	1.	5.5
W. Va.	0.5	0.7	1.
Ohio	0.5	5.	5.5
Mich.	1.	8.	10.
Wisc.	1.	1.	3.
Iowa	2.	3.	9.
Mo.	t	8.	9.
Kans.	2.	10.	14.
Ky.	t	10.	10.
Tenn.	40.	30.	70.
Miss.	t	t	-
Ark.	t	4.	5.
Mont.	0	0	2.
Colo.	-	-	t
Ariz.	0	0	5.
Utah	-	-	3.
Wash.	0.5	0.2	1.
Ore.	3.	1.	5.

1930 - CHERRY

Estimated percentage reduction in yield due to diseases

State	Estimated percentage loss due to diseases		
	Brown Rot	Leaf Spot	All Diseases
	%	%	%
Mass.	t	-	5.
Conn.	1.	0.5	1.5
N. Y.	5.	t	5.
Ohio	-	1.	1.
Mich.	0.5	3.	3.5
Wisc.	1.	1.	3.
Minn.	2.	5.	7.
Mo.	-	3.	3.
S. D.	t	2.	3.2
Del.	t	0.5	1.
Md.	1.	2.	3.
N. C.	5.	1.	8.
Ark.	t	t	-
Tex.	t	-	10.

1928 - PLUM AND PRUNE

Estimated percentage reduction in yield due
to disease

State	Estimated percentage loss due to diseases	
	Brown Rot	All Diseases
	%	%
N. H.	30.	30.
Mass.	25.	33.
N. Y.	3.	3.
Del.	0.5	1.
Md.	5.	6.
Va.	5.	6.5
W. Va.	1.5	2.
N. C.	9.	9.
Ohio	20.	21.
Mich.	2.5	2.5
Wisc.	6.	6.
Iowa	5.	6.
Mo.	7.	12.5
N. D.	t	1.
Kans.	4.	5.
Tenn.	40.	40.
Miss.	6.	6.
Tex.	2.	7.
Ariz.	0	4.
Wash.	t	1.
Ore.	1.	1.

1929 - PLUM AND PRUNE

Estimated percentage reduction in yield of plum and
prune due to diseases

State	Estimated percentage loss due to disease	
	Brown Rot	All Diseases
	%	%
Maine	6.	6.
Mass.	10.	18.
Del.	0.5	1.
Md.	5.	6.
Va.	2.5	4.
W. Va.	t	t
N. C.	10.	10.
S. C.	10.	10.
Ohio	15.	15.
Mich.	5.	6.
Wisc.	3.	3.
Iowa	1.	1.
Mo.	12.	12.
N. D.	-	1.
Kans.	2.	2.
Tenn.	10.	11.
Miss.	5.	5.
Wash.	t	t
Ore.	4.	10.

1930 - PLUM AND PRUNE

Estimated percentage reduction in yield due to diseases

State	Estimated percentage loss due to disease		
	Brown rot	Other diseases	All diseases
Mass.	10.	2.	12.
Conn.	1.	0.5	1.5
Ill.	5.	-	5.
Mich.	3.	1.	4.
Wisc.	3.	t	3.
Minn.	10.	-	10.
Del.	0.5	0.5	1.
Md.	2.5	1.	3.5
Va.	t	t	t.
N.C.	5.	1.	6.
S.C.	8.	-	8.
Fla.	10.	5.	15.
Ark.	t	-	t.
Tex.	t	5.	5.
Mont.	-	1.	1.

AGRICULTURAL REFERENCE DEPARTMENT
U. S. DEPARTMENT OF AGRICULTURE

DISEASES OF PLANTS IN THE UNITED STATES IN 1931

Compiled by

Paul R. Miller, Neil E. Stevens, and Jessie I. Wood

Plant Disease Reporter
Supplement 84

March 15, 1933.

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INTRODUCTION

The value of the annual summaries of plant diseases prepared by the Plant Disease Survey is to a certain extent cumulative, since a comparison of different years is one of the chief points of interest. It is important, therefore, to have the information on diseases of different years readily comparable. To facilitate this we have endeavored to have the "Plant Diseases in the United States for 1931" follow closely in form and arrangement the preceding summaries.

Information already published in the Plant Disease Reporter is not repeated but in some cases is referred to by "P. D. R. --, Page ---." There are, of course, numerous notes regarding the occurrence of plant diseases in the Reporter which are not referred to in this summary. Anyone wishing information regarding a particular disease or host should consult the index to the Reporter. As is probably well known many notes of occurrence of diseases are received each year by the Plant Disease Survey which cannot be mentioned in the Reporter or the Summary. Any pathologist planning to publish on the distribution of a specific disease in the United States would do well to consult our files. So far as is practical we are always glad to prepare summaries or maps giving the known distribution of a disease.

As individual contributions cannot be acknowledged without undue use of space, a list of collaborators is given below. Continued contacts with plant pathologists throughout the United States both personally and by letter is one of the pleasantest features in the work of the Plant Disease Survey.

N. E. S.

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- WEST VIRGINIA, West Virginia College of Agriculture, Morgantown - C. R. Orton.
 Agricultural Experiment Station, Morgantown - Anthony Berg, E. C. Sherwood.
 Agricultural Experiment Station, Inwood - F. J. Schneiderhan.
- WISCONSIN, Agricultural Experiment Station, Madison - L. R. Jones.
 University of Wisconsin, Madison - G. W. Keitt, A. J. Riker, R. E. Vaughan.
- WYOMING, Agricultural Experiment Station, Laramie - Aven Nelson.
- HAITI, Port au Prince, Haiti - H. D. Barker.
- HAWAII, University of Hawaii, Honolulu - G. H. Godfrey, C. P. Sideris.
 Pineapple Experiment Station, Honolulu - M. B. Linford.
- PHILLIPPINE ISLANDS, Bureau of Science, Manila - C. J. Humphrey.
- PORTO RICO, Insular Experiment Station, Rio Piedras - M. T. Cook, J. A. F. Nolla.

METHOD OF PRESENTING WEATHER DATA

So important are weather conditions in the incidence of plant diseases that some review of the weather must accompany any plant disease summary, yet for an area so large as the United States only the most generalized statement can be presented in any reasonable space. In an endeavor to present in small compass certain salient facts regarding the weather of 1931 a series of maps has been prepared showing the deviation from the normal of mean temperature and total precipitation. (Figs. 1 - 8).

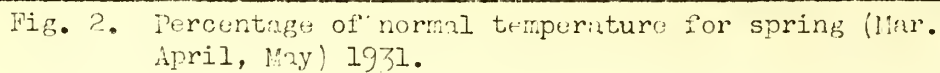
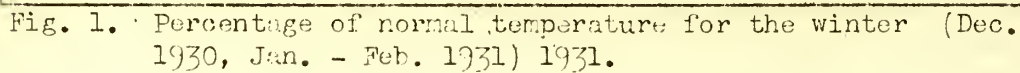
For convenience the climatic regions used by the Weather Bureau have been utilized, although these are political, that is, limited by State boundaries, rather than natural climatic units. The seasons have been considered arbitrarily as consisting of three calendar months, although the duration of the periods of growth and dormancy vary greatly in different parts of the United States. Mean temperature and total rainfall are given in percentages of normal, regions approximately normal and above being further indicated by shading. Deviation from the normal probably furnishes one of the best means of correlating weather with the unusual crop or disease conditions, since obviously "normal" indicates an average of the conditions to which the crops of the region have been subject during a series of years.

In addition to these general maps, the accumulated rainfall and temperature for six selected stations is indicated by means of graphs. (Figs. 9 - 20) In each case the normal for the station is indicated by a solid line and the actual for 1931 by a broken line.

THE WEATHER IN 1931

While there was in 1931, of course, no single outstanding feature comparable to the drought of 1930, it is evident that a large part of the United States suffered from deficient rainfall in 1931. This is particularly true of the Plains States and the southeastern States. Spring temperatures were somewhat below normal in the southeastern United States while summer temperatures were nearly normal or somewhat above normal throughout the country, and fall temperatures well above normal in all the States east of the Rocky Mountains.

The individual stations for which detailed records are given were selected by J. B. Kincer, Senior Meteorologist of the Weather Bureau, as being fairly representative of the various sections of the country. With the exception of Bismarck, North Dakota, precipitation was somewhat below normal in all these centers throughout the growing season, and at Atlanta, Georgia, was decidedly below normal. Temperatures, on the other hand, were nearly normal at Harrisburg, Pennsylvania; Little Rock, Arkansas; and Atlanta, Georgia; slightly above normal at Sacramento, California; and well above normal at Portland, Oregon, and Bismarck, North Dakota.



TEMPERATURE

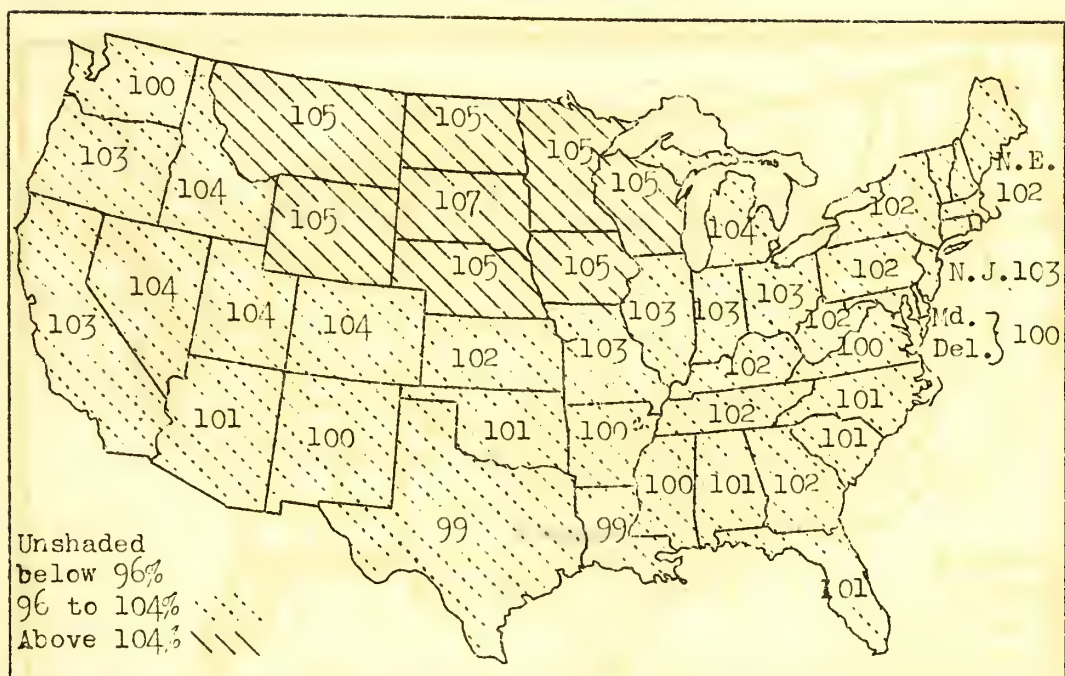


Fig. 3. Percentage of normal temperature for the summer (June July, Aug.) 1931.

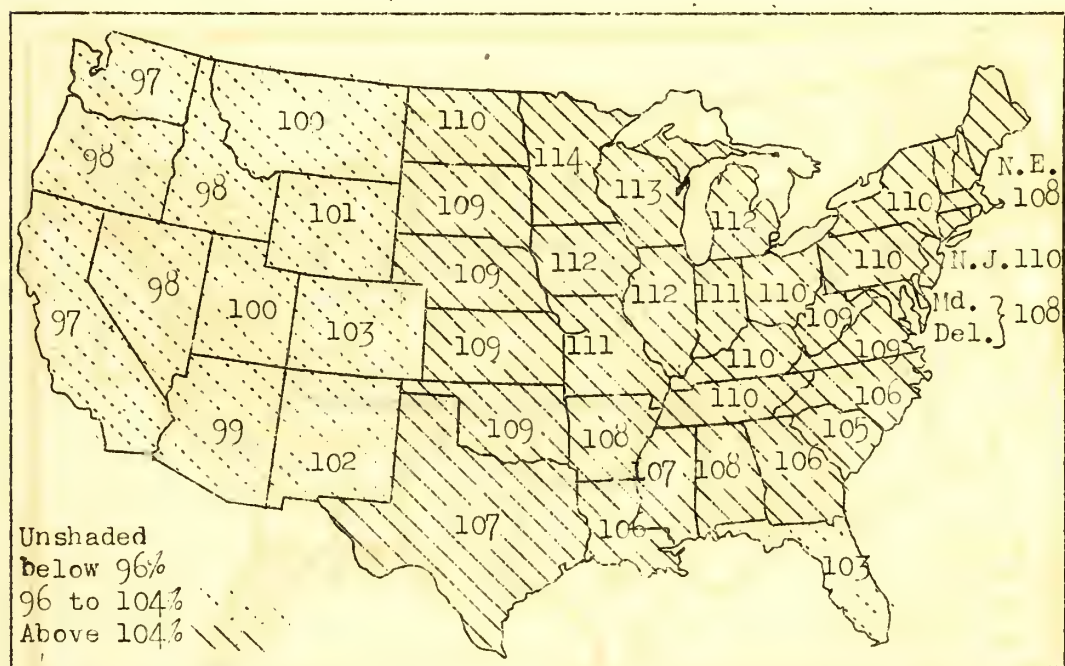


Fig. 4. Percentage of normal temperature for the fall (Sept., Oct., Nov.) 1931.

PRECIPITATION

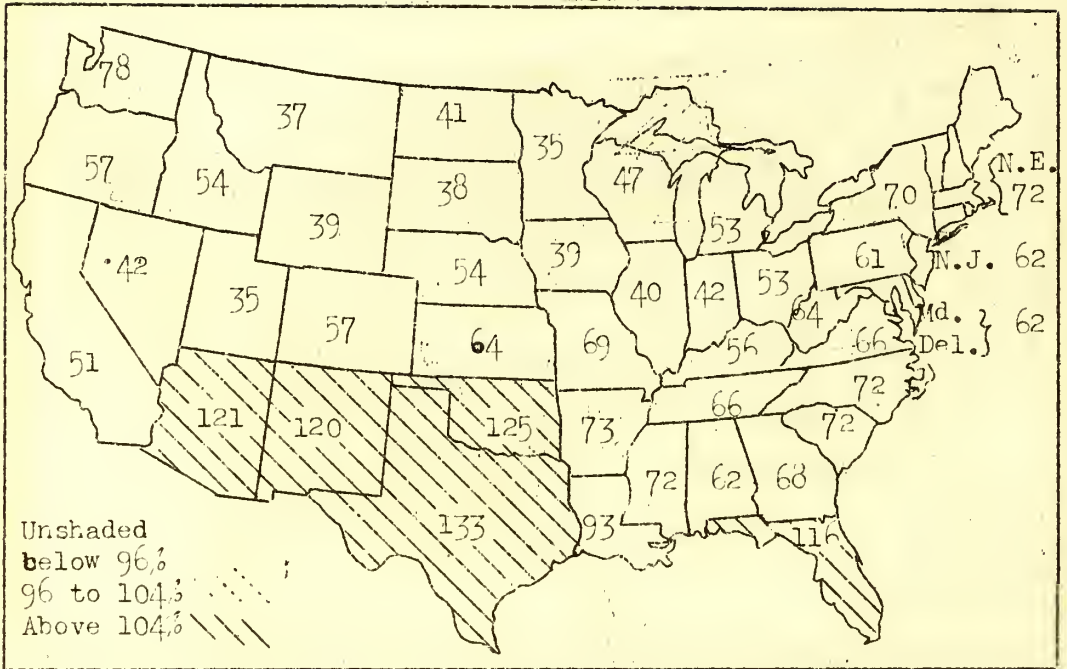


Fig. 5. Percentage of normal precipitation for the winter (Dec. 1930, Jan. - Feb. 1931) 1931.

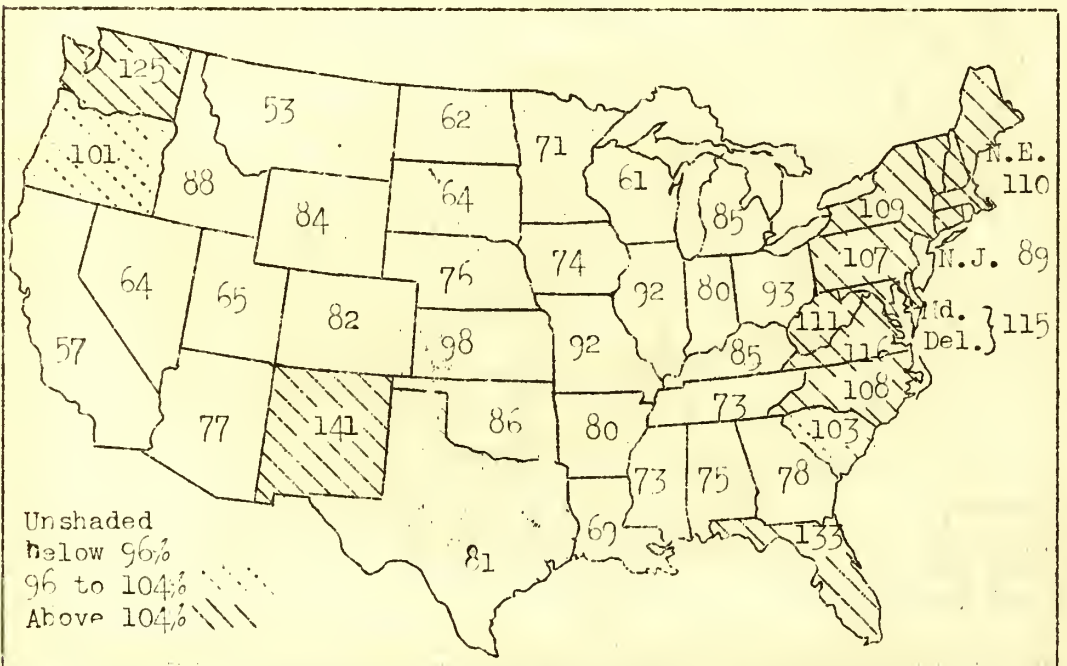


Fig. 6. Percentage of normal precipitation for the spring (Mar., Apr., May) 1931.

PRECIPITATION

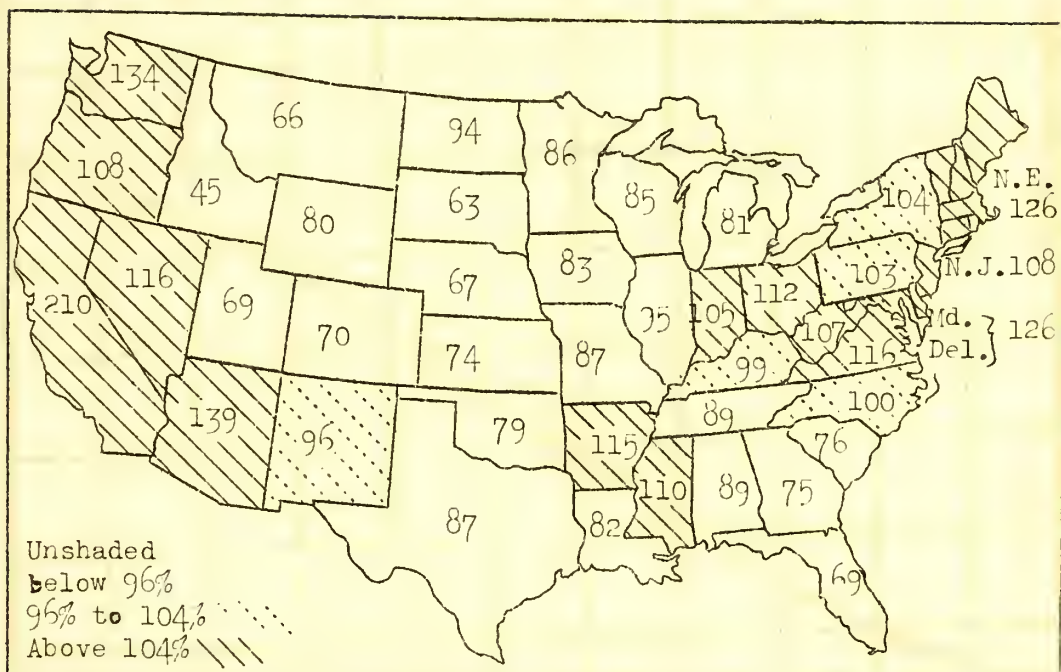


Fig. 7. Percentage of normal precipitation during summer (June, July, Aug.) 1931.

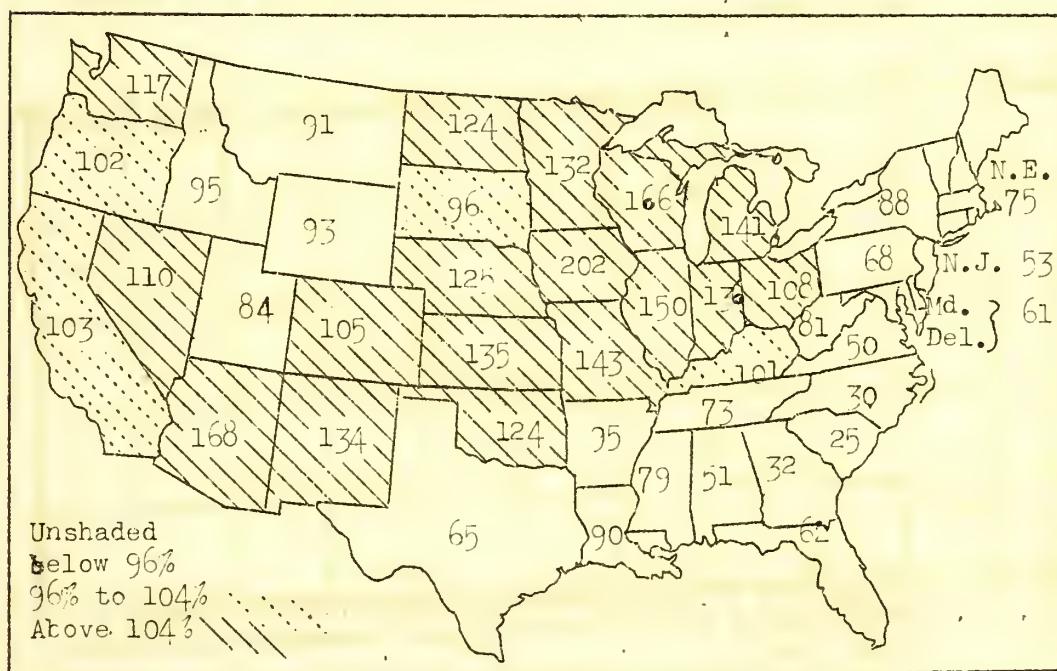


Fig. 8. Percentage of normal precipitation during fall (Sept., Oct., Nov.) 1931.

HARRISBURG, PENNSYLVANIA

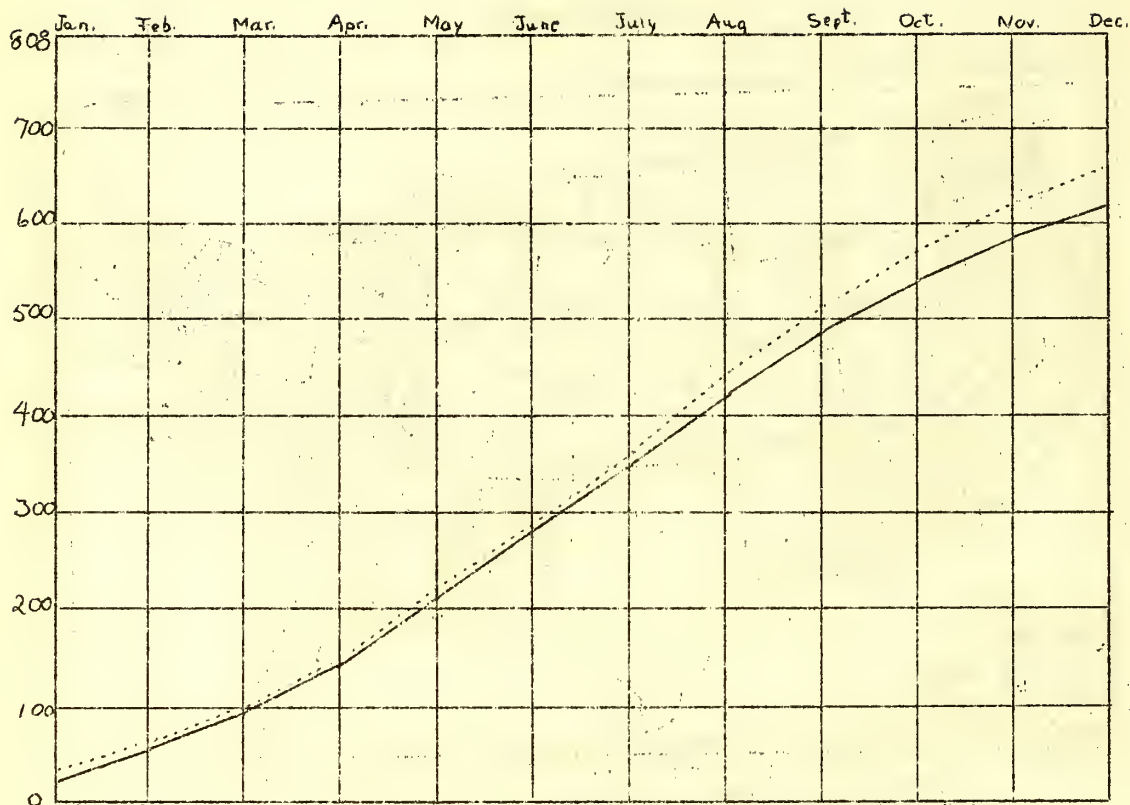


Fig. 9. Accumulated temperature in degrees F. for Harrisburg, Pennsylvania, 1931 (dotted line), compared with normal (solid line).

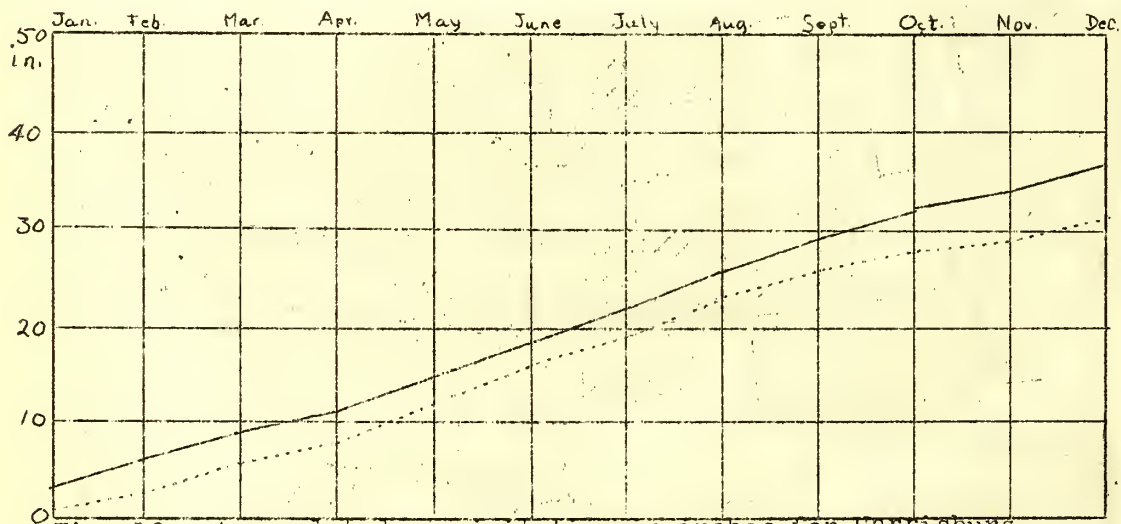


Fig. 10. Accumulated precipitation in inches for Harrisburg, Pennsylvania, 1931, (dotted line), compared with normal (solid line).

ATLANTA, GEORGIA

12

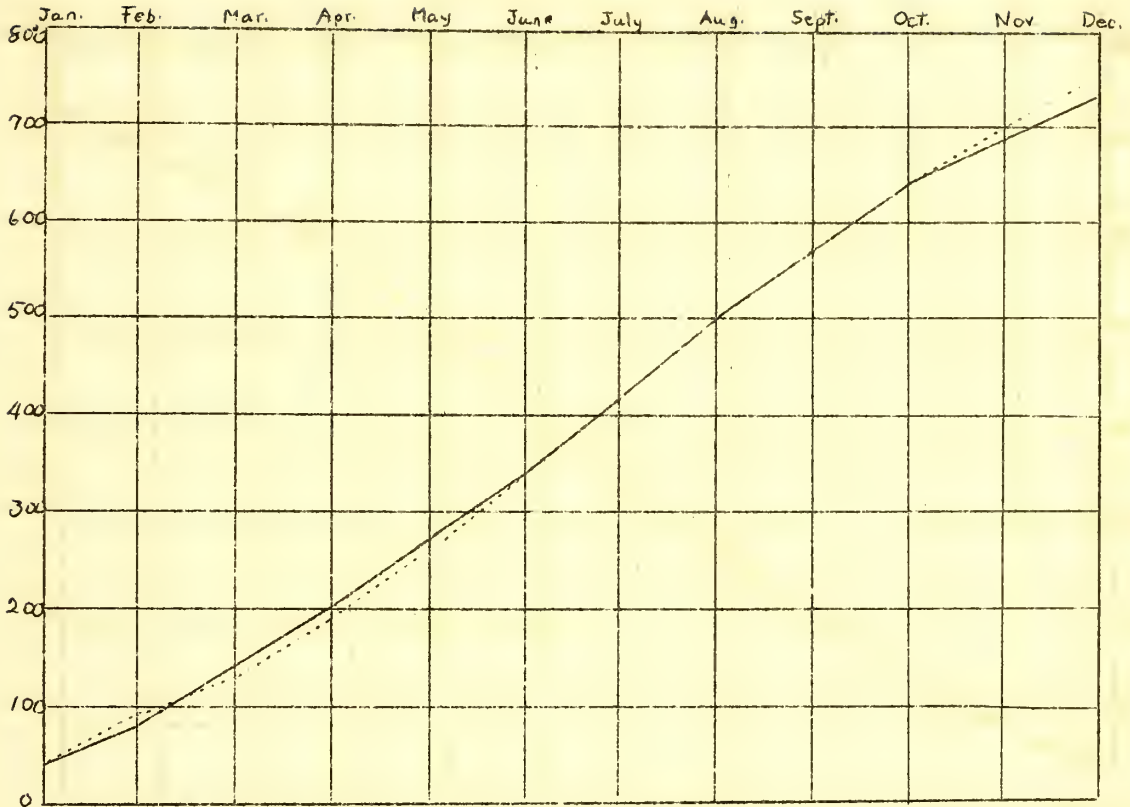


Fig. 11. Accumulated temperature in degrees F. for Atlanta, Georgia, 1931, (dotted line), compared with normal (solid line).

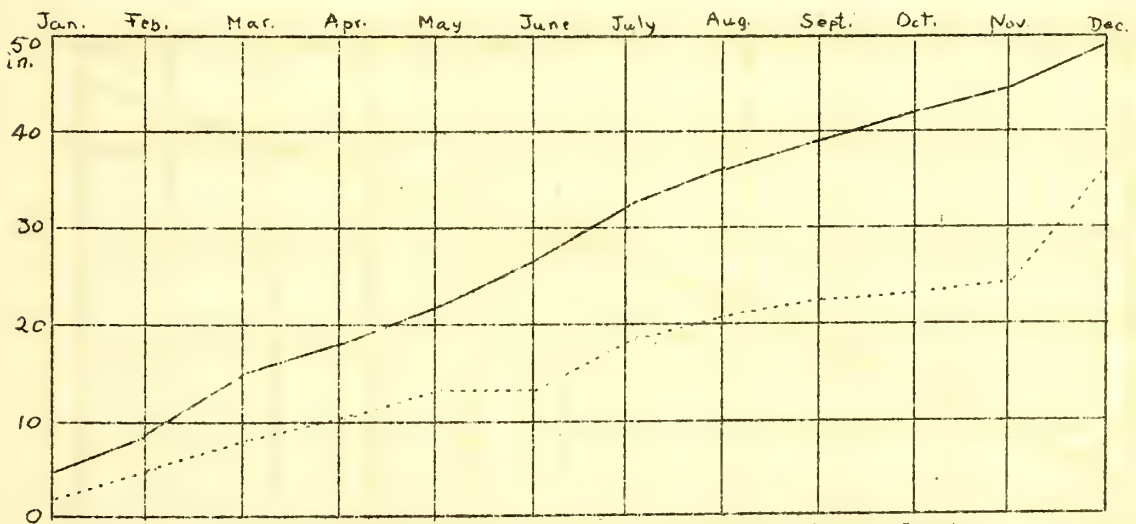


Fig. 12. Accumulated precipitation in inches for Atlanta, Georgia, 1931, (dotted line), compared with normal (solid line).

LITTLE ROCK, ARKANSAS

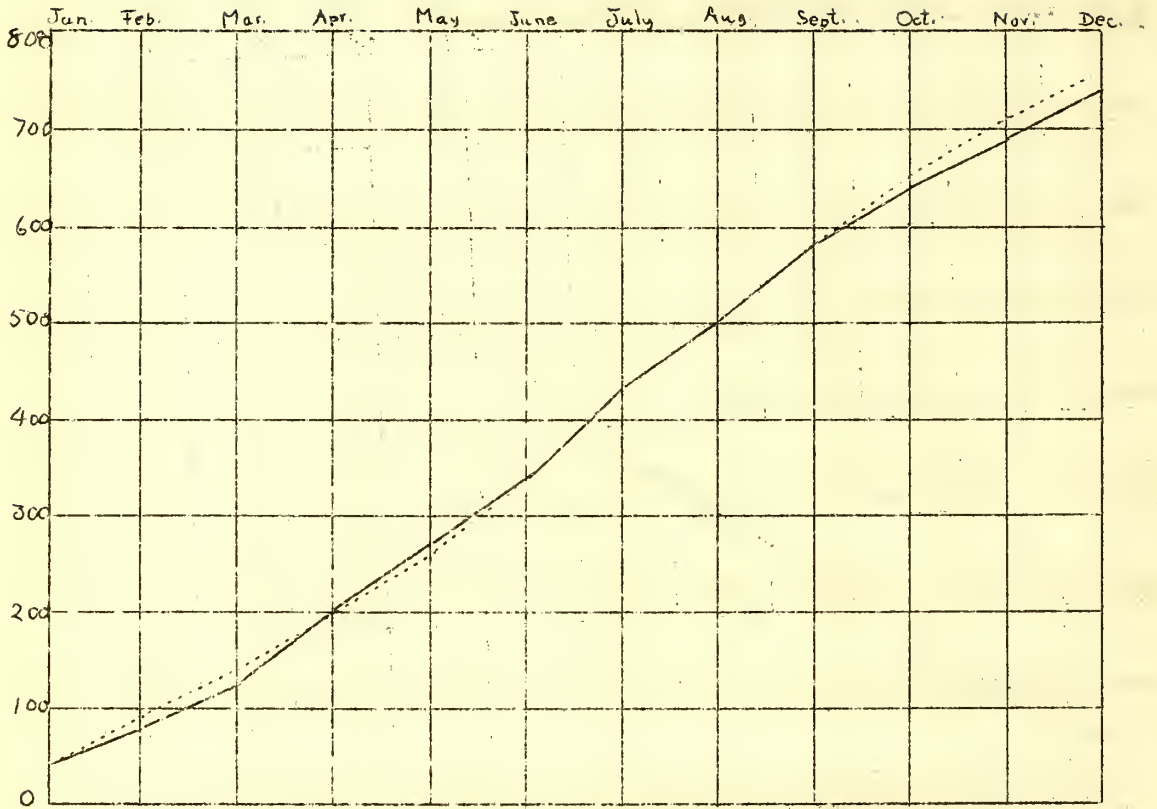


Fig. 13. Accumulated temperature in degrees F. for Little Rock, Arkansas, 1931, (dotted line), compared with normal (solid line).

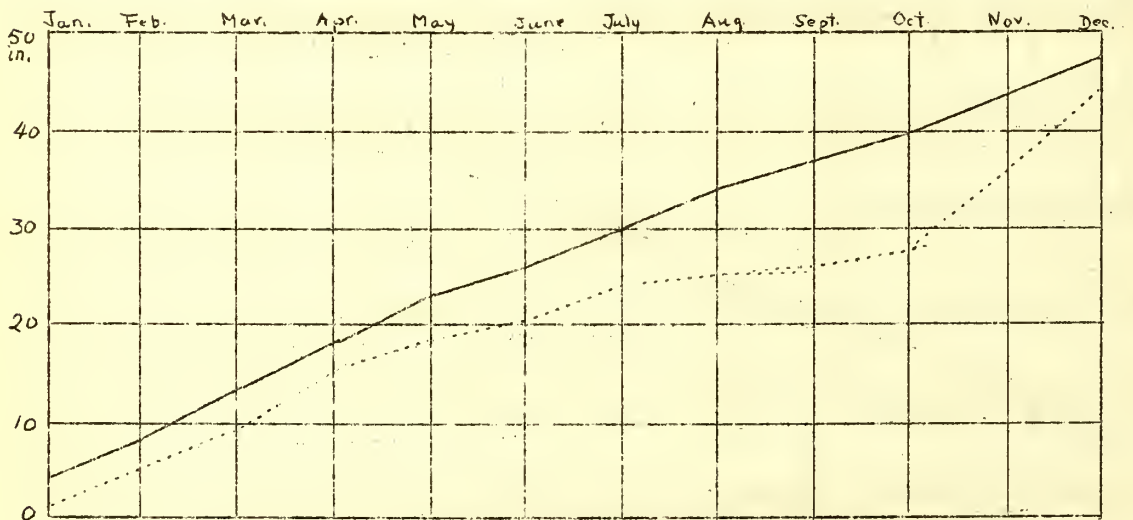


Fig. 14. Accumulated precipitation in inches for Little Rock, Arkansas, 1931, (dotted line), compared with normal (solid line).

BISMARCK, NORTH DAKOTA

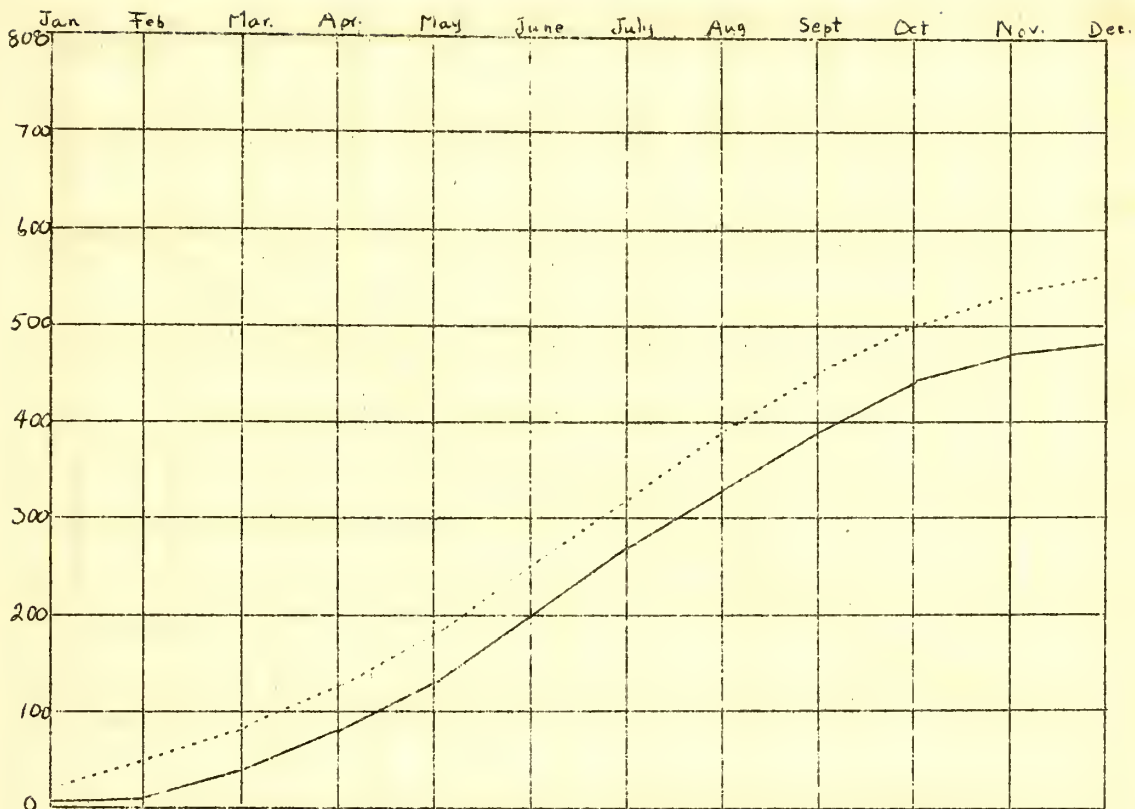


Fig. 15. Accumulated temperature in degrees F. for Bismarck, North Dakota, 1931, (dotted line), compared with normal (solid line).

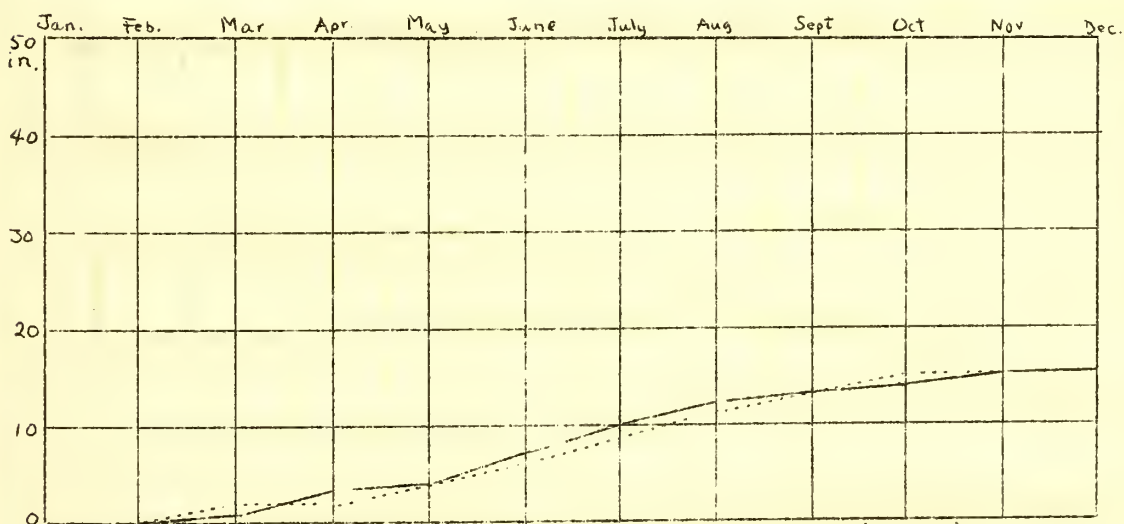


Fig. 16. Accumulated precipitation in inches for Bismarck, North Dakota, 1931, (dotted line), compared with normal (solid line).

PORTLAND, OREGON

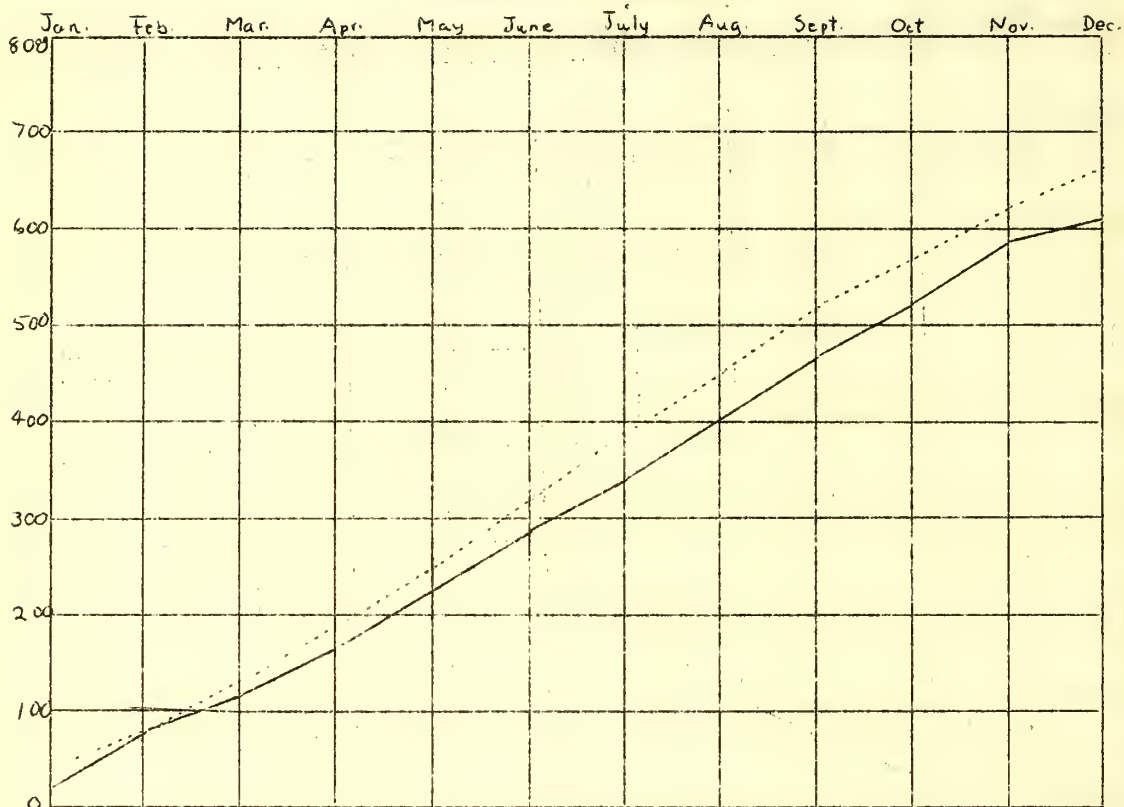


Fig. 17. Accumulated temperature in degrees F. for Portland, Oregon, 1931, (dotted line), compared with normal (solid line).

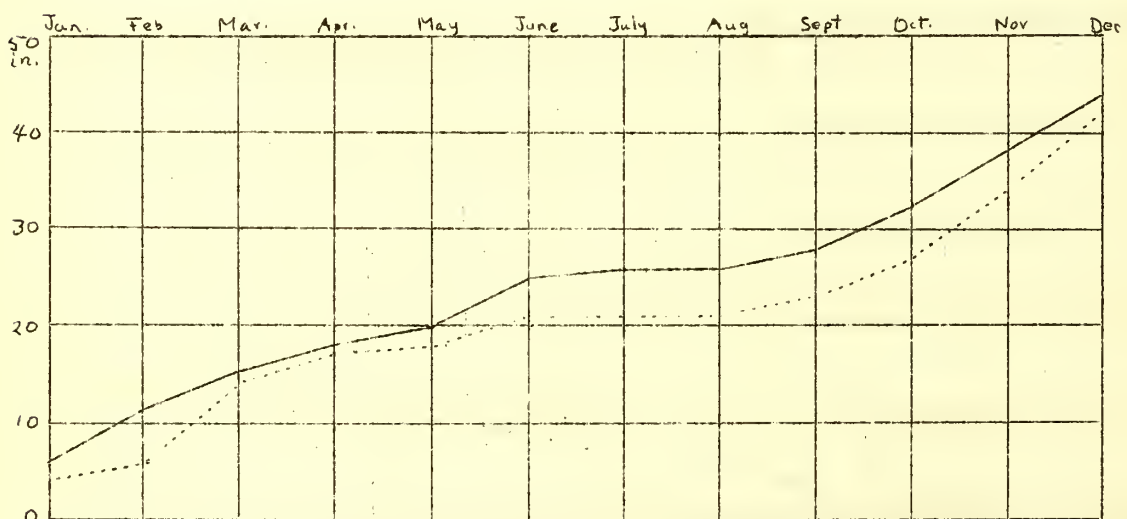


Fig. 18. Accumulated precipitation in inches for Portland, Oregon, 1931, (dotted line), compared with normal (solid line).

SACRAMENTO, CALIFORNIA

16

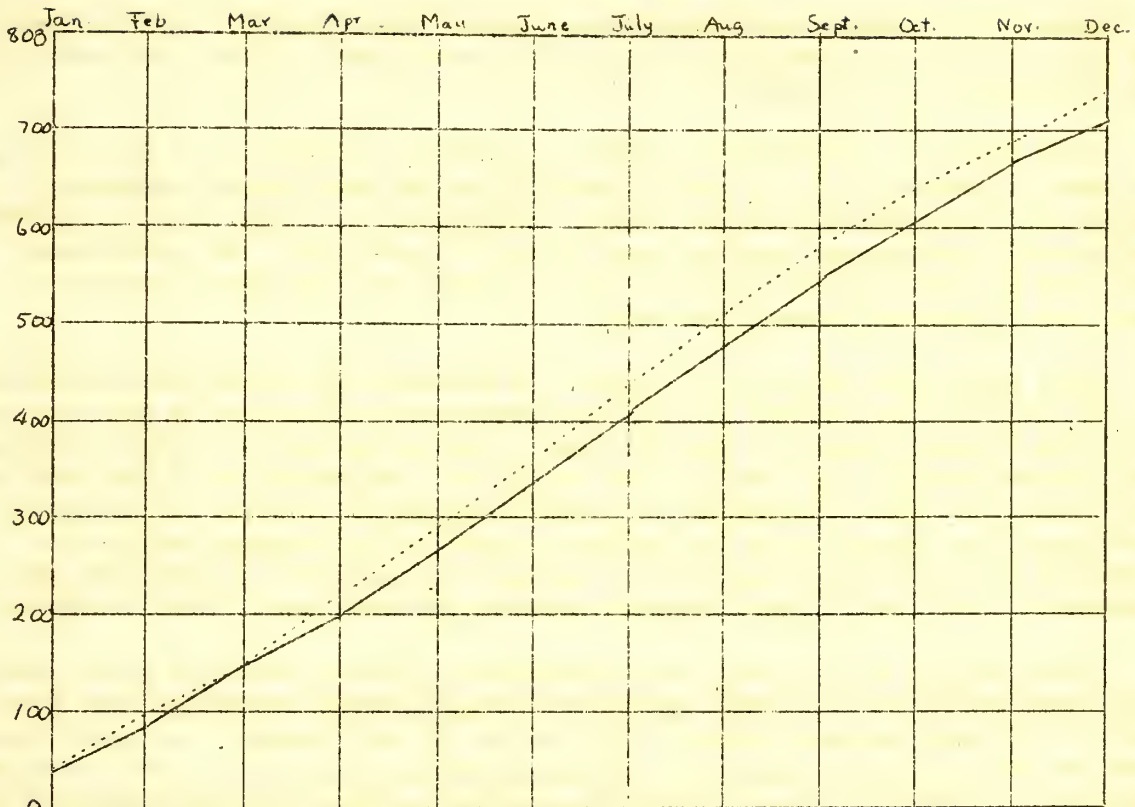


Fig. 19. Accumulated temperature in degrees F. for Sacramento, California, 1931, (dotted line), compared with normal (solid line).

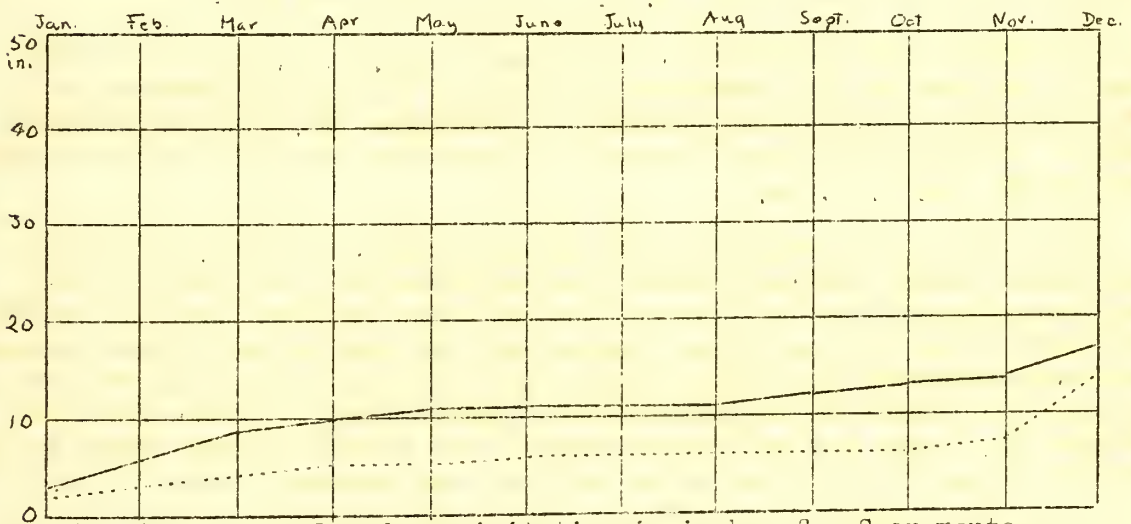


Fig. 20. Accumulated precipitation in inches for Sacramento, California, 1931, (dotted line), compared with normal (solid line).

WEATHER AND DISEASE

Among the unusual manifestations of plant diseases which are believed by observers to be correlated with weather conditions during the year 1931, the following may be cited.

LATE BLIGHT OF POTATOES IN TEXAS: According to reports by Bach (P. D. R. 46) and Stalmach (P. D. R. 20-21) late blight of potatoes was unusually severe in the lower Rio Grande Valley throughout the latter part of February and March, the damage varying from 25 to 100 per cent. The conditions believed to have been favorable to this disease are excessive moisture combined with cool, cloudy weather.

LATE BLIGHT OF TOMATOES IN TEXAS: As reported by Taubenhau and Ezekiel (P. D. R. 54), late blight of tomatoes destroyed as much as 80 per cent of the crop in some fields in the Rio Grande Valley during the spring months. For Cameron County, as a whole, the damage was estimated as 50 per cent of the crop. The same conditions as those favoring late blight of potatoes continued long enough into the spring to permit this unusual outbreak. Although the total rainfall was not excessive, there was a prolonged unseasonable cool spell with frequent showers and continued cloudy weather.

DOWNY MILDEW OF TOBACCO: The outstanding disease outbreak of the year was undoubtedly that of downy mildew of tobacco which spread to seed beds in six of the southeastern States. This is, as is well known, the first appearance of tobacco downy mildew in the United States since 1921. This disease has been the subject of much study in Australia, where no definite conclusion has been reached concerning its relation to weather conditions as yet. It may, however, be pointed out that throughout the regions affected in 1931, temperatures averaged somewhat below normal during the period in which the tobacco is in the seed beds. P. D. R. 32, 43, 57, and 108.

STRAWBERRY ROTS IN FLORIDA: According to Dr. A. N. Brooks not more than 50 per cent of the strawberries picked in 1931 in Hillsborough and Polk Counties, Florida, were packed for shipping. Dr. Brooks attributes most of this trouble to cold weather and excessive rainfall during the picking season. P. D. R. 24.

CONDITION OF THE STRAWBERRY CROP IN LOUISIANA: In sharp contrast to the Florida crop, Plakidas reports for Louisiana that the largest berry crop ever produced in the State was of excellent quality. This he attributes to favorable weather conditions during both the growing and picking seasons. Temperatures during the winter months were uniformly favorable, not too cold to check the growth of the plants and not warm enough to force premature blossoming. There was sufficient rainfall for growth but not enough to waterlog the roots. The picking season was cool and unusually dry. P. D. R. 65.

CRANBERRY ROTS IN MASSACHUSETTS: The Massachusetts cranberry crop of 1931 was characterized by losses from decay greater than any year since 1914, and perhaps the greatest in the history of the industry. Experienced observers estimate that over 20 per cent of the berries harvested decayed before they reached the consumer. This condition is believed to be correlated with abnormally high spring temperatures, relatively low summer temperatures, and high summer rainfall.

DISEASES OF CEREAL CROPS

W H E A T

STINKING SMUT (Tilletia levis and T. tritici). Percentage losses from stinking smut were reported as follows: 8 in Maryland; 5 in Montana; 3, Virginia and South Dakota; 2, Pennsylvania, North Dakota, and Kansas; 1.5, Ohio and Minnesota; 1, Texas and Wisconsin; 0.5, Delaware and Michigan; traces in New York, West Virginia, North Carolina, Arkansas, Indiana, Missouri, and Colorado. Except in Montana and Maryland, they were about the same as or somewhat less than for the past few years. In Montana the loss of 5 per cent was considerably more than usual and has only been equalled once before, in 1927. In Maryland the total loss of 8 per cent was unusually high but the 3 per cent reduction in yield was about the normal. Considerable decrease in loss as compared to last year was observed in Minnesota, Michigan, Colorado, and North Carolina. In Kansas, according to E. H. Leker, there was less smut in the north central counties but more in the south central part where seed treatment has been falling off due to light losses for several years.

A 2 per cent infection of T. tritici occurred in one area of a field of Forward wheat in New York, where this species is rather uncommon.

The results, compiled by J. A. Faris, of a survey conducted during 1931 in parts of Minnesota, Iowa, North and South Dakota, Nebraska, Montana, Utah, and Idaho are given in the Reporter, vol. 16, no. 6, pp. 56-67; May 1, 1932. Other reports are quoted in Plant Disease Reporter 15: 68, 90 (survey in Pennsylvania), 130-131 (survey in Maryland).

LOOSE SMUT (Ustilago tritici) was about normal in prevalence. In Minnesota there was more than for the past two years when there had been less than usual. In Missouri just the opposite condition was reported. Losses in West Virginia and Maryland were somewhat less than usual, otherwise there was not much variation from the normal. Estimates were 2 per cent in Georgia, Texas, and Missouri; 1.5 in South Dakota; 1, New York, Virginia, Ohio, Wisconsin, and Minnesota; 0.5, Maryland, North Dakota, and Montana; 0.1 to trace in Delaware, West Virginia, North Carolina, Arkansas, Indiana, Michigan, and Colorado. P. D. R. 15: 60.

FLAG SMUT (Urocystis tritici) was reported from Kansas, Illinois, and Missouri in 1931. According to J. A. Faris there was some extension of its range in Kansas. In small local areas there was as much as 50 per cent infection in a few fields, but the usual amount ranged from a trace to 6 per cent. P. D. R. 15: 51, 130.

STEM RUST (Puccinia graminis), caused very little damage in 1931. Only four States reported 1 per cent or more, including Texas, 2 per cent; Ohio, 1.5 per cent; and Virginia and Minnesota, 1 per cent. Dry weather and late appearance of the rust are mentioned by collaborators in explanation of the small losses. I. T. Scott remarked, "If most infections in Missouri are from uredinospores the percentage of infection should have been greater this season as the winter was the mildest in years and thus should have been favorable for overwintering of uredinospores. Since the barberry is rare in Missouri, it is thought that infection from aeciospores is negligible."

C. O. Johnston stated that in Kansas "Rust did not appear until very late except in isolated spots. Just before harvest infection was very heavy in the north central counties." Heat and drought in western and northern Nebraska confined stem rust development largely to the southeastern part of the State, according to M. E. Yount. A survey in that section immediately preceding harvest showed infection ranging from a trace to 30 per cent with 100 per cent in some isolated fields.

LEAF RUST (Puccinia triticina) was generally more important than stem rust and caused moderate to heavy loss in a number of States. In Indiana, according to R. M. Caldwell, the disease was present throughout the winter, and heavy and frequent dews favored its development during the growing season so that it caused a loss of 12 per cent. Most collaborators, however, reported that dry weather prevented its appearance in quantity sufficient to cause much damage until late. Valteau stated that leaf rust was of very little importance in Kentucky and remarked that "Perhaps the abundance of mildew affected its development." Losses reported, besides that in Indiana, of 1 per cent or more were 5 per cent in Virginia, 3, North Carolina; 2, New York and Kansas; 1.5, Ohio; 1, Texas. P. D. R. 15: 68, 108.

SCAB (Gibberella saubinetii), was mostly of slight importance or negligible in 1931. In Iowa it was said to be prevalent and destructive on spring wheat but not on winter wheat (P.D. R. 15: 108). Eight States reported it to be less or much less damaging than usual; no State reported it to be more so. One per cent loss occurred in Maryland, Texas, and Ohio; all other losses reported were less. P.D.R. 15: 68, 108.

GLUME BLOTCH (Septoria nodorum) and SPECKLED LEAF BLOTCH (S. tritici). The glume blotch caused appreciable loss in some States, estimated at 3 per cent (0.5 reduction in yield) in Maryland; 2 per cent in West Virginia; 1 per cent in North Carolina; 0.5 per cent in New York. Barrus reported that "In some fields (in New York) it appeared to be present on every head and every spikelet but even in such cases, the grain seemed to be well filled so that the loss must be small." In North Carolina, according to Poole, "This disease was widely distributed and was abundant on sandy soils where the plants were low in vitality and on very fertile soils where growth was rank."

Melchers reported that the leaf spot is steadily becoming more prevalent and causing greater damage in Kansas. It was also reported from Indiana.

LEAF SPOT (Helminthosporium sativum). North Carolina, and Michigan. A loss of 1 per cent was estimated in North Carolina where the disease seemed to be widespread.

BASAL GLUME ROT (Bacterium atrofaciens). Arkansas. P.D.R. 15: 69.

BLACK CHAFF (Bacterium translucens undulosum). Arkansas and Indiana, on the variety Hope and its hybrids; Wisconsin, also on Hope; Minnesota; Iowa, prevalent on spring wheat in Hancock County, present on at least 20 per cent of the heads in one field. P.D.R. 15: 110.

POWDERY MILDEW (Erysiphe graminis), was reported from several States but was not important. Valteau stated that "For the first time in twelve years has mildew been even noticeable on wheat. This year the blades were

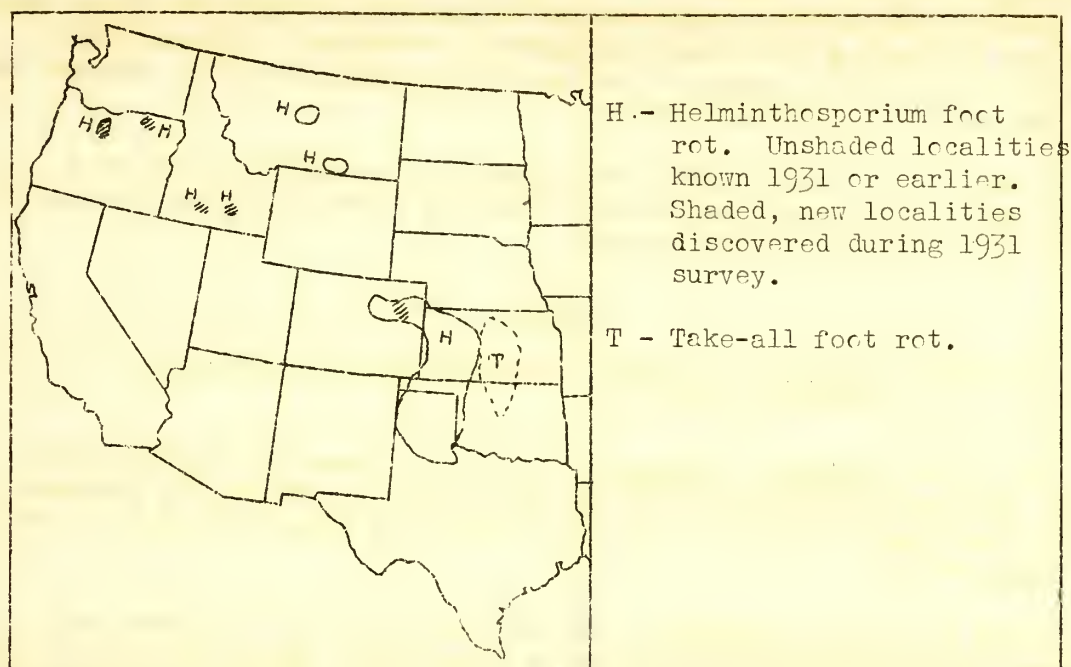


Fig. 21. Wheat foot rot survey, 1931. (After map by Hurley Fellows).

destroyed about one-third of the way up the plant in numerous fields." P. D. R. 15: 49, 52, 68.

BLIGHT, due to Fusarium sp. (not Gibberella saubinetii) and low temperatures occurred in Whitman County, Washington.

FOOT AND ROOT ROTS. TAKE-ALL (Ophiobolus graminis) caused a loss estimated at 1 to 2 per cent in New York and was also reported from Kansas. (See map Fig. 21).

HELMINTHOSPORIUM FOOT ROT (H. sativum) was reported from Ohio, Wisconsin, Minnesota, Texas, Kansas, Montana, and Colorado. During a survey in winter wheat areas west of the Mississippi, it was found in new localities in Colorado, Idaho, and Oregon, according to Hurley Fellows (see map Fig. 21). L. W. Boyle stated that at the time of the survey in Kansas, June 14 to 20, "A timely rain following a drought period seemed to have checked its development. This may be temporary, and the loss will be dependent on later conditions. Where infections had become well developed in the crown there was little apparent benefit from the rain." A loss of 5 per cent was reported from Colorado.

FOOT ROT due to Fusarium spp. was reported from Michigan and Minnesota. In the latter State Fusarium and Helminthosporium together caused a loss of 1 per cent.

WINTER BLIGHT (Sclerotium fulvum). Montana. P. D. R. 15: 52.

NEMATODE DISEASE (Tylenchus tritici). Virginia, North Carolina, and South Carolina.

MOSAIC (virus) is known to occur in a few fields in North Carolina, and caused heavy losses, approaching 80 per cent, in some of them. Many infested fields may have been overlooked, according to Lehman, since most of the varieties grown do not show the striking rosette symptom but only the less conspicuous mosaic.

A mosaic also was reported from Kansas, where it occurred in 4 counties. Near Salina one 40-acre field was a complete loss because of the disease. P. D. R. 16: 115-116.

R Y E

STEM RUST (Puccinia graminis) caused very little loss. P. D. R. 15: 137.

LEAF RUST (Puccinia dispersa). There was considerably more than usual in Massachusetts where 10 per cent loss was estimated, Indiana, with 5 per cent, and Ohio with 2 per cent. In other States the disease was unimportant.

ERGOT (Claviceps purpurea). Eighty per cent of the plants were observed to be affected in a field in Minnesota. Losses of 1.5 per cent were reported from Wisconsin and Colorado, 1 per cent from Massachusetts, trace to 0.1 per cent in other States. P. D. R. 15: 110.

POWDERY MILDEW (Erysiphe graminis). Kentucky. P. D. R. 15: 52.

SCAB (Gibberella saubinetii) caused a loss of 1 per cent in Ohio. Only traces were reported in other States.

B A R L E Y

COVERED SMUT (Ustilago hordei) occurred in practically the usual amounts. New York was the only State reporting more than usual, while Wisconsin, Kansas, and Colorado reported less. In Wisconsin, Vaughan said that it was difficult to find specimens for demonstration purposes. Losses estimated at 1 per cent or more were 10 per cent in Maryland; 4, Pennsylvania; 3, Virginia; 2, New York, Georgia, and South Dakota; 1, North Dakota.

LOOSE SMUT (Ustilago nuda and U. nigra). Although the losses from covered smut were higher in certain cases, loose smut seemed to be somewhat more important generally. Four States reported more, two less, while in other States there was about the usual amount. Losses of 1 per cent or over were 4 per cent, Kansas; 3, New York, and Virginia; 2.7, North Carolina; 2.5, Wisconsin; 2, Pennsylvania, Minnesota; 1, Maryland, Texas, North Dakota, South Dakota, and Montana. In New York, according to Barrus "Of 54 fields of barley grown for certification only four were reported as free from loose smut, 16 having percentages ranging from 1.1 to 4.6 per cent. These latter did not receive hot water treatment." Poole stated that in North Carolina "Loose smut was more widely distributed than in the two preceding years. Our Office of Pure Seed Certification reports this disease as interfering seriously with the certification of barley in many fields. Where the hot water treatment was given the infec-

tion was always low as compared with untreated." In Wisconsin, according to Vaughan, the hot water treatment was not entirely satisfactory but did reduce the amount of smut.

Some of the conflicting statements concerning control of barley loose smut by chemical seed treatments, etc. may be explained by Tapke's discovery that two species of *Ustilago* cause the disease, one undescribed the he calls *U. nigra* and the other previously known *U. nuda*. (Tapke, V. F. An undescribed loose smut of barley. *Phytopath.* 22: 869-870. Oct. 1932). P. D. R. 15: 109.

RUSTS. The only losses of 1 per cent or more reported were 1 per cent from STEM RUST (*Puccinia graminis*) in Virginia and Ohio, and 1.5 per cent from LEAF RUST (*P. anomala*) in Ohio. Other States reported only a trace of or no loss from either disease. P. D. R. 15: 108, 137.

STRIPE (*Helminthosporium gramineum*) was apparently more prevalent than in 1930. It was said to be much more important than usual in Minnesota, where it caused a loss of 2.5 per cent. Other losses of more than a trace were 2 per cent in Virginia and North Carolina; 1, Wisconsin, Montana; 0.5, North Dakota, Kansas. High maximum infections were reported from some States. In North Carolina 100 per cent was observed in some fields especially in areas where rainfall was abundant. A loss of more than 75 per cent occurred in one field in Michigan, and 60 per cent loss in a field in Wisconsin. In Minnesota the highest infection observed was 65 per cent. According to Vaughan, there has been a general reduction in the amount of stripe in Wisconsin due to the increasing use of the very resistant variety Wisconsin Pedigree No. 38 and to seed treatment with Ceresan. Other reports on varietal susceptibility were as follows: Very resistant, Wisconsin Pedigree No. 37 and Minnesota Glabron in Wisconsin. Susceptible, Wisconsin Pedigree No. 6 and Minnesota Velvet in Wisconsin; Glabron and Velvet in Minnesota; Velvet, Manchuria, Cderbrucker, and Minsturdi in Iowa; Mariout and Stavropol in Kansas. Very susceptible, Svansota and Minsturdi in Minnesota. P. D. R. 15: 109.

SCAB (*Gibberella saubinetii*), judging from the few reports received, was of about average prevalence or less. Ohio reported 5 per cent loss, Iowa 1 or 2 per cent, Wisconsin 1.5 per cent. Other losses reported were traces. P. D. R. 15: 108.

POWDERY MILDEW (*Erysiphe graminis*) caused losses of 1 per cent in New York and North Carolina. Reports from both States indicated that a wet spring favored its development. One field of late-planted barley in New York was said to have been ruined. The disease was severe in all fields observed in Kentucky. Early in the year it was reported as prevalent in Virginia. Wisconsin reported less than usual. P. D. R. 15: 49, 52.

O A T S

SMUTS (Ustilago avenae and U. levis) continued to cause important losses, which averaged, probably, about the same as usual for the country as a whole. There was a reduction in amount in Missouri and Kansas, where losses have been unusually heavy during the past few years. North Carolina, West Virginia, South Dakota, and Colorado also reported less. More than usual occurred in Georgia, Florida, Wisconsin, and Iowa. Other States reported about the normal amounts. Losses reported were 15 per cent in Florida and possibly in Pennsylvania; 10, Texas, Arkansas, and Iowa; 6, Montana; 5, Maryland and Wisconsin; 4, Virginia, Ohio, and Kansas; 3.5, Missouri; 3, New York, Georgia, and Minnesota; 2, Michigan and South Dakota; 1 to 2, West Virginia; 1, Indiana; others, less than 1 per cent.

STEM RUST (Puccinia graminis). Losses estimated are: 3 per cent, Illinois; 2, Florida; 1, Virginia and Minnesota; other States less than 1 per cent. In Louisiana according to Edgerton, "Stem rust appeared in epidemic form. This is very unusual in Louisiana, where stem rust on oats is not common. Losses in some fields ran as high as 10 to 20 per cent."

CROWN RUST (Puccinia coronata) caused losses estimated at 5 per cent in Virginia and Florida; 4, New York; 1, Texas and Ohio.

ANTHRACNOSE (Colletotrichum graminicolum) was apparently the cause of considerable dying of oats in Arkansas during the winter months of 1931 (V. H. Young). Also reported from Texas.

LEAF SPOT (Helminthosporium avenae). Prevalent in North Carolina, most pronounced in low damp areas (Poole). Also reported from Michigan.

BLAST or STERILITY (undet.). Present in most fields in New York and Kansas every year. In New York according to Barrus, "Usually from 10 to 25 per cent of blasted spikelets may be found. Whether the remaining healthy spikelets yield more than if all were healthy is undetermined. Therefore, the loss from blast cannot be estimated."

ALKALINE SPOT due to heavy lime application, North Carolina. Most of the oats in the field were two to three feet high, but in spots were only three to five inches high and the leaves were yellow with bronzed margins. The roots were injured and many were dead, the plants being kept alive mostly by the feeding roots near the surface. The injury was most severe where lime had been piled. (Poole).

C O R N

SMUT (Ustilago zeae) was said to be more prevalent than usual in Massachusetts, in some of the Great Lakes States, including Ohio, Michigan (on sweet corn), Wisconsin, and Minnesota, and in Florida and Louisiana in the South. Practically all other States reporting indicated about normal amounts. Several reports mentioned sweet corn as affected most severely. Losses were reported as follows: 15 per cent, Michigan (sweet corn); 10, Minnesota; 3 to 5, West Virginia; 3, Ohio and South Dakota; 2 to 3, New York; 2, Massachusetts, Connecticut, Virginia, North Carolina, Florida,

and Texas; 1.5, Arkansas, Wisconsin, and Missouri; 1, Michigan, North Dakota, and Colorado; others less than 1.

ROOT ROTS AND EAR ROTS (due to various organisms). Gibberella saubinetii, Diplodia spp., Fusarium moniliforme, Fusarium spp., Penicillium sp., and Pythium sp. are the fungi associated with root and stalk rots and seedling blight, and ear rots. In general, both root rots and ear rots were reported as less destructive than usual. Drought may have complicated injury from root rot, as indicated in the reports from Minnesota, where "Losses were perhaps high in some fields, but it was impossible to say whether drought or the organism was the primary agent," and Kansas, where Melchers said "A drought similar to 1930 did much damage to the corn crop, and it is impossible to estimate the injury from this disease." I. T. Scott reported that root rot appears to be decreasing somewhat in Missouri, due perhaps to droughts for the past two seasons, more extensive rotation of crops on corn land, and better seed selection. In Indiana, according to J. F. Trost, "Pythium sp. was responsible for considerable killing of the plants late in the fall, following drought injury at silking." Losses of one per cent or more are as follows:

ROOT ROTS: 5 per cent, Massachusetts and Maryland; 4, Kansas (root, stalk, and ear rots); 3, Texas; 2, Florida.

EAR ROTS: 9 per cent, Texas; 8, Maryland; 4, Florida; 3, North Carolina; 2, Massachusetts and Virginia; 1.5, Missouri; 1.1, Indiana; 1, Ohio, Wisconsin, and Delaware.

BACTERIAL WILT (Aplanchacter stewartii) occurred in New Jersey, Maryland, Virginia, West Virginia, Texas, Arkansas, Ohio, Indiana, Iowa, and Kansas. None was observed in New York according to Chupp, although a number of sweet corn fields were examined, both upstate and on Long Island. The disease was again of more than average importance in West Virginia, Ohio, and Indiana, where losses were estimated at 10, 3, and 1 per cent, respectively. Iowa also reported increased amounts. Infections up to 100 per cent were observed in sweet corn fields in West Virginia and Indiana. Orton remarked "I think this epiphytotic of Stewart's disease was the most severe I have ever seen. It was accompanied by stalk rot (Bacterium dissolvens) in the same field. Forty-five of the 54 sweet corn varieties planted on the Experiment Farm at Lakin, West Virginia, were affected." J. F. Trost and G. M. Smith reported that "Golden Bantam sweet corn averaged 50 per cent loss this year in early plantings in Indiana. The low total loss is due to the small percentage of Bantam in proportion to fall season sweet corn." Pop corn was affected in Indiana and Iowa. Late dent corn, Evergreen, Country Gentleman, and Narrow Grain sweet corn were said to be very resistant in Indiana, while Golden Bantam and Sunshine sweet corn, Tom Thumb pop corn, and early flint corn were very susceptible. P. D. R. 15: 68, 110.

BACTERIAL STALK ROT (Bacterium dissolvens), West Virginia, Louisiana, Arkansas. In West Virginia it occurred together with bacterial wilt and was very destructive. (See also Stanley and Orton, Bacterial stalk rot of sweet corn. (Abst.) Phytopath. 22: 26. 1932).

LEAF SPOT believed to be due to bacteria was reported from Florida and Texas, and a bacterial leaf blight from Indiana. Infections of 60 and 100 per cent were observed in Indiana and Florida, respectively. In the latter State the disease was said to be very abundant during late spring and summer. In one field the loss was probably more than 25 per cent.

S O R G H U M

ROOT, SHOOT, AND CROWN DISEASE, cause unknown, became evident locally in Kansas in 1920 and 1929, and has been increasing, although it is still local in distribution. In some fields of Milo, all plants are infected. Milos are especially susceptible, but most other sorghums are very resistant. Resistant selections of milos are being found. Soil conditions may be concerned but the disease appears to be parasitic. This may become a very important problem in milo growing. (Melchers).

R I C E

BLAST (Piricularia oryzae) caused one per cent loss in Texas.

The following diseases were reported from Arkansas by E. M. Cralley:

FOOT ROT (Ophiobolus sp.) was more prevalent than usual.

STEM ROT (Sclerotium oryzae) is spreading slowly in Arkansas. As much as 25 per cent loss was estimated in some badly infected fields.

BLACK SMUT (Tilletia horrida) was not observed in 1931.

LEAF AND GLUME SPOTTING, undetermined, partly attributed to Helminthosporium sp., was very common.

STRAIGHTHEAD (Non-par.) caused considerable damage where present but was observed only in a few fields. (Also reported from Texas.)

F L A X

WILT (Fusarium lini) was more prevalent than usual in Wisconsin and Minnesota, the only States reporting. In Minnesota the hot weather during middle and late summer aggravated the damage from wilt and only very early sown flax escaped considerable injury even in resistant sorts. The loss was estimated at 13 per cent of which 10 per cent was reduction in yield. The varieties Bison, Buda, and Red Wing were resistant; all others were susceptible.

HEAT CANCKER (non-par.) caused an unusual amount of loss, except in early sown flax, in Minnesota. As much as 90 per cent injury occurred in some fields. The total loss was estimated at 10 per cent. Heat canker was also reported from Montana.

RUST (Melampsora lini) and PASMO (Phlyctaena linicola) caused very little damage in Wisconsin and Minnesota due probably to dry weather.

DISEASES OF FORAGE CROPS

ALFALFA

BACTERIAL WILT (Aplanobacter insidiosum) was found for the first time in South Dakota during 1951; otherwise no unusual development was reported. A loss of 15 per cent was estimated in Kansas and 5 per cent in Massachusetts. P. D. R. 15: 161.

DOWNY MILDEW (Peronospora trifoliorum) was found on newly seeded alfalfa in Mason and Harrison Counties in West Virginia. This is the first report for the State. (Orton). It was more prevalent than usual in Louisiana. Practically all plants of the March crop were affected and the leaves turned yellow. It disappeared with warm weather (Edgerton). Reported from several other States.

LEAF SPOT (Pseudopeziza medicaginis) and **LEAF BLOTCH** (Pyrenopeziza medicaginis), less than usual. In Wisconsin the leaf spot was said to be more prevalent on soils deficient in lime and phosphorous.

BACTERIAL BLIGHT (Bacterium medicaginis). Arizona. P. D. R. 15: 69.

ROOT ROT (Phymatotrichum omnivorum). A loss of 25 per cent was estimated in Texas. Entire fields are killed by this disease. (Taubenhaus, Bach, and Wolff).

ROOT ROT (Fusarium sp.) caused 2 per cent loss in Missouri.

ROOT ROT (Undet.) Minnesota, of considerable importance.

STEM ROT (Sclerotinia trifoliorum). Pennsylvania, Virginia, and Washington. P. D. R. 15: 50.

WINTER INJURY, judging from the absence of reports, was less important than usual.

CLOVER

POWDERY MILDEW (Erysiphe polygoni). Rather generally reported but caused little damage.

STEM ROT (Sclerotinia trifoliorum) was severe locally in North Carolina during April. In Kansas it was found apparently for the first time attacking Dutch white clover in a lawn that was watered freely.

BLACK ROOT ROT (Thielavia basicola) found on red clover on infected soil in Guilford County, North Carolina.

SWEET CLOVER

LEAF SPOT (Ascochyta caulicola). Washington.

SMUT (Entyloma meliloti) has been observed on Melilotus indica for the past three years near Baton Rouge, Louisiana, increasing in amount each year. According to Dr. H. S. Jackson this is the first report of the fungus on the mainland of North America. (Edgerton, P. D. R. 15: 31).

ROOT AND STEM ROTS. Rhizoctonia sp. and Fusarium sp. have been isolated in Kansas. Corticium vagum was prevalent in North Carolina. Phymatotrichum omnivorum caused 20 per cent loss in Texas. Sclerotinia trifoliorum was destructive in Oregon, according to L. W. Kephart.

BLACK STEM AND ROOT ROT, . destructive everywhere (Kephart).

MOSAIC (Virus) important in the central and eastern States (Kephart).

C O W P E A

POWDERY MILDEW (Erysiphe polygoni) is the one serious factor in growing cowpeas in North Carolina. It causes defoliation, destroys flowering parts, and suppresses growth. The loss is estimated at 10 per cent (Poole). Also in Texas.

ROOT ROT AND WILT, both due to Fusarium sp., caused losses in Virginia estimated at 3 per cent and 5 per cent, respectively. WILT (Fusarium tracheiphilum) was severe in scattered fields in North Carolina where it caused a loss of 2 per cent. About 50 per cent of the plants were affected in one field in Georgia, the disease appearing in yellow spots throughout the field with very little actual wilt. Also reported from Texas with 1 per cent loss.

STEM BLIGHT (Macrophomina phaseoli). Half of the plants in a field at the University of Georgia were infected. Most of the plants were also attacked by Fusarium (J. H. Miller).

MOSAIC (undet.). New Jersey and Louisiana.

STEM AND POD SPOT (Diplodia natalensis). Texas.

S O Y B E A N

FUSTULAR SPOT (Bacterium phaseoli sejenae), very abundant in eastern North Carolina.

LEAF SPOT. Cercospora cruenta was common in North Carolina and caused severe damage to the leaves. Growers seem to think that the greater prevalence of leaf spot diseases is responsible for decreased yields obtained in recent years. (Poole). C. diazi, Louisiana.

DOWNY MILDEW (Peronospora manshurica). North Carolina.

WILT (Fusarium tracheiphilum) caused severe damage in fields in Currituck County, North Carolina. In one field the plants were not affected in low moist areas and under persimmon trees as in all adjacent areas. (Poole).

STEM ROT (Sclerotium rolfsii). Widespread and apparently increasing in importance in North Carolina. P. D. R. 15: 17.

ROOT ROT (Phymatotrichum omnivorum). Texas.

VETCH (VICIA SPP.)

LEAF SPOT (Ascochyta pisi) is abundant in North Carolina and does heavy damage on soils where growth is rank and the plants become prostrate. It is less severe where vetch and grains are grown together (Poole). Ascochyta sp. reported also in New Jersey.

SPOT (Protocorynespora nigricans) is always present and sometimes does considerable damage to Vicia villosa which is allowed to mature as in western North Carolina where seed is grown. (R. McKee).

SUNFLOWER

RUST (Puccinia helianthi-mollis) is often a limiting factor in growing sunflowers for silage in Wisconsin, according to R. E. Vaughan. Also reported from Connecticut, New Jersey, North Carolina, where it was very abundant, and Missouri.

OTHER DISEASES reported included POWDERY MILDEW (Erysiphe cichoracearum) in North Carolina, ROOT ROT (Phymatotrichum omnivorum) on Helianthus annuus and H. maximiliani in Texas, WILT (Sclerotinia sclerotiorum) in Washington, STEM ROT (Sclerotium rolfsii) in Louisiana, LEAF SPOT (Septoria helianthi) in Missouri.

DISEASES OF VEGETABLES

POTATO

LATE BLIGHT (Phytophthora infestans). With the exception of Massachusetts with 10 per cent, Maine with 7 per cent, and Texas with 3 per cent, the losses were considerably lower than an average year and somewhat less than 1930. Late blight has been known to occur in the lower Rio Grande Valley in Texas, but such a severe outbreak as this year is very unusual. No blight was seen in Minnesota, Wisconsin, Michigan, Arkansas, North Carolina, West Virginia, and New Jersey. P. I. R. 15: 7, 20, 46, 63, 66, 116.

EARLY BLIGHT (Alternaria solani). Ten per cent loss occurred in Virginia, otherwise this disease was generally slight. The other States reporting more than a trace of loss were Texas and Maryland, 5 per cent; Massachusetts, 3; Ohio, 2; Florida and Michigan, 1. P. D. R. 15: 47, 64, 116.

SCAB (Actinomyces scabies) was in general about as severe as in 1930 and somewhat more prevalent than an average year. The following major losses were reported: Wisconsin, 10 per cent; South Dakota and New York, 5; New Jersey and Minnesota, 3; Missouri and Maryland, 2.5; and Texas and Kansas, 2. Scab is reported to be a limiting factor in south Florida in muck soil. Wisconsin reports that results of demonstrations indicated corrosive sublimate to be the most valuable treatment for scab. Acid mercury was good on dormant seed, but injured sprouted seed. Semesan Pel was very irregular

in effectiveness. P. D. R. 15: 47, 64, 115.

STEM ROT (Corticium vagum). The losses resulting from this disease seem to be somewhat variable in different States from year to year; for example, Florida and Massachusetts each reported 1 per cent loss in 1930 and 10 per cent for 1931. Virginia reported a trace in 1930 and 7 per cent in 1931. Although the losses mentioned were greatly increased over 1930, generally, for the United States, they were about the same. Other States reporting more than one per cent were: Kansas, 6; Maryland, 5; Minnesota and New York, 4; Montana, 3; and Ohio, 2. P. D. R. 15: 116.

BLACK LEG (Bacillus phytophthorus) was about normal in occurrence and severity as indicated by the following losses reported: Kentucky, 3 per cent; West Virginia, 2 to 3; Kansas, 2; Michigan, Missouri, North Dakota, North Carolina, and Montana, 1. P. D. R. 15: 47, 64, 116.

WILT (Fusarium oxysporum) was probably less severe than an average year and somewhat less than last year. The four States reporting more than 1 per cent loss were: Montana, 4 per cent; Maryland and Minnesota, 2; and West Virginia, 1 to 2. P. D. R. 15: 7.

WILT (Bacterium solanacearum) was abundant in parts of North Carolina especially in soils which were infected as a result of the continuous cropping of tobacco. This disease is serious in certain scattered areas of Florida where it is of a more or less perennial nature. It is severe in Porto Rico. P. D. R. 15: 63.

TIPBURN AND HOPPERBURN (Climatic and leafhopper). The losses, aggravated possibly by the dry and hot growing season, were severe, equaling those of last year and probably somewhat greater than an average year. The States reporting more than 1 per cent loss were: West Virginia, 40 per cent; Arkansas, 30; New York, 15; Massachusetts, 10; New Jersey, 8; Ohio, 7; Michigan, Wisconsin, and Minnesota, 5.

LEAF ROLL (Virus). Due to more general use of certified seed leaf roll seems to decrease in New York and Maryland. The losses generally were about equal to those of a usual year. P. D. R. 15: 64.

MOSAIC (Virus) was generally reported to be less serious than usual which may be attributed to the increased use of certified seed and to the failure to recognize the symptoms due to the favorable growing season of the host. In Wisconsin, the high temperature reduced aphid infestation, therefore limiting the spread of the virus. Probably the same can be said of the other virus diseases of potatoes.

INTERNAL BREAK DOWN (non-par.). It was necessary to create a new grade in order to market the potatoes legally in Michigan where a 10 per cent loss occurred due to this disorder.

FERTILIZER BURN (Superphosphate). In West Virginia an interesting case was noted of burning of potatoes, which had been put in superphosphate sacks.

PREMATURE GERMINATION (High temperature). Wisconsin reports premature germination of new tubers in mid summer, the occurrence of which was most frequently on the south side of the row, thus indicating a heating relationship.

ROOT KNOT (Heterodera radiciola). On Long Island, New York, about 40 acres were so badly infested that the tubers were practically unsalable. Several other lots of potatoes were found to be infested in the same State.

TUBERS WITHOUT VINES (non-par.). Pennsylvania, Michigan, and Washington. P. D. R. 15: 53, 86, 132.

T O M A T O

LEAF SPOT (Septoria lycopersici) was generally much less severe than usual, probably due to the dry hot weather which prevailed during the growing season. A loss of 2 per cent was reported from Massachusetts, New York, and Kansas; 1.5 per cent from Missouri and Wisconsin.

WILT (Fusarium lycopersici) was about normal in severity. The States reporting more than 1 per cent loss were: Texas, 15 per cent; Virginia and Michigan, 5; Florida, 4; Kansas, 3; Indiana, North Carolina, and Missouri, 2. Texas, Missouri, Indiana, North Carolina, and New Jersey all reported as high as 50 per cent losses in some fields. P. D. R. 15: 102, 65.

BACTERIAL CANKER (Aplanobacter michiganense) was reported for the first time from North Carolina, Arkansas, Indiana, Nebraska, and New Mexico, but probably it had occurred in some of these localities previously, and had not been observed as such. For further information on this disease. see P. D. R. 15: 20, 48, 65, 86, 87, 101, 116.

EARLY BLIGHT (Alternaria solani). Generally the losses reported were a little more than usual. New York, New Jersey, Michigan, Wisconsin, and Minnesota report less than normal; Maryland, Virginia, and Ohio more than usual. The States reporting more than 1 per cent loss were: Massachusetts, 10 per cent; Virginia, 10; Maryland, 7; and Indiana, 2. P. D. R. 15: 67, 117.

LEAF MOLD (Cladosporium fulvum) was reported as being severe in green-houses in New York, Indiana, and Ohio.

BUCK-EYE ROT AND BLIGHT (Phytophthora terrestris) was reported for the first time for New Jersey. It also occurred in New York, Florida, Arizona, and Texas, but the losses were small. P. D. R. 15: 48.

LATE BLIGHT (Phytophthora infestans) was severe in Texas where a 20 per cent loss occurred. For details see P. D. R. 15: 53. It was also noted in Connecticut, New York, and Florida, and Mexico. P. D. R. 15: 26, 48.

BLOSSOM END ROT (non-par.). The following States reported more than usual, New Jersey, North Carolina, Florida, Ohio, and Michigan, whereas in Wisconsin and Minnesota there was much less and less, respectively. Michigan reports the heaviest loss of 15 per cent. P. D. R. 15: 65, 102.

BLACK SPOT (Phoma destructiva). Weber of Florida reports this disease to be more plentiful than ever before. It caused extensive damage throughout the season and injured all varieties including Marglobe. The loss was estimated to be over a million dollars.

MOSAIC (Virus) caused about the usual amount of loss in greenhouses and field plantings. Mosaic in New York has become of minor importance since eradication of the weed hosts about the seed beds has been practiced. In Minnesota a type of mosaic somewhat different from the usual type was prevalent, characterized by a mosaic pattern of large irregular yellow spots with slight crinkling of leaves. P. D. R. 15: 48.

CURLY TOP OR WESTERN YELLOW BLIGHT (Virus) was severe in Utah. P. D. R. 15: 87.

STREAK (Virus) caused considerable losses in the field in California and in greenhouses in Ohio. (S. P. Doolittle).

ROOT KNOT (Heterodera radicum) caused considerable damage in greenhouses in New York, Arkansas, and Wisconsin, and in fields in North Carolina and Texas.

COLLAR ROT (various organisms) was very severe on several lots of plants which had "heated" during transit. Colorado reported 30 per cent reduction in yield for that State. It was also prevalent in Maryland.

OTHER DISEASES. WILT (Verticillium albo-atrum), Massachusetts, in greenhouse; rather common in California. P. D. R. 15: 65. SOUTHERN BLIGHT (Sclerotium rolfsii) was common in Georgia, Texas, Florida, and North Carolina. P. D. R. 15: 17, 65, 102. PODDER (Cuscuta sp.), New York, one specimen. LEAF ROLL (undet.), New Jersey, severe rolling of leaves but no evident injury. LIGHTNING INJURY, New Jersey and Connecticut.

S W E E T P O T A T O

BLACK ROT (Ceratostomella fimbriata). Except in Missouri, Delaware, and North Carolina which reported more, the losses were about normal. States reporting more than 1 per cent loss were: Texas, 10; North Carolina and Kansas, 8; Virginia, 3; Missouri, 2.5; and Maryland, 1.5. Sprout treatment with organic mercury compounds reduced severity in New Jersey. P. D. R. 15: 54, 162.

SCURF (Monilochaetes infusans) was about normal in occurrence. The outstanding losses were 20 per cent in Virginia, and 4 per cent in New Jersey.

STEM ROT, WILT (Fusarium batatas and F. hyperoxysporum). The following loss estimates were given: Virginia, 15 per cent; New Jersey, 12 per cent; Kansas and Indiana, 5; North Carolina, 3; Missouri, 2; and Maryland, 1.

SOIL ROT, POX (Actinomyces sp.) seems to be increasing in prevalence and destructiveness in Maryland.

SOFT ROT (Rhizopus nigricans) was very severe in Missouri. The collaborator attributes this to the fact that the potatoes were dug late and stored in a rather immature state. Drought during the summer had held back growth of roots, then the fall rains caused the vines to still be growing at digging time. The disease was reported as being severe in Texas, North Carolina, Delaware, and New Jersey.

MOTTLE NECROSIS (Pythium spp.). Ten per cent was observed in one field in New Jersey. It was also noted in Maryland, Indiana, and North Carolina.

BROWN RING (Tylenchus dipsaci) appeared again in New Jersey. P. D. R. 15: 41.

SCLEROTIUM ROT (Sclerotium rolfisii). Considerable injury in plant beds in Arkansas. P. D. R. 15: 54.

P E A N

BACTERIAL BLIGHT (Bacterium phaseoli) seemed to be somewhat more severe than usual. Those States reporting more than normal with the percentage of loss are given: Colorado, 40; Virginia, 30; Michigan, 10-15; Texas, 12; and New York, 5. The greatest damage according to collaborators in Massachusetts, Maryland, and Virginia appeared to be from pod blight which occurred rather late in the season. P. D. R. 15: 117.

ANTHRACNOSE (Colletotrichum lindemuthianum) caused about the usual amount of loss. Florida and Louisiana report heavy losses due to conditions favorable for the disease during early spring. It was evidently too dry for this disease to do much damage in Minnesota, Wisconsin, and Maryland. P. D. R. 15: 117.

RUST (Uromyces appendiculatus) was reported to be severe in Arizona.

MOSAIC (Virus) caused a 15 per cent loss in New York, which was much more than usual. Wisconsin, Michigan, Florida, and Virginia all report Refugee variety as being very susceptible. P. D. R. 15: 117.

STEM ROT (Corticium vagum) seemed to be more prevalent than usual in New York, New Jersey, and Florida. The other States reporting record about the normal occurrence.

ROOT KNOT (Caconema radiculicola) was severe in Florida where the loss was estimated at 5 per cent. It also did considerable damage in Texas and Missouri.

POWDERY MILDEW (Erysiphe polygoni) caused a loss of 2 per cent in North Carolina. The loss in Florida was only 1 per cent but the practice of dusting with sulphur undoubtedly prevented much larger losses in this State.

YELLOWING (Manganese deficiency). A loss of 5 per cent occurred in Florida, and cases of 100 per cent loss were not uncommon on burnt soil where manganese was not used.

L I M A B E A N

BACTERIAL BLIGHTS. Bacterium phaseoli was reported from Michigan and Georgia. In Michigan Limas were said to be affected much more severely than usual. The loss was 2 per cent. In Georgia one nine-acre field had at least 80 per cent loss, two other fields about 10 per cent, and others showed varying amounts according to J. H. Miller.

Bacterium medicaginis phaseolicola (halo blight). Considerable pod infection occurred in Georgia, as much as 40 per cent in one field. Also reported from Massachusetts.

Bacterium vignae (= B. viridifaciens; bacterial spot), reported from Massachusetts, New York, Delaware, Maryland, Georgia, Florida, and Porto Rico. W. H. Moore reported the loss of about a third of the crop in one thirty-acre field in Georgia.

O N I O N

SMUT (Urocystis cepulae). Massachusetts and New York report 10 and 5 per cent losses, respectively, which were about normal, and Ohio reports 5 per cent loss, much more than usual for that State.

DOWNY MILDEW (Peronospora schleideni) was conspicuous by its absence. Of the five States reporting only New York and Maryland report even a trace of loss.

PINK ROOT (Fusarium malli) caused 10, 5, 2-3 per cent losses in Texas, Ohio, and New York, respectively. The damage was probably aggravated by the dry, hot weather which prevailed. P. D. R. 15: 117.

BLACK MOLD (Aspergillus niger) was reported on stored onions from Texas, Kansas, and Washington. P. D. R. 15: 103.

STEM NEMATODE (Tylenchus dipsaci). In New York this trouble was first observed by the growers in 1930 when there was one spot about four feet in diameter in an onion field on the muck soil. By July, 1931, this spot had increased to 50 feet in diameter, and another spot 10 feet in diameter had appeared nearby. Every onion in these two areas was killed by a constant spread of the organism. The infested soil was steam sterilized with hopes of completely eradicating this disease. According to Steiner this is the first report of this nematode on onions in this country.

C A P B A G E

Davis and Boyd of Massachusetts make a general statement that this year the plants generally were more healthy than during the past ten years.

YELLOW (S) (Fusarium conglutinans). The losses from this disease were about normal. Those States reporting more than one per cent loss are: Maryland, 8 per cent; Michigan, 3; Texas and Missouri, 2; and Wisconsin 1.5. Maximum infections reported were 100 per cent, New York; 50-70, Michigan; 35, Kansas; and 21, Missouri.

BLACK ROT (Bacterium campestre). New York reports over 50 per cent infection of the plants in a seed bed containing more than five million plants. Many fields set from this bed were a complete loss. The disease was well distributed in Florida and was serious in certain fields. Indiana reports 60 per cent loss in one field. P. D. R. 15: 62.

CLUB-ROOT (Plasmodiophora brassicae). In New York one four-acre field was completely destroyed. According to Chupp, hydrated lime gives good control but care should be taken not to use too much lime, especially in short rotations. This disease was also severe in many plantings in North Carolina, Indiana, and Ohio.

BLACK LEAF SPOT (Alternaria brassicae). Very common and injurious in Florida and North Carolina. In New York it followed rather generally the dry hot weather injury that occurred on late varieties in October.

DROP (Sclerotinia sclerotiorum) was common and destructive in fields in all portions of Florida and caused from 2 to 3 per cent loss of heads. Missouri reports this year as being the first authentic occurrence of this disease.

C A U L I F L O W E R

In Massachusetts LEAF SPOT (Alternaria brassicae) was about as prevalent as usual in various parts of the State; while BLACK ROT and BACTERIAL SPOT (Bacterium maculicolum) were decidedly more damaging than in the average year, especially to the later plantings. In no instance where heavy infection of either disease occurred had seed or seed-bed treatment been practiced.

B R O C C O L I

Connecticut reports four diseases new for this host in the State, BLACK LEAF SPOT (Alternaria brassicae), BLACK LEG (Phoma lingam), CLUB ROOT (Plasmodiophora brassicae), and DOWNY MILDEW (Peronospora parasitica).

H O R S E R A D I S H

WILT (Verticillium alboatrum) caused a 20 per cent loss in Michigan.

R A D I S H

WHITE RUST (Albugo candida) is severe in a few greenhouses in New York. It usually starts on the fall crop and becomes worse on succeeding crops through the winter.

CLUB ROOT (Plasmodiophora brassicae) was serious in New York in an occasional field, and several fields on Long Island were destroyed.

BLACK ROOT (Aphanomyces raphani) was serious on Long White variety in Connecticut, where it had not previously been reported. Also reported from Ohio and Indiana.

C U C U M B E R

WILT (Bacillus tracheiphilus) was generally about as prevalent as usual. It was more destructive than usual in Massachusetts, New York, Ohio, and Minnesota where it caused losses of 15, 5, and 4 per cent, and a trace, respectively. Those States report the season as being generally favorable for the increased population of the cucumber beetle. P. D. R. 15: 118.

DOWNY MILDEW (Pseudoperonospora cubensis). Texas and Porto Rico reported severe attacks of this disease. In other States reporting there was much less than usual, in some cases practically none. Apparently the weather was too dry for its occurrence. P. D. R. 15: 48.

MOSAIC (virus). New York reports 15 per cent loss for the State which is more than usual. Maximum infections for some fields where weed host eradication is not practiced were as high as 90 to 100 per cent. Mosaic seems to be increasing in importance in Florida. In most other States less than usual was reported. P. D. R. 15: 118.

ANGULAR LEAF SPOT (Bacterium lacrymans). Massachusetts and Michigan reported more than usual, otherwise this disease was conspicuous by its absence, probably due to the dry weather. No State loss was reported greater than a trace, although 30 per cent loss occurred in one large greenhouse in Michigan. P. D. R. 15: 118.

LEAF SPOT (Bacterium cucurbitae). First report of this organism on cucumbers was from Massachusetts.

ANTHRACNOSE (Colletotrichum lagenarium). G. H. Godfrey reported 50 per cent loss in one field in Hawaii. Generally anthracnose was unimportant, although there was said to be more than usual in Ohio, and severe defoliation occurred locally in New Jersey.

SCAB (Cladosporium cucumerinum) was generally of slight importance although it caused severe damage in some fields in Massachusetts and Florida. According to Weber, this seems to be the first authentic collection in Florida. P. D. R. 15: 118.

POWDERY MILDEW (Erysiphe cichoracearum) very little reported. Referring to eastern Massachusetts Guba said, "Disease was practically absent although greenhouse conditions were about the same as in other years. The lack of powdery mildew is hardly explainable." P. D. R. 15: 48.

LEAF SPOT (Septoria cucurbitacearum), reported for the first time from Massachusetts in a commercial planting in Hampshire County. Many leaves had literally hundreds of spots but the crop appeared to be little affected. Nearby muskmelons and winter squash were also attacked.

GUMMY STEM BLIGHT (Mycosphaerella citrullina). Two small patches in Niagara County, New York, were completely destroyed by this disease which was probably present because of high temperatures (Chupp). Also reported from New Jersey.

ROOT KNOT (Caconema radicum) caused 2 per cent loss in greenhouses in Massachusetts. Cuba states that a soil drench of carbon disulfide emulsion is occasionally used. No other chemicals are of value. In North Carolina the commercial crop is not affected since it is harvested before infestation is general. Also reported from Texas.

M U S K M E L O N

BACTERIAL WILT (Bacillus tracheiphilus) caused a reduction in yield of 10 per cent in Massachusetts with an additional 5 per cent loss in marketability. Cucumber beetles were said to be more numerous than usual. The disease was general and destructive in New York also where the loss was 2 to 3 per cent.

ANTHRACNOSE (Colletotrichum lagenarium) was unimportant in 1931, probably due to dry weather as noted in a number of States.

LEAF BLIGHT (Macrosporium cucumerinum). In Massachusetts, Connecticut, New York, Delaware, central and northern Florida, and locally in Arkansas and Ohio, leaf blight was more prevalent than usual. In Maryland losses were said to be decreasing due to greater use of spraying and dusting. Losses estimated were 10 per cent, of which 5 per cent was reduction in yield, in Massachusetts; and 2.5 per cent, of which 1 per cent was reduction in yield, in Maryland.

DOWNY MILDEW (Pseudoperonospora cubensis). Boyd and Davis state that absolutely none was seen or reported in Massachusetts, which is very unusual. According to Weber it was not as destructive as last year in Florida where it usually occurs wherever the host is grown and often causes serious damage. Several other States also reported reduced prevalence. In Texas, however, it was said to be severe, and caused a loss of 5 per cent. In Maryland, 1 per cent reduction in yield and 1.5 per cent loss in marketability were estimated. P. D. R. 15: 48.

POWDERY MILDEW (Erysiphe cichoracearum) did not seem to be very important except in Texas where 10 per cent loss was reported. P. D. R. 15: 48.

MOZAIC (virus). Two types of mosaic occurred in New York on muskmelon. The common cucumber mosaic was serious, causing 90 to 100 per cent loss in many fields where rigid weed host eradication was not practiced. The total loss for the State was 5 per cent. Another form to which cucumbers seemed to be immune was observed in the Great Lakes Counties in 1930 and was fully as common in 1931. One one-acre field in Orleans County had only four healthy plants. (Chupp).

LEAF SPOT (Septoria cucurbitacearum) was reported for the first time from Massachusetts where it was found September 1, causing very slight injury in one field near an infected squash field. (Boyd and Davis).

LEAF SPOT, GUMMY STEM BLIGHT (Mycosphaerella citrullina). Leaf spot occurred in one field in Massachusetts. The disease was found in one planting of what is known as "Persian Cantaloupe" in New York; other varieties in the same field were not affected.

WILT (Fusarium sp.). The same Fusarium that was reported in New York in 1930 was even more common in 1931. F. nivum caused 1 per cent loss in Missouri.

P U M P K I N

BACTERIAL WILT (Bacillus tracheiphilus) was more prevalent than usual in New York where it caused 1 per cent loss.

BACTERIAL LEAF BLIGHT (Bacterium cucurbitae) was found in Massachusetts for the first time. It was less severe than on winter squash.

BLACK ROT (Mycosphaerella citrullina) caused only a trace of reduction in yield in Massachusetts, but 2.5 per cent loss in marketability. This is the first report for the State.

LEAF SPOT (Septoria cucurbitacearum). Massachusetts.

S Q U A S H

BACTERIAL WILT (Bacillus tracheiphilus) was more severe than usual on both summer and winter squash in Massachusetts and New York. The cucumber beetles were numerous in Massachusetts where bacterial wilt was the most important field disease of both kinds of squash. The loss in Massachusetts was 15 per cent of which 10 per cent was reduction in yield. One per cent loss was estimated in New York. P. D. R. 15: 118.

BACTERIAL LEAF BLIGHT (Bacterium cucurbitae) was present late in the season and caused slight to severe leaf damage in almost every field of winter squash observed in Massachusetts. It occurred on summer squash also but was more abundant and severe on the winter squash. The total loss was 2 per cent. (Boyd).

SCAB (Cladosporium cucumerinum) was severe locally on summer squash in Massachusetts. P. D. R. 15: 118.

POWDERY MILDEW (Erysiphe cichoracearum) reported from several widely scattered States, said to be common and rather severe in Florida and Texas. P. D. R. 15: 48.

MOSAIC (virus) was said to be more prevalent than last year in Massachusetts and New York and occurred also in several other States. Summer squash showed greater injury than winter squash in Massachusetts. P. D. R. 15: 118.

LEAF SPOT (Septoria cucurbitacearum) reported from Massachusetts. Premature defoliation occurred in some fields. Winter squash was more severely affected than summer squash. A few cases were seen where Hubbard fruits were spotted.

LEAF SPOT, GUMMY STEM BLIGHT, BLACK ROT (Mycosphaerella citrullina). The black rot was the most important fruit rot observed in storage houses in Massachusetts during February and March of 1931. In the field the disease was first noticed about the beginning of September, causing leaf

spots, and cankers on stems, petioles, and fruit stalks, and later decay of young imperfectly developed fruit. Storage rot began to appear about two weeks after harvest. P. D. R. 15: 35, 118.

STORAGE ROTS (various fungi). Loss averaged about 35 per cent, said to be about usual, in Massachusetts. The most important organisms were Mycosphaerella citrullina and Fusarium sp., while secondary invaders included Rhizopus, Penicillium, Aspergillus, Cephalothecium, bacteria, etc. P. D. R. 15: 35.

W A T E R M E L O N

ANTHRACNOSE (Colletotrichum lagenarium) was generally less abundant than usual, although Maryland and Ohio reported more. In Florida, where it is usually very important, the extremely dry season greatly reduced losses. Maryland reported 8 per cent loss, of which 7 per cent was loss in grade. Kansas reported 1 per cent loss.

WILT (Fusarium niveum). Rotation, planting on disease-free soil, and use of resistant varieties are used to reduce losses from this disease with good results, usually. The disease does not occur in the main watermelon section of southwestern Arkansas, according to V. H. Young, but it is severe in Lonoke County which has important local plantings, and the Iowa resistant varieties have been planted there with considerable promise. Resistant varieties used in a number of counties in Indiana, although not completely resistant give good control, but are only fair in quality. In Missouri the reduction in yield was estimated at 16 per cent.

STEM-END ROT (Diplodia sp.). North Carolina, Texas, Missouri. In North Carolina the disease is abundant but is not serious since affected melons can be pulled from the vines in time to permit others to benefit from the thinning. Two per cent loss in quality was reported in Missouri.

FRUIT ROT (Pythium sp., spiny form), Connecticut. GUMMY STEM BLIGHT (Mycosphaerella citrullina), Virginia, Georgia, Missouri. Two per cent loss in Virginia. P. D. R. 15: 102. FRUIT ROT, STEM ROT (Sclerotium rolfsii). North Carolina and southeastern Missouri.

C E L E R Y

EARLY BLIGHT (Cercospora apii) was more severe than usual in New York, Delaware, North Carolina, Ohio, Indiana, Michigan, and Wisconsin. North Carolina reports it as abundant and severe on late celery. In Indiana it was said to be very difficult to control. In Michigan there was probably the most serious outbreak recorded for this State. It was present everywhere and caused very serious losses in irrigated fields.

In Connecticut and New Jersey, on the other hand, there was apparently no increase over last year and Massachusetts notes, "The disease has grown less for the past six years."

LATE BLIGHT (Septoria apii) was reported as less prevalent than usual in Connecticut, New York, North Carolina, Michigan, Wisconsin, Minnesota, and Colorado. Massachusetts, however, reported much more than usual with

an estimated loss of 5 per cent. While Florida reported 12-15 per cent loss in the Sarasota area. For market reports of this disease see P. D. R. 15: 26-37, 15:50.

In Michigan losses in celery from ROOT KNOT (Caconema radiculicola), YELLOWS (Fusarium sp.), and BLACK HEART (non-par.) were all observed as unusually high.

SOFT ROT (Sclerotinia libertiana) was reported in unusual abundance from Massachusetts with an average loss of 10 per cent in the eastern part of the State. New York - "Mostly a storage trouble. Probably ruined 1,000 or 2,000 crates in cold storage."

MOSAIC (virus), more severe in Florida in localized areas. (F. Wellman).

L E T T U C E

GRAY MOLD ROT (Botrytis cinerea) was reported as very abundant, causing as high as 50 per cent loss in some plantings.

WILT AND STUNT (Pythium sp.) caused very heavy losses in head lettuce out of doors near Bay City, Michigan.

DROP (Sclerotinia sclerotiorum) is reported as relatively of little importance in such northern States as Connecticut, New York, and Indiana; prevalent but of slight importance in North Carolina; and severe in Florida, where the losses this year are estimated as 10 to 20 per cent which is somewhat lower than last year.

P E A

ROOT ROT (Aphanomyces euteiches) is reported as the principal trouble of peas in New York State. The losses are estimated at only 2 to 3 per cent. Maryland indicates 5 per cent loss. In Wisconsin, the combined losses from root rot and the effect of high temperatures on the weakened plants equalled half the crop. P. D. R. 15: 62-63 and 87-88.

WILT (Fusarium martii pisi), reported as rare in New York State; locally important in New Jersey, Maryland, Ohio, Wisconsin, Montana, and Colorado. P. D. R. 15: 62 and 37. See also P. D. R. 15: 88.

A S P A R A G U S

RUST (Puccinia asparagi) reported as follows: Connecticut, appearing on some of the resistant varieties. New York, rare. New Jersey, scattered but more than usual. Maryland, losses from rust are gradually being reduced by use of resistant varieties. Georgia, on an estate on Butler Island half the plants were practically killed by this disease. North Carolina, Texas, Wisconsin, and Missouri, scattered.

B E E T

SCAB (Actinomyces scabies) reported as more severe than usual in Massachusetts and New York.

C A R R O T

ROOT KNOT (Heterodera radiculicola) was reported from West Virginia, Connecticut, and New York. In the last named State, Chupp reports "Severe on 20 acres in Oswego County, 95 per cent unmarketable carrots on one farm."

E G G P L A N T

BLIGHT (Phomopsis vexans) reported from Connecticut, bad on fruit in one instance. New Jersey, less than usual. Virginia, damped off approximately 35 per cent of the plants in the seed bed on one farm near Norfolk and many of the remaining plants bear stem cankers; average loss 5 per cent. Florida, about the same as last year, widespread and destructive on seedlings, foliage, stems and fruit. Also common in Texas and Porto Rico.

S P I N A C H

DOWNY MILDEW (Peronospora effusa) was reported from Connecticut, New York, New Jersey, Maryland, Virginia, Missouri, and Texas usually as occurring in about the same amounts as in previous years.

D I S E A S E S O F S P E C I A L C R O P ST O B A C C O

During the spring and summer of 1931 special surveys of tobacco disease were made in the States of Pennsylvania, Kentucky, Indiana, Wisconsin, New York, Maryland, West Virginia, Massachusetts, South Carolina, and also in Canada. The results of these have been fully reported in the P. D. R. 15. See Index pp. 188-189. The outstanding event was the outbreak of DOWNY MILDEW. See P. D. R. 15: 32, 43, 44, 45, 57, 58, 61, 72, 85, 94.

C O T T O N

WILT (Fusarium vasinfectum), prevalent, as usual, where cotton is grown, especially on light, sandy-loam soils. The use of resistant varieties reduces losses. A resistant strain of Mexican Big Boll is being developed in North Carolina, according to R. F. Poole. Dixie 14, Dixie Triumph, Super-Seven, Cook, and Lightning Express were listed as very resistant in Arkansas; Rowden 40, Rowden 2119, D. and P. L. Strains, Express as resistant; Acala as susceptible, and Trice and Delfos as very susceptible; by V. H. Young who says, "Counts were made in several localities in eastern Arkansas, and yield and wilt records were kept at the Cotton Branch Station. This year the beneficial effect of potash fertilizers and wilt resistant varieties was very marked. A great deal of partial recovery was noted after rains in July." Losses reported were: 5 per cent, Florida and Texas; 4, Arkansas; 2, North Carolina. P. D. R. 15: 83.

ROOT ROT (Phymatotrichum omnivorum) caused a loss of 15 per cent in Texas. P. D. R. 15: 99.

WILT (Vorticillium alboatrum). Specimens of this disease were collected from Bolivar, Washington, Yazoo, and Sunflower Counties in Mississippi, and the fungus recovered in culture. Symptoms of the disease are noticeable defoliation of the plants, usually occurring rather late in the season, and rotting at basal nodes together with vascular discoloration. Losses at present small in these localities, but some fields observed with as high as 20 per cent infestation. (D. C. Neal).

ANTHRACNOSE (Glomerella gossypii) was apparently of slight importance generally. The only loss of more than a trace reported was 3 per cent in Missouri. P. D. R. 15: 119.

STEM ROT, DAMPING OFF, SORESHIN (Corticium vagum) was said to be rather severe in North Carolina and Arkansas. In both States replanting was necessary. Two per cent loss was estimated in North Carolina, and 1 per cent in Texas. P. D. R. 15: 59, 82.

ANGULAR LEAF SPOT (Bacterium malvacearum) was widespread in North Carolina and probably damaged early cotton on sandy soils. According to D. C. Neal it caused serious injury to seedling cotton in the black lands of Texas and later was responsible for considerable boll shedding. He estimated the loss at 3 per cent. Also reported from Florida with a loss of 1 per cent; and from Georgia, Louisiana, Arkansas, and Missouri, as apparently of slight importance. P. D. R. 15: 119.

BLACK LEAF SPOT (Macrosporium nigricantium) caused severe injury on one farm in North Carolina where the plants were completely defoliated before the bolls matured. Other fields showed different degrees of infestation in isolated areas. The disease was not of wide occurrence, however. (R. F. Poole).

RUST. Puccinia hibisciata caused considerable injury near Casa Grande, Arkansas, according to F. P. Eaton of the Sacaton Station. It was also reported from Texas. Euchneola gossypii was reported from Porto Rico.

SEEDLING DISEASE caused by the nematode Aphelenchus parietinus was reported by C. E. Arndt and G. Steiner from South Carolina. (P. D. R. 15: 82-83).

MINUTRITION (non-parasitic rust). North Carolina: Loss 5 per cent. Deficiency diseases interpreted from prevailing symptoms as lack of Potash, Magnesium, and Manganese were especially prominent during the drought and late autumn seasons, especially on light sandy soils. (R. F. Poole). Texas: Prevalent in the lighter soils of east Texas, and frequently found in association with Alternaria leaf-blight. Considerable defoliation of plants was caused by this disease. (D. C. Neal). Arkansas: Loss 3 per cent. Very common on sandy potash - poor soils. Beneficial effects of potash fertilizers and stable manure very marked. Much immaturity and failure to open properly of top bolls attributed to rust. (V. H. Young).

FERTILIZER INJURY. North Carolina: Heavy loss of plants, not directly due to Corticium vagum, soon after germination, resulted from concentrated fertilizers, probably nitrogen and potash. (Poole).

MOSAIC (non-par.). A mosaic disease of cotton, apparently a non-infectious type, and similar to sweet potato mosaic, occurred at Greenville, Texas. This malady has been observed for several years by H. C. McNamara, (U.S.D.A.), who finds that it is not communicable through contact or insects, but is a definitely inherited character. (D. C. Neal).

ALBINISM, CHLOROSIS (non-par.). Chlorosis, or whitening of leaves of cotton plants was observed in Mississippi and Texas, the varieties affected being Lone Star and Delfos. Damage negligible. (D. C. Neal).

LIGHTNING INJURY. North Carolina: Very prominent. Some of areas showed complete kill of plants in circles of 50 feet in diameter. Other spots struck showed a few plants killed near the strike and others scorched a distance of 25 feet away, and frequently cankered, but not killed. (R. F. Poole). Arkansas: Two small killed areas noted this year. Noted rarely in previous years. (V. H. Young).

D I S E A S E S O F T R E E S

DROUGHT AND WINTER INJURY: Clinton lists the following hosts reported as suffering from the combined effects of drought and winter injury in Connecticut: Quercus rubra, Q. prinus, Pinus spp., Picea spp., Tsuga sp., Prunus sp. (cherry), Acer sp.

S P R U C E - (PICEA SPP.)

CANKER (*Cytospora* sp.) was observed in various sections of Massachusetts. Three trees in Taunton showed from 25 to 75 per cent of the limbs killed.

P I N E (PINUS)

DISTRIBUTION OF WHITE PINE BLISTER RUST (*CRONARTIUM RIBICOLA*) IN 1931 (WITH FIG. 22). Climatic conditions during 1931 were favorable for the extensive spread of the white pine blister rust in the Eastern United States. From the generally infested region the disease spread southward into the bordering States. In Maryland, scouting showed it to be present at 6 centers in Washington County, 1 on pine and Ribes, and 5 on Ribes alone; and at 2 centers in Allegany County on Ribes. Ribes were found infected in Virginia at 2 centers located in Frederick and Rappahannock Counties; in West Virginia, at 2 centers in Randolph and Tucker Counties; and in Ohio at 2 centers in Ashtabula County and 1 each in Fulton and Geauga Counties. White pine was found infected in Iowa, in Tama County.

Many new centers of infection were located in the Lake States. The Counties of Alpena, Chippewa and Iron in Michigan, and of Dane and Jackson in Wisconsin, were found infested. Pine infection was discovered for the first time in Iosco and Oceana Counties, Michigan, and in Chippewa, Oconto, Pepin, Pierce, and Waupaca Counties, Wisconsin. The disease was also found on white pine in the Ottawa National Forest in Michigan, and on Ribes in the Chippewa National Forest in Minnesota.

In the commercial areas of western white pine in northern Idaho, 45 additional centers of pine infection were found showing the rust to be firmly established in that region. These centers were distributed as follows: On the National Forests, 24 centers on the St. Joe, 2 on the Coeur d'Alene, and 1 on the Clearwater; on the Timber Protective Associations, 4 centers on the Coeur d'Alene, 7 on the Potlatch and 7 on the Clearwater. One new pine infection center was found in Mount Rainier National Park and another within a half mile of the Wind River Nursery in Washington. In Oregon, the only new pine infection center located is in the Mount Hebo Plantation on the Siuslaw National Forest.

New Ribes infections were found in northeastern Washington at 4 points in Stevens County and 9 points in Ferry County, while in Oregon infected Ribes were located at 21 points, none of which mark a further extension southward than reported in previous years. The disease was again found on Ribes (currant and gooseberry plants) in southwestern Oregon within 40 miles of the California line and within the range of valuable forests of sugar pine which are known to be susceptible. It appears certain that the rust will reach the main sugar pine belt of California when favorable conditions for spread occur in that region. (J. F. Martin and R. G. Pierce).

RUST (Cronartium cerebrum) was reported on long-leaf and loblolly pines in Georgia; P. banksiana in New York. P. D. R. 15: 91, 104.

J U N I P E R (JUNIPERUS SPP.)

BLIGHT (Phomopsis juniperovora) was especially destructive on seedlings in beds in Kansas.

M A P L E (ACER SPP.)

WOOD ROTS (Fomes fomentarius and F. igniarius). Very prevalent in North Carolina.

LEAF BLIGHT (Gloeosporium acerinum) abundant in North Carolina.

CANKER (Phomopsis sp.) on Acer palmatum. Scattered in New Jersey. Most serious on young nursery stock, although cases were observed on established trees.

TAR SPOT (Rhytisma acerinum), more abundant than usual in Massachusetts, North Carolina, and Wisconsin; also reported from Connecticut and New Jersey.

TWIG BLIGHTS. New Jersey reports twig blights on maple due to Steganosporium pyriforme and to Sphaeropsis sp.

WILT (Verticillium sp.) was reported from Massachusetts, Connecticut, New Jersey, Ohio, Missouri, and Rhode Island. P. D. R. 91.

H O R S E C H E S T N U T (AESCULUS HIPPOCASTANUM)

LEAF ELOUCH (Guignardia aesculi) was very important for the past three years in Massachusetts. Fifty per cent defoliation was observed in some places during August. In Connecticut it was "bad; complicated with scorch."

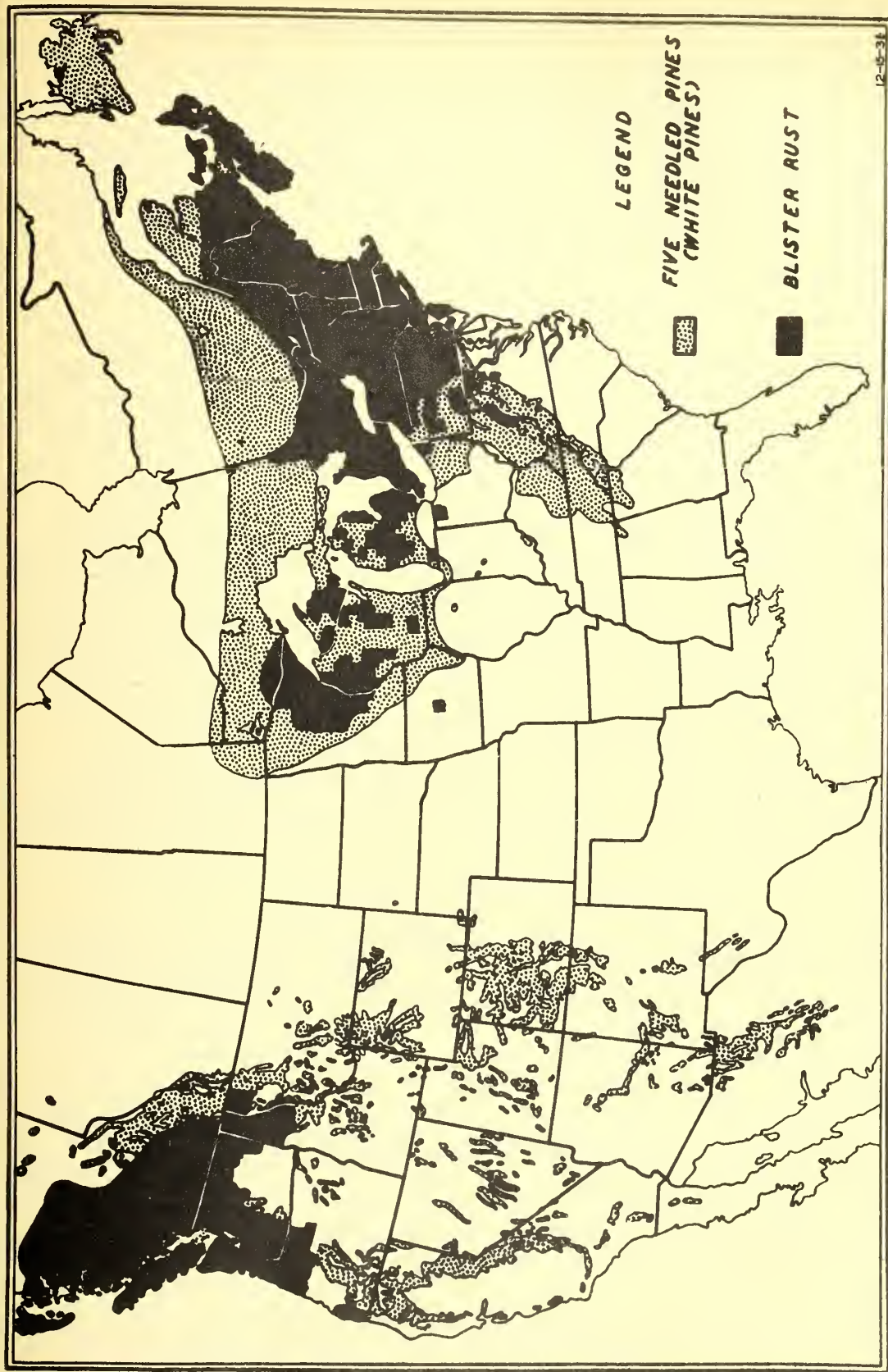


Fig. 22. Range of white pines and distribution of blister rust (*Cronartium ribicola*) in North America, 1931. Counties in which blister rust has been found on Ribes or pines or on both host plants in one or more places are shown in solid black.

It was very abundant in New York and was noted as present in New Jersey, Missouri, and Texas.

DOGWOOD (CORNUS FLORIDA)

TWIG DIE BACK (Cryptostictus sp. (?)). In New Jersey large numbers of young dogwood were ruined for shade purposes due to the center branches being killed. A number of trees were completely killed. Cryptostictus sp. was suspected.

HAWTHORN (CRATAEGUS SPP.)

BLIGHT (Bacillus amylovorus). In New Jersey blight often caused severe injury to ornamental hawthorn. Poole reported both spur and twig blight abundant in North Carolina but observed "Plants, even ornamentals, are more resistant than apples and pears."

BLACK WALNUT (JUGLANS NIGRA)

CANKER (Nectria sp.). West Virginia reported this disease in occasional plantings with maximum infection of 85 per cent observed, with the comment "Localized, presumably, because of special ecological conditions." Orton also notes that the black walnut canker is known to be present in 27 counties in West Virginia and in the States of Rhode Island, Pennsylvania, Virginia, Wisconsin, Tennessee, and North Carolina; and in Ontario, Canada.

SYCAMORE (PLATANUS SP.)

ANTHRACNOSE (Gnomonia veneta) was reported from Massachusetts, New York, Connecticut, New Jersey, Ohio, Indiana, Kansas, and Arkansas. Arkansas and Indiana noted much more than last year.

POPLAR (POPULUS SPP.)

CANKERS due to Cytospora chrysosperma or Dothichiza populea were reported from Massachusetts, New York, New Jersey, North Carolina, Missouri, Wisconsin, and Nebraska. Massachusetts and Missouri reported more than in previous years.

OAK (QUERCUS SPP.)

ROOT ROT (Armillaria mellea). The frequent occurrence of Armillaria root rot and its importance in association with the drought of 1930 was noted in North Carolina, Wisconsin, and West Virginia.

ANTHRACNOSE (Gnomonia veneta) was reported from Massachusetts, New York, New Jersey, Delaware, and Wisconsin. Wisconsin and Delaware reported more than last year.

WILLOW (SALIX SPP.)

SCAB (Fusicladium saliciperdu) reported from Massachusetts and Connecticut as more abundant than last year or an average year. In Massachusetts severe damage occurred in Berkshire County. In one area 18 per cent, by actual count, of the leaves were infected. See P.D.R. 15: 70.

E L M (ULMUS SPP.)

ANTHRACNOSE (Gnomonia ulmea) reported from Massachusetts, Connecticut, New Jersey, Ohio, Missouri, Oklahoma (P. D. R. 15: 57), and Texas (P. D. R. 15: 70). Massachusetts, Connecticut, and Missouri indicated more than last year. Maximum loss of 40 per cent was noted in one place in Missouri.

DUTCH ELM DISEASE (Graphium ulmi). Four cases were discovered at Cleveland, Ohio, in addition to the three reported there in 1930 and the one in Cincinnati in 1930. Although 600 suspected specimens were cultrued no other infected trees were found.

D I S E A S E S O F O R N A M E N T A L SH O L L Y H O C K (ALTHAEA ROSEA)

STEM ROT (Sclerotinia libertiana) is reported by P. A. Young from Montana. He notes that both stems and roots are badly affected by this fungus, which produces symptoms almost identical with those which this fungus causes in sunflower. For a description of the disease on sunflower see Montana Agr. Exp. Sta. Bul. 208. 1927.

S N A P D R A G O N (ANTIRRHINUM MAJUS)

RUST (Puccinia antirrhini) reported from Connecticut, New York (less than usual), New Jersey (scattered), West Virginia, North Carolina (very abundant), Texas (10 per cent loss), Ohio (same as usual), Michigan ("On outdoor plantings rust appeared too late in the season to cause any marked damage. Well controlled in most greenhouses by careful watering."), Wisconsin (same as last year, less than usual), Minnesota, Missouri ("Found to be serious in greenhouses. Very little in outdoor plantings."), Nebraska, Kansas ("In some cases 50 per cent destructive."), and Washington.

A S T E R (CALLISTEPHUS CHINENSIS)

RUST (Coleosporium solidaginis). New York "Aster rust more prevalent and serious than usual this year. Shade grown asters just as seriously affected as those grown out in the open." Wisconsin, "Of more importance than usual but came too late to be of commercial importance. Most of the asters had been harvested." Reported also from Missouri.

WILT (Fusarium conglutinans callistephi), Connecticut (more than usual), New York (more than usual), New Jersey, "Locally severe, some gardens losing a high percentage of plants," Indiana, "Occurred in plats at Lafayette. The Horticultural Department has resistant strains," Michigan, "Ten per cent loss. A very troublesome disease everywhere but readily prevented by intelligent growers," Wisconsin, "More than usual. The Department's selection continued to improve in type and resistance." Present in Ohio, Missouri, and Washington.

YELLOW (virus). Massachusetts "More important than usual, 30 per cent loss in gardens and flower beds. Very few succeeded in obtaining blossoms worth while." New York, "Very important, about the same amount as usual."

Several florists in the State obtained 100 per cent control by growing asters in insect-proof tents." New Jersey, "General and the cause of general disappointment", Ohio and Kansas, about the same as usual, Michigan, "Continues to be the most destructive disease of ornamentals," Wisconsin, "About the same as usual. Asters grown under cloth shade proved very satisfactory."

S W E E T W I L L I A M (DIANTHUS BARBATUS)

STEM AND PLANT ROT (Sclerotium rolfsii) was general in the eastern part of North Carolina with a 70 per cent reduction in yield. One of the most destructive pests of the crop. From 75 to 90 per cent of the plants in the city of Raleigh destroyed by this disease. Both old and new plants attacked. New plants developed from seed in the summer mostly destroyed.

C A R N A T I O N (DIANTHUS CARYOPHYLLUS)

LEAF SPOT (Alternaria sp.) reported from Indiana, "Very common this year, one florist had a \$10,000 loss from this disease." Michigan, "Twenty per cent loss. Observed for the first time as a serious disease of lining-out stock and also mature plants." Also reported from Connecticut, New York, and New Jersey.

ROOT KNOT (Caconema radiculicola). North Carolina, "Severe losses observed in greenhouses where old and infected soil had been used for several years. The plants were stunted and unprofitable."

G L A D I O L U S (GLADIOLUS SP.)

SCAB (Bacterium marginatum). Massachusetts, "More than usual. Both the neck rot and corm spot stages were observed generally. Severe losses to corms in some cases." Michigan, "Less than usual. High temperature and dry soil unfavorable for scab this year." More than usual in New Jersey and Nebraska. Noted in New York, Ohio, Florida, and Texas.

HARD ROT (Septoria gladioli). Wisconsin, "About the same amount as an average year. Corm selection more important than treatment. Biggest factor in control is in raising clean bulblets." New Jersey, "About the same as usual. The importance of this disease is being eclipsed by the increasing importance of scab." Noted in Ohio.

DRY ROT (Sclerotium gladioli). Michigan, "Less than usual. No reports of dry rot for the first time in several years."

I R I S (IRIS SP.)

LEAF SPOT (Didymellina iridis). New York, "This disease was serious again this year despite the dry weather in certain parts of the State." Michigan, "Initial infections from ascospores noted early in May. The disease developed rapidly thereafter and caused a marked decrease in vegetative vigor." Kansas, less than usual, general in the eastern part of the State. Texas, "Exceedingly common, affecting vigor of plants and blooming habits." Wisconsin, more than last year or an average year. Same as

last year in Massachusetts, New York, and Ohio. Noted in Connecticut, New Jersey, Indiana, and North Carolina.

S W E E T P E A (LATHYRUS ODORATUS)

ROOT KNOT (Caconema radiculicola). New York, "Two large greenhouses planted to sweet peas were a total loss as a result of this pest."

N A R C I S S U S (NARCISSUS SP.)

BULB ROT (Fusarium sp.). Massachusetts, "Attention was recently called to almost total loss of a shipment of narcissus due to a Fusarium bulb-rot. The bulbs were shipped to this State last August from Long Island. The grower stated that the bulbs appeared sound when he received them."

P E O N Y (PAEONIA SP.)

BLIGHT (Botrytis sp.) noted from Connecticut, New Jersey, New York, Ohio, Michigan, Wisconsin, Minnesota, Arkansas, and Washington. All these States reported the same as or less than the previous year except Connecticut which reported more than last year but the same as usual.

ROOT KNOT (Caconema radiculicola). "Steadily on the increase in southern Michigan. Eighty per cent control by treating infested roots for 30 minutes in water at a temperature of 120° F."

P H L O X (PHLOX SPP.)

MILDEW (Erysiphe cichoracearum). Virginia. P. D. R. 15: 103.

LEAF SPOT (Septoria divaricata). Michigan, "The most common disease affecting this plant with the exception of powdery mildew. Defoliation is a common effect of the disease."

R O S E (ROSA SPP.)

BLACK SPOT (Diplocarpon rosae). In Massachusetts and Connecticut more than last year, same as average year. New York and New Jersey, same as last year, same as average year. New York, "Black spot was prevalent again on both garden and greenhouse roses." New Jersey, "As usual this is the most prevalent and most severe disease of roses in this State. Unsprayed or undusted gardens and fields showed severe defoliation by the middle of August." North Carolina, "Common, caused some defoliation of such varieties as Dr. Van Fleet, usually very resistant. Bush roses badly attacked." Georgia, "All leaves on bush roses heavily infected." Texas, "Common, particularly on old plantings." Arkansas, much more than last year and more than average year. "No varieties showed marked resistance this year. Even rugosas, hybrid perpetual, and climbers showed considerable black spot." Indiana, "Very common, but not usually injurious to the crop." Michigan, "Dry season unfavorable for black spot on outdoor roses. In greenhouses prevalent as usual." Wisconsin, same as last year and less than average year. "Sulphur and arsenate dusts gave good control." Missouri, "Very severe in greenhouses." Colorado, general, less than last year and less than average

year. "Use of wettable sulphur found very effective." New York, Ohio, Louisiana, and Kansas same as last year and same as average year. Also reported from South Carolina.

POWDERY MILDEW (Sphaerotheca pannosa). New York, less than usual and less than last year. Delaware, much more than last year and much more than an average year. Michigan, "Developed rapidly in September and October. Minor importance previously." Wisconsin, "Observed only where air drainage conditions were poor. Controlled by dusting." Minnesota, "Heavy infection on climbers noted during June." Missouri, "Serious in greenhouses." Georgia, "Leaves, young stems, and buds covered and dying." Arkansas, more than usual, more than last year. "Dusting with sulphur has not given good control this year." Texas, "Very common and prevalent." Ohio and Colorado, same as usual. "Use of wettable sulphur found very effective." Reported from Connecticut, New Jersey, Kansas, and Nebraska.

CROWN CANCKER (Cylindrocladium scoparium). New York, "A few cases observed where this disease resulted in serious losses in greenhouse roses." New Jersey, "This disease apparently on increase in rose houses of this State. Certain varieties are killed, due to complete cessation of root growth. Plants wilt, show marginal leaf browning and yellow leaves."

CROWN GALL (Eacterium tumefaciens). North Carolina, "Common and destructive on greenhouse roses." Wisconsin, "Much more than last year. Seems to come from lack of rotation or slight infection of plant sets." Missouri, scattered. Connecticut, Ohio, and Kansas same as last year and same as an average year.

L I L A C (SYRINGA SP.)

POWDERY MILDEW (Microsphaera alni). Noted from Connecticut, New York, and Missouri, same as last year. North Carolina, "Abundant, causing defoliation in moist locations." Texas, trace. Kansas, less than last year.

T U L I P (TULIPA SP.)

BOTRYTIS BLIGHT (Botrytis tulipae). Michigan, "Everywhere present in old plantings and extremely destructive." New York, more than last year and same as an average year. New Jersey and Delaware, scattered. Ohio, same as last year. Arkansas, noted at Little Rock.

Z I N N I A (ZINNIA ELEGANS)

POWDERY MILDEW (Erysiphe cichoracearum). Michigan, "General but damage slight on account of delayed appearance. Arizona "Reported to be very bad this year. Estimates show 30 per cent loss." Texas, very common. Reported from Connecticut, New Jersey, Missouri, and Kansas.

DISEASES OF FRUIT AND NUT CROPS

APPLE

SCAB (Venturia inaequalis) was generally somewhat more severe than in 1930. The highest loss was reported from Massachusetts where 12 per cent was estimated for the State. The average loss for the twelve States reporting was 4.5 per cent. This disease was more prevalent in Maine, Massachusetts, Virginia, Arkansas, Michigan, and Missouri than during previous years, apparently due to the unusually favorable weather conditions for infection. (P. D. R. 49, 56, 66, 89, 99, 100, and 119). There were several good infection periods, which extended the time for the discharge of ascospores longer than the average year, but where the spray schedule was carried out the disease was controlled fairly well. The drouth seemed to reduce the amount of scab in Pennsylvania and Montana. (P. D. R. 15: 34, 150).

PLOTCH (Phyllosticta solitaria). The severity of blotch was apparently about that of an average year. Three States, New Jersey, Delaware, and Virginia, reported more than usual. Maryland, Wisconsin, and Missouri estimated less and Kansas, Ohio, Arkansas, North Carolina, and West Virginia report an average year. The highest loss for any State reported was 2 per cent from Missouri. One orchard in North Carolina was 100 per cent infected. Gardner in Indiana reports good control with Bordeaux mixture spray, but failure with dry lime sulphur.

BLIGHT (Uromyces amylovorus) was less prevalent than last year, and probably less so than an average year. Of the nineteen collaborators reporting its relative importance, 8 reported an average year, 5 less than an average year, 2 much less, 3 more, and only one State, Virginia, reports much more. North Carolina and Missouri reported the heaviest losses, each estimating the loss at 5 per cent. The growers of Kentucky are impressed with the value of the weak Bordeaux sprays applied during the blossoming period. Wisconsin also advocates the application of weak Bordeaux. Blossom blight was severe in a few scattered orchards in Michigan. The limited area of infection was probably due to the small number of holdover cankers formed on account of dry weather in 1930. P. D. R. 15: 67, 89, 99.

BITTER ROT (Glomerella cingulata) was considerably more prevalent than in 1930, as indicated by the fact that ten of the eleven States reporting estimated more loss. Losses up to 100 per cent occurred on the Mother variety in small areas in numerous orchards of Virginia. North Carolina reported an average loss of 4 per cent, and a single orchard having 15 per cent infection, whereas Ohio, Missouri, and Maryland report 2, 1.5, and 1.5 per cent losses, respectively. Other States note losses of a trace to 1 per cent. Trees which had been sprayed with sulphur showed 50 per cent loss in several cases in New Jersey. In Kentucky, bitter rot became severe during a warm humid period in September, and continued to develop in storage.

APPLE RUST (Gymnosporangium juniperi-virginianae). There was generally less apple rust than in an average year, however, South Dakota reported a total loss of 4 per cent, Missouri a 5 per cent infection in one orchard, North Carolina suffered heavy infection in orchards near cedars, but very

slight infection of fruit, even where leaf infection was abundant. Cedar eradication in West Virginia has reduced losses to a point where they are relatively of slight importance according to Orton.

W. D. Mills of New York reports telial horns one-half inch long, April 25, one inch long, April 26, and two inches long, May 8. The first sporidia were found May 8 to 9, and the first lesions on Winter Banana were observed on May 26. Only a few gelatinous horns were left during the rain of June 16. Further notes on spore horn protrusions are included in P. D. R. 15: 49 for Virginia, and 89 for Minnesota.

QUINCE RUST (Gymnosporangium germinale) was reported from three States. The major alternate host for quince rust in Maine appears to be Juniperus communis var. depressa. In this State quince rust occurred on Delicious, Winter Banana, Wealthy, Baldwin, Tolman Sweet, Bellflowers, and McIntosh. There was more in New York than 1930, with a maximum infection of 4.4 per cent on Rome in one orchard. Indiana reports Delicious, Winesap, and Stayman as being infected..

HAWTHORN RUST (Gymnosporangium globosum) occurred on the Baldwin variety and one unknown variety in Maine. It was noted also in New York.

POWDERY MILDEW (Podosphaera leucotricha) was severe on new growth of the Rome variety in New Jersey. It was controlled by colloidal sulfur and lime sulfur. P. D. R. 15: 67, 99.

BLACK ROT (Phylospora malorum). Of the nineteen States reporting this disease, Massachusetts, New York, Virginia, and West Virginia reported more than an average year; Delaware, Maryland, Indiana, Wisconsin, and Missouri less; and the other States the usual amount. The heaviest losses reported were 4 per cent and 2 per cent from Maryland and Virginia, respectively. Abundant twig infection occurred in New Jersey orchards where blight was present the previous year. Virginia reported an unusual amount of calyx-end infection in August. In West Virginia the greatest loss occurred where the disease followed insect injury, especially codling moth. Blossom-end rot was worse than usual in Kentucky, perhaps due to more thorough codling moth spray and consequent spray injury. The leaf spot (frog eye) was abundant in North Carolina, due to the large amount of inoculum carried over on blighted twigs killed by Bacillus amylovorus. Black rot was noticeable in nursery stock in Wisconsin, where as many trees had to be discarded from it as from callus gall.

BLISTER CANCKER (Nectria discreta) was found quite generally in old Ben Davis plantings and apparently had caused the death of a considerable number of trees in Virginia. West Virginia and Arkansas also reported severe losses due to blister canker on the Ben Davis variety. In Missouri the loss was estimated at 2.3 per cent.

CROWN GALL (Bacterium tumefaciens) caused a 5 per cent loss in Texas. Wisconsin reported 1 per cent loss in nursery stock. Missouri and Kansas noted small losses on nursery stock.

SOOTY BLOTCH (*Gloeodes pomigena*). New Jersey, West Virginia, Virginia, North Carolina, and Indiana reported sooty blotch as being present in serious amounts where spray applications were omitted. Massachusetts, Connecticut, Maryland, and Missouri also reported its presence.

FLYSPECK (*Leptothyrium pomi*) was more generally present this season than usual in Virginia. It was observed in New Jersey, Maryland, North Carolina, Arkansas, Wisconsin, and New York.

FRUIT SPOT (*Phoma pomi*) damaged as high as 95 per cent of the fruit of Rome when lime sulphur or other sulphur fungicides were used, in New Jersey. It was present on Baldwin, Wealthy, Spy, and McIntosh in Massachusetts, where favorable weather prevailed (rainy and cool). Stayman, Black Ben Davis, and Limbertwig were severely infected in the mountain areas of North Carolina. Other States reporting it are New York, Maryland, Ohio, and Missouri.

BITTER PIT (non-par.) caused 5 per cent loss, and a maximum spotting in some orchards of 100 per cent in North Carolina. Trees heavily loaded were especially affected and the varieties Stayman, York, and Grimes seemed to suffer most. West Virginia reported 2 per cent loss on York, King David, Stayman, Grimes, Stark, and Ben Davis. The collaborators of these two States think that the drought conditions of 1929 and 1930 probably played some part in the severity of bitter pit. It was reported as common and severe in all parts of New Jersey. Also reported from Massachusetts, Connecticut, New York, Maryland, Michigan, and Washington.

DROUGHT AND FROST caused a 50. per cent reduction in yield in South Dakota due to an early frost and a severe drought during midsummer. (P. D. R. 15: 151).

SPRAY INJURY. 1931 seems to have been an unusual year as regards spray injury. Delaware experienced some arsenical foliage injury where excess lime was not used. Considerable injury was reported from New York on fruit and foliage from the use of copper dusts. New Jersey reported severe leaf injury occurring in late summer from the use of sulfur and other cases due to lead arsenate. West Virginia reported spray injuries as becoming increasingly important because apple growers are applying more spray material, particularly arsenate of lead, during the early season. The following account was taken from C. L. Burkholder's notes on spray burn of apple foliage in 1931. (Hoosier Hort. 14: 20-24, 1932):

"The first serious appearance of leaf burn began to show up a few days after the first spray application for second brood codling moth. The next lead and lime spray the middle of July caused more serious burns. Varieties such as Grimes, Jonathan and Ben Davis were most seriously affected and in many cases dropped 50 per cent of their leaves by September 1. The most serious leaf drop occurred in a band eight to ten feet high around the bottom of the tree, and this was followed by a premature ripening and drop of fruit in that area of the tree. This seemed to indicate that burning was most severe in that part of the tree which would naturally receive the heaviest coverage of spray material. It seems to be generally agreed among the pathologists that the injuries received were probably due to insufficient

lime, thus causing carbonation which causes the production of a large amount of soluble arsenic. The excess arsenical injury of 1931 may also be due to the weakened condition of the trees brought about by the drought of previous seasons."

P E A R

BLIGHT (Bacillus amylovorus) apparently was less severe than in an average year, as indicated by the estimates of loss by the collaborators. Of the thirteen reporting, only two estimate more than a usual year, namely, Virginia (15 per cent) and Missouri (12 per cent). Blight is rather sporadic in occurrence. It was severe in some orchards in Arkansas while entirely absent in others. In contrast to the outbreak in California in 1930, there was a marked decrease in 1931. For the year 1930 it generally seemed to be more prevalent in the same area on apples than pears, while in 1929 the reverse was true. For 1931, Virginia reported a loss of 15 per cent as contrasted with a trace in West Virginia. P. D. R. 15: 67, 89, 99.

SCAB (Venturia pyrina) caused 5, 3.5, and 3 per cent losses, respectively, in Maryland, Wisconsin, and Ohio. A trace was reported from Virginia, West Virginia, Michigan, Massachusetts, and Missouri. One hundred per cent fruit infection was noted in Flemish Beauty orchards in New York. P. D. R. 15: 100.

LEAF BLIGHT (Fabraea maculata) was relatively unimportant. The greatest losses were reported in Maryland (4 per cent) and Delaware (2 per cent). Michigan, Missouri, Virginia, and West Virginia reported a trace loss.

SOOTY BLOTCH (Gloeodes pomigena) was severe locally in New York.

FRUIT ROTS. Pears did not keep well in Massachusetts. Several diseases developed late in the season. Among the principle organisms involved were Botrytis cinerea, Cephalothecium roseum, Gloeosporium rufomaculans (= Glomerella cingulata), and Physalospora malorum. P. D. R. 15: 27-28.

Q U I N C E

RUST (Gymnosporangium germinale) seemed to be more prevalent than usual. Its presence was reported in Massachusetts, Connecticut, New York, Michigan, and Nebraska.

P E A C H

BROWN ROT (Sclerotinia fructicola). Six States reported more, seven less, and three the same amount as previous years. States reporting more than 1 per cent loss were Massachusetts, 10 per cent; Ohio and North Carolina, 5; Maryland, 4; and Missouri, Delaware, Virginia, West Virginia, Kentucky and Texas, all 2 per cent. There was comparatively little rot in Kentucky, Indiana, and Michigan on Elbertas this season as it was dry at picking time. Rains just before and during harvest in North Carolina resulted in more severe brown rot losses than at any time during the past 5 years, in late varieties (Elberta and Hale).

LEAF CURL (Exoascus deformans). Of the 15 States reporting on this disease nine, Massachusetts, New York, Delaware, Kentucky, North Carolina, Georgia, Louisiana, Ohio, and Indiana indicated either more or much more than usual, and it was generally more prevalent than last year. In Delaware, where 100 per cent infection occurred on unsprayed trees, this is the first serious outbreak for three years. North Carolina reported heavy defoliation in the Piedmont and mountain area, and also considerable fruit injury resulting from late infections. Leaf curl appeared in epidemic form in northern Louisiana in April, which was very unusual for that State. Apparently either late sprayed or unsprayed orchards were the only ones that were severely damaged by this disease. P. D. R. 15: 35, 54, 55, 100.

BACTERIAL SPOT (Bacterium pruni). Indiana, North Carolina, Missouri, Maryland, and Texas, reported 10, 5, 2, 1.5, and 1 per cent losses, respectively, which are somewhat greater than occur during an average year and considerably more than last year. The varieties Elberta and Hale were generally reported as very susceptible. P. D. R. 15: 55.

SCAB (Cladosporium carpophilum). The States reporting more than 1 per cent loss were Florida, Delaware, Texas, West Virginia, and Kentucky which estimated 15, 5, 3, 3, and 2 per cent losses, respectively. Delaware reports this year as being the first since 1923 in which this disease was prevalent.

BLIGHT (Coryneum beijerinckii). Serious locally in Michigan. P. D. R. 15: 100.

CROWN GALL (Bacterium tumefaciens). The actual number of trees killed in North Carolina was very great. Entire orchards were probably killed by this disease in the sand hill area. It is reported as being severe in young stock, especially in nurseries in Missouri.

ROOT ROT (Armillaria mellea) is very abundant, causing severe die back and eventually death of trees, in North Carolina.

DIE BACK (Valsa leucostoma) caused a trace loss in North Carolina, Texas, and Missouri. It is particularly severe on trees with impaired vigor due to drought or winter-injury.

YELLOW S (Virus). Five States reported the presence of this disease, but the losses were under 1 per cent. P. D. R. 15: 34, 99.

LITTLE PEACH (Virus) reported from New York, New Jersey, Virginia, and Michigan. P. D. R. 15: 34.

RED SUTURE (Virus) was serious in four counties in Michigan. Twenty per cent of the trees in a well managed orchard showed symptoms. It has been shown that this disease can be reproduced by budding.

PHONY PEACH (Virus). . A detailed account of the distribution of phony peach will be given in the 1932 annual summary.

ARSENICAL INJURY. Several severe cases of defoliation adjacent to 85-15 dusted apple orchards were noted in New York. Virginia and North Carolina experienced severe arsenical burning on foliage and fruit when zinc lime was not used in all lead arsenate applications. Defoliation of 5 to 35 per cent resulted from arsenical spray injury in Indiana.

P L U M

BROWN ROT (Sclerotinia fructicola) was generally more severe than an average year. Some of the heaviest losses occurred in Massachusetts, 20 per cent; Ohio, 12 per cent; Michigan, 10 per cent; Missouri and Maryland, each 5 per cent. Cases of 50 per cent infection were noted in Michigan, when it followed curculio infestation. P. D. R. 15: 101.

CROWN GALL (Bacterium tumefaciens) killed over 200 trees in one orchard in Arizona. P. D. R. 15: 67.

PLUM POCKETS (Exoascus pruni). Louisiana reports more of this disease than usual, causing especially an enlargement of the buds which dried later. It was unusually severe in Iowa, causing greatly enlarged fruits. P. D. R. 15: 100, 104.

DECAY (Penicillium sp., Cladosporium sp.). Italian prunes from the Northwest.

C H E R R Y

BROWN ROT (Sclerotinia fructicola) was probably a little less severe than in the average year, although losses to the extent of 10, 5, 4, and 2 per cent for North Carolina, Virginia, Massachusetts, and Texas, respectively, were reported. P. D. R. 15: 50, 73, 74.

LEAF SPOT (Coccomyces hiemalis) was about equal in importance to previous years in most States reporting. Massachusetts, New Jersey, Delaware, and Michigan reported severe defoliation. Wisconsin reported satisfactory control with either lime sulfur or Bordeaux.

DECAY of sweet cherries from California, due to various fungi, including Aspergillus sp., Botrytis sp., Cladosporium sp., Alternaria sp., Penicillium sp., Rhizopus sp., P. D. R. 15: 73, 74. Cladosporium sp. and other organisms also occurred on sweet cherries from Idaho, Washington, and Oregon, following cracking.

CRACKING (apparently water relationship). Idaho, Washington, and Oregon. P. D. R. 15: 102.

FROST INJURY. A 75 per cent reduction in yield occurred in Massachusetts. P. D. R. 15: 56.

G R A P E

BLACK ROT (Guignardia bidwellii) was somewhat more severe generally than an average year, and considerably more prevalent than last year as evidenced

by the fact that 10 of the 15 States considering its prevalence reported more or much more. Those States reporting more than 3 per cent loss were: Massachusetts (20), North Carolina (10), Florida, Texas, and Virginia (5 each), Maryland and Kentucky (4 each). Virginia reported the loss of the entire crop of a 15-acre vineyard which was sprayed with Bordeaux, but in which the spray was applied with a gun instead of a nozzle. Arkansas, Michigan, Minnesota, and Kansas reported no loss due to unfavorable conditions for the development of black rot. P. D. R. 15: 56.

DOWNY MILDEW (Plasmopara viticola) was very severe in Virginia, causing a 10 per cent reduction in yield. Severity was apparently due to favorable weather conditions (rainy and high temperature). Other States reported nothing of outstanding interest.

RIPE ROT (Glomerella cingulata). Massachusetts reported an 8 per cent reduction in yield from this disease. The symptoms were not typical, in that the infected grapes kept their form, there was no wrinkling, the fibrovascular bundles of the pulp turned black, and the fruit dropped prematurely. Ohio also reported this disease as being prevalent.

ROOT KNOT (Caconema radicicola). Arizona. P. D. R. 15: 148.

STRAWBERRY

LEAF SPOT (Mycosphaerella fragariae) was generally about as prevalent as in an average year. Louisiana reports 15 per cent reduction in yield, but good control was obtained by winter spraying with 4-4-50 Bordeaux.

SCORCH (Diplocarpon earliana). Louisiana, less important than leaf spot; North Carolina, slight injury. P. D. R. 15: 66, 149.

ROOT ROT (Armillaria mellea). Although this seemed to be quite prevalent throughout the strawberry growing region, Massachusetts with 5 per cent reduction in yield gave the only loss estimate. P. D. R. 15: 24, 66.

BERRY ROTS: Some of the heaviest reductions in yields reported are as follows: Botrytis cinerea, Massachusetts 8 per cent, Missouri 5 per cent. Rhizopus nigricans, Missouri 12 per cent. P. D. R. 27, 28, 50, 65, 66.

DWARF (Aphelenchoides fragariae). The reports regarding strawberry dwarf, including the results of a special survey during the summer of 1931, are noted in P. D. R. 15: 60, 66, 147, and 149, and summarized with a map in the Journal of Economic Entomology, Vol. 25, No. 3, p. 450, June, 1932.

RASPBERRY

ANTHRACNOSE (Plectodiscella veneta) was generally more severe than usual and caused somewhat heavier losses than last year. The losses estimated by collaborators are expressed in percentage: Virginia 10, Missouri 6, Michigan 5, Maryland 4, and Massachusetts 1. This disease is a limiting factor in many plantings in Arkansas. Maximum infections of 75 and 100 per cent were reported from Michigan and Missouri respectively.

MOSAIC (Virus) appeared to be somewhat less prevalent than last year and less severe than an average year, although the following losses were reported: Massachusetts 20 per cent, Michigan 5, and Minnesota 4. Michigan and Wisconsin report beneficial effects from roguing.

LEAF RUST (Pucciniastrum americanum). New York. P. D. R. 15: 135-136.

CANE BLIGHT (Leptosphaeria coniothyrium) 10 and 4 per cent losses were reported from Massachusetts and Maryland, respectively.

VERTICILLIUM WILT (Verticillium sp.). Pennsylvania. P. D. R. 15: 150.

SPUR DROP (undet.). Kentucky. P. D. R. 15: 55.

BLACKBERRY

ORANGE RUST (Kuehneola nitens) caused appreciable loss in many plantings in Arkansas. P. D. R. 15: 56.

FRUIT ROT (Botrytis vulgaris). Massachusetts reports a 5 per cent reduction in yield.

DEWBERRY

ANTHRACNOSE (Ectodiscella veneta) caused 20 per cent loss in North Carolina and was severe in New Jersey.

VIOLET ROOT ROT (Rhizoctonia crocorum). North Carolina. P. D. R. 15: 89.

CURRENT

POWDERY MILDEW (Sphaerotheca mors-uvae). Severe locally in Washington. P. D. R. 15: 56.

ANTHRACNOSE (Pseudopeziza ribis) caused heavy defoliation in Wisconsin.

CRANBERRY

FRUIT ROTS. Massachusetts, which produces about two-thirds of the cranberry crop of the United States, suffered the worst outbreak of cranberry fruit rots during the past 20 years, perhaps the worst in the history of the industry. In spite of the fact that the condition of the crop was accurately forecast early in September, and in spite of all the efforts of a highly organized industry to reduce the amount of rot, it is conservatively estimated that one-fourth of the berries produced in Massachusetts decayed before they were sold to the ultimate consumer. A summary of notable outbreaks of cranberry fruit rot in Massachusetts so far as they are recorded is given in Phytopathology 22: 911-916. (1932).

FALSE PLOSSOM (virus) as reported in P. D. R. 15: page 25, seems not to spread on the Pacific Coast but to be spreading rapidly in certain Wisconsin bogs in which it has been introduced during the last 10 years. In

Massachusetts the progress of the disease has apparently been slowed down perhaps due to active measures for the control of the insect carrier.

New Jersey, on the other hand, is now feeling the full force of this, the most serious disease which has been known to attack cranberries. R. B. Wilcox has recently prepared a series of graphs showing the total yield for the State and the yield of the more important varieties in New Jersey for the period 1913 to 1929. These curves, shown in Fig. 23, are expressed in terms of percentage of the highest yield, which in most cases was in 1923. The curve is smoothed by considering the yield for each year as the average of that particular year, of the two preceding and the two following years. It will be noted that the decline in yield since 1923 amounted to 33 per cent, when all varieties are averaged together, 16 per cent in the case of Early Black, 33 per cent for Howes, 32 per cent for Champion, 44 per cent for "Native Jersey," and 56 per cent for Centennial. The rate of decline indicated agrees closely with the susceptibility of the different varieties to the false blossom disease as observed in field studies and by actual tests.

M U L B E R R Y

BACTERIAL BLIGHT (Bacterium mori). Texas. P. D. R. 15: 67.

POPCORN DISEASE (Sclerotinia carunculoides). Texas, Georgia. P. D. R. 15: 68, 101.

C I T R U S

SCAB (Sphaceloma fawcettii) caused 50 per cent loss on lemons, 25 to 50 per cent on Tangelos, and 3 per cent on grapefruit in Florida.

FRUIT ROTS. BLACK MOLD ROT (Aspergillus niger) and ALTERNARIA ROT (Alternaria sp.), California. P. D. R. 15: 133.

FRUIT SPOTS (Alternaria sp. and Colletotrichum sp.). California. P. D. R. 15: 161.

F I G

DIE BACK (Diplodia sycina syconophila) was very abundant on trees dying from nematode infestation and winter injury in North Carolina.

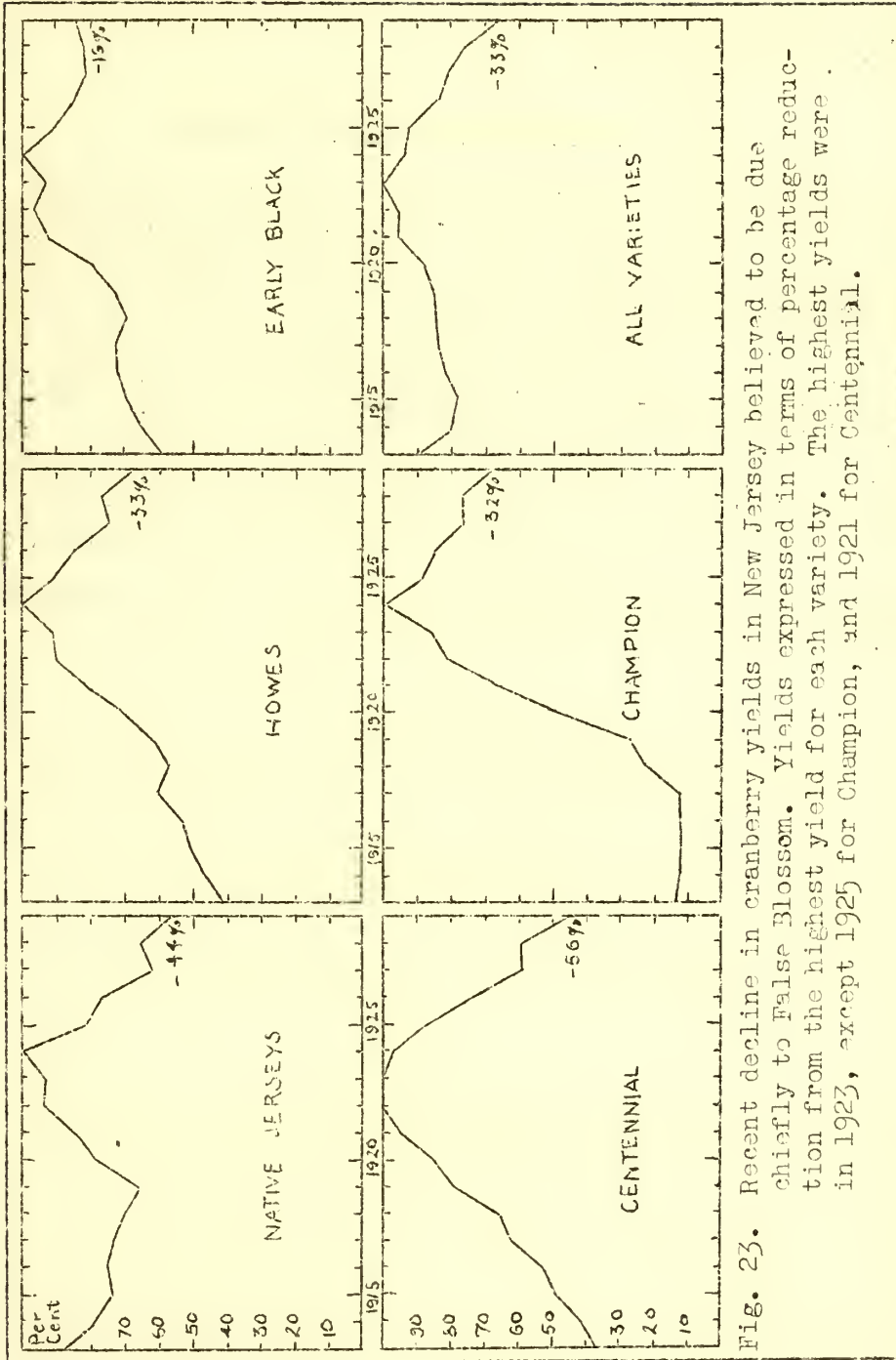
ROOT KNOT (Caconema radiculicola) very severe in North Carolina; a trace in Texas.

P E R S I M M O N

FRUIT ROT (Sphaeropsis malorum) was reported from Georgia.

P E C A N

LEAF SPOT (Cercospora fusca) was very abundant in North Carolina.



SCAB (Cladosporium effusum) caused 5 per cent loss in North Carolina with as high as 100 per cent infection in some cases. P. D. R. 15: 136.

CROWN GALL (Bacterium tumefaciens). Arizona. P. D. R. 15: 67.

KERNEL SPOT due to stink bug punctures was unusually severe in North Carolina, Arkansas, and Texas where 10, 20 to 50, and 8 per cent losses, respectively, were reported.

NEMATODE DISEASES

Two nematode diseases attracted unusual attention during the year; the brown ring disease of sweet potato (P. D. R. 41) caused by Tylenchus dipsaci, which was noted again in New Jersey, and strawberry dwarf caused by Aphelenchoides fragariae, which has long been established throughout the southeastern States and is now found in one or two more northern localities. There has also been an unusual number of reports of root knot due to Caenorhynchus radiculicola in the United States. In this case, it is particularly difficult to determine whether the increase is an actual one or if the greater number of reports is due to an increased interest in nematode diseases. An interesting possibility is that abnormally warm winters of the past few years may have permitted the building up of an unusually large nematode population in the northeastern United States.

For detailed reports on nematode diseases see the various hosts and the index.

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 muskmelon, 36.
 watermelon, 38.
 lindemuthianum, bean, 32.
Corticium vagum, bean, 32.
 cotton, 41.
 potato, 29.
 sweet clover, 27.
Coryneum beijerinckii, peach, 53.
 Cracking (water relationship),
 cherry, 54.
Cronartium cerebrum, Pinus spp., 43.
 Pinus banksiana, 43.
 ribicola, Pinus spp., 42.
 Ribes spp., 42.
 Crown disease, sorghum, 25.
Cryptostictus sp., Cornus florida,
 44.
 Curly top (virus), tomato, 31.
Cuscuta sp., tomato, 31.
Cylindrocladium scoparium, Rosa spp.,
 48.
Cytospora sp., Picea spp., 42.

Cytospora chrysosperma, Populus spp.
 44.

D

Didymellina iridis, Iris sp., 46.
Diplocarpon earliana, strawberry, 55.
 rosae, Rosa spp., 47.
Diplodia spp., corn, 24.
 watermelon, 38.
 natalensis, cowpea, 27.
 sycina syconophila, fig, 57.
Dothichiza populea, Populus spp., 44.
 Drought, Acer sp., 42.
 apple, 51.
 Picea spp., 42.
 Pinus spp., 42.
 Prunus sp., 42.
Quercus prinus, 42.
 rubra, 42.
 Tsuga sp., 42.

E

Ear rots, corn, 24.
Entyloma meliloti, sweet clover, 27.
Erysiphe cichoracearum, cucumber, 35.
 muskmelon, 36.
 Phlox spp., 47.
 squash, 37.
 sunflower, 28.
 Zinnia elegans, 48.
 graminis, barley, 22.
 rye, 21.
 wheat, 19.
 polygoni, bean, 32.
 clover, 26.
 cowpea, 27.
Excascus deformans, peach, 53.
 pruni, plum, 54.

F

Fabraea maculata, pear, 52.
 False blossom, cranberry, 56.
 Fertilizer burn (superphosphate),
 potato, 29.
 Fertilizer injury, cotton, 41.
Fomes fomentarius, Acer spp., 43.
 igniarius, Acer spp., 43.
 Frost injury, apple, 51.
 cherry, 54.
 Fruit rots, cranberry, 56.

Fusarium spp., alfalfa, 26.
 celery, 39.
 corn, 24.
 cowpea, 27.
 muskmelon, 37.
Narcissus sp., 47.
 squash, 38.
 sweet clover, 27.
 wheat, 20.
batatas, sweet potato, 31.
conglutinans, cabbage, 33.
callistophi, *Callistephus*
chinensis, 45.
hyperoxysporum, sweet potato, 31.
lini, flax, 25.
lycopersici, tomato, 30.
malli, onion, 33.
martii pisi, pea, 39.
moniliforme, corn, 24.
niveum, muskmelon, 37.
 watermelon, 38.
oxysporum, potato, 29.
tracheiphilum, cowpea, 27.
 soybean, 27.
vasinfectum, cotton, 40.
Fusicladium saliciperdu, *Salix* spp.,
 44.

G

Gibberella saubinetii, barley, 22.
 corn, 24.
 rye, 21.
 wheat, 19.
Gloeodes pomigena, apple, 50.
 pear, 52.
Gloeosporium acerinum, *Acer* spp., 43.
rufomaculans, pear, 52.
Glomerella cingulata, apple, 49.
 grape, 55.
 pear, 52.
gossypii, cotton, 40.
 Glume spotting (undet.) rice, 25.
Gnomonia ulmea, *Ulmus* spp., 45.
veneta, *Platanus* sp., 44.
Quercus spp., 44.
Graphium ulmi, *Ulmus* spp., 45.
Guignardia aesculi, *Aesculus hippo-*
castanum, 43.
hidwellii, grape, 54.
Gymnosporangium germinale, apple,
 50.
Juniperus communis depressa,
 50.

Gymnosporangium germinale, quince, 52.
globosum, apple, 50.
juniperi-virginianae, apple, 49.

H

Heat canker (non-par.), flax, 25.
Helminthosporium sp., rice, 25.
avenae, oats, 23.
gramineum, barley, 22.
sativum, wheat, 19, 20.
Heterodera radicum, see *Gaeumma*
radicum.
 Hopperburn (leafhopper), potato, 29.

I

Internal breakdown (non-par.), potato,
 29.

K

Kernel spot, pecan, 59.
Kuehneola gossypii, cotton, 41.
nitens, blackberry, 56.

L

Leaf roll (virus), potato, 29.
 Leaf roll (undet.), tomato, 31.
 Leaf spot (undet.), corn, 25.
 rice, 25.
Leptosphaeria coniothyrium, rasp-
 berry, 56.
Leptothyrium pemi, apple, 51.
 Lightning injury, cotton, 42.
 tomato, 31.
 Little peach (virus), peach, 53.

M

Macrophomina phaseoli, cowpea, 27.
Macrosporium cucumerinum, muskmelon,
 36.
nigricantium, cotton, 41.
 Malnutrition (non-parasitic rust),
 cotton, 41.
Melampsora lini, flax, 25.
Melilotus indica, sweet clover, 27.
Microsphaera alni, *Syringa* sp., 48.
Monilochaetes infusans, sweet potato,
 31.
 Mosaic (non-par.), cotton, 42.
 Mosaic (undet.), cowpea, 27.

Mosaic (virus), bean, 32.

celery, 39.

cucumber, 35.

muskmelon, 36.

potato, 29.

raspberry, 56.

squash, 37.

sweet clover, 27.

tomato, 31.

wheat, 21.

Mycosphaerella citrullina, cucumber,

35.

muskmelon, 36.

pumpkin, 37.

squash, 37, 38.

watermelon, 38.

fragariae, strawberry, 55.

N

Nectria sp., *Juglans nigra*, 44.

Nummularia discreta, apple, 50.

O

Ophiobolus sp., rice, 25.

graminis, wheat, 20.

P

Penicillium spp., cherry, 54.

corn, 24.

plum, 54.

squash, 38.

Peronospora effusa, spinach, 40.

hyoscyami, tobacco, 17, 40.

manshurica, soybean, 27.

parasitica, broccoli, 34.

schleideni, onion, 33.

trifoliorum, alfalfa, 26.

Phlyctaena linicola, flax, 25.

Phoma destructiva, tomato, 31.

lingam, broccoli, 34.

pomi, apple, 51.

Phomopsis sp., *Acer palmatum*, 43.

juniperovora, *Juniperus* spp.,

43.

vexans, eggplant, 40.

Phony peach (virus), peach 53.

Phyllosticta solitaria, apple, 49.

Phymatotrichum omnivorum, alfalfa,

26.

cotton, 40.

Phymatotrichum omnivorum, *Helianthus*

annuus, 28.

Helianthus maximiliani, 28.

soybean, 28.

sweet clover, 27.

Physalospora malorum, apple, 50.

pear, 52.

Phytophthora infestans, potato, 17, 28

tomato, 17, 30.

terrestris, tomato, 30.

Piricularia oryzae, rice, 25.

Plasmodiophora brassicae, broccoli, 34

carbage, 34.

radish, 34.

Plasmopara viticola, grape, 55.

Plectodiscella veneta, dewberry, 56.

raspberry, 55.

Podosphaera leucotricha, apple, 50.

Premature germination (high tempera-
ture), potato, 30.

Protocoronospora nigricans, *Vicia*

villosa, 28.

Pseudoperonospora cubensis, cucumber,

35.

muskmelon, 36.

Pseudopeziza medicaginis, alfalfa, 26.

ribis, currant, 56.

Puccinia anomala, barley, 22.

antirrhini, *Antirrhinum majus*, 45.

asparagi, asparagus, 39.

coronata, oats, 23.

dispersa, rye, 21.

graminis, barley, 22.

oats, 23.

rye, 21.

wheat, 18.

helianthi-mollis, sunflower, 28.

hibiscata, cotton, 41.

triticea, wheat, 19.

Pucciniastrum americanum, raspberry,

56.

Pyrenopeziza medicaginis, alfalfa, 26.

Pythium spp., corn, 24.

lettuce, 39.

sweet potato, 32.

watermelon, 38.

R

Red suture (virus), peach, 53.

Rhizoctonia sp., sweet clover, 27.

crocorum, dewberry, 56.

Rhizopus spp., cherry, 54.

Rhizopus spp., squash, 36.
 nigricans, strawberry, 55.
 sweet potato, 32.

Rhytisma acerinum, Acer spp., 43.

Root disease, sorghum, 25.

Root rot (undet.), alfalfa, 26.

Root rots, corn, 24.

Rots, cranberry, 17.

strawberry, 17.

S

Sclerotinia carunculoides, mulberry,
 57.

fruticicola, cherry, 54.

peach, 52.

plum, 54.

libertiana, Althaea rosea, 45.

celery, 39.

sclerotiorum, cabbage, 34.

lettuce, 39.

sunflower, 28.

trifoliorum, alfalfa, 26.

clover, 26.

sweet clover, 27.

Sclerotium fulvum, wheat, 20.

gladioli, Gladiolus sp., 46.

oryzae, rice, 25.

rolfsii, Dianthus barbatus, 46.

soybean, 28.

sunflower, 28.

sweet potato, 32.

tomato, 31.

watermelon, 38.

Septoria apii, celery, 38.

cucurbitacearum, cucumber, 35.

muskmelon, 36.

pumpkin, 37.

squash, 37.

divaricata, Phlox spp., 47.

gladioli, Gladiolus sp., 46.

helianthi, sunflower, 28.

lycopersici, tomato, 30.

nodorum, wheat, 19.

tritici, wheat, 19.

Shoot disease, sorghum, 25.

Sphaceloma fawcettii, citrus, 57.

Sphaeropsis sp., Acer spp., 43.

malorum, persimmon, 57.

Sphaerotheca mors-uvae, currant, 56.

pannosa, Rosa spp., 48.

Spray injury, apple, 51.

Spur drop (undet.), raspberry, 56.

Steganosporium pyriforme, Acer spp.,
 43.

Sterility (undet.), oats, 23.

Straighthead (non-par.), rice, 25.

Streak (virus), tomato, 31.

T

Thielavia basicola, clover, 26.

Tilletia horrida, rice, 25.

levis, wheat, 18.

tritici, wheat, 18.

Tipburn (climatic), potato, 29.

Tubers without vines (non-par.),

potato, 30.

Tylenchus dipsaci, onion, 33.

sweet potato, 32, 59.

tritici, wheat, 20.

U

Urocystis cepulae, onion, 33.

tritici, wheat, 18.

Uromyces appendiculatus, bean, 32.

Ustilago avenae, oats, 23.

hordei, barley, 21.

levis, cats, 23.

nigra, barley, 21.

nuda, barley, 21.

tritici, wheat, 18.

zeae, corn, 23.

V

Valsa leucostoma, peach, 53.

Venturia inaequalis, apple, 49.

pyrina, pear, 52.

Verticillium spp., Acer spp., 43.

raspberry, 56.

albicatum, cotton, 40.

horseradish, 34.

tomato, 31.

W

Western yellow blight (virus), tomato,
 31.

Winter injury, Acer sp., 42.

alfalfa, 26.

Picea spp., 42.

Pinus spp., 42.

Prunus sp., 42.

Quercus prinus, 42.

Winter injury, *Quercus rubra*, 42.
Tsuga sp., 42.

Y

Yellowing (manganese deficiency), bea
32...
Yellows (virus), *Callistephus*
chinensis, 45.
peach, 53.

DISEASES OF PLANTS IN THE UNITED STATES IN 1932

Compiled by

Jessie I. Wood, Neil E. Stevens, and Paul R. Miller

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INTRODUCTION

The unusual severity and wide distribution of bacterial wilt of sweet corn and downy mildew of tobacco outweigh in interest other developments in the realm of plant diseases in the United States during 1932. Collaborators and other pathologists gave much attention to these two diseases, and their spread was closely watched and recorded. For details see the 1932 Reporter. General reports on these two diseases were published in the American Year Book for 1932, pages 419-420, and in the International Bulletin of Plant Protection, November and December, 1932.

For reasons well known to most of the readers of this summary the extent of field work engaged in by American plant pathologists was materially less in 1932 than in any other recent year. This may have reduced somewhat the detail and volume of the reports sent in to the Survey, particularly as regards less important diseases. On the other hand, most State pathologists are so closely in touch with county agents and field workers that unusual developments come quickly to their attention.

Unquestionably the value of such coördination of information as is here attempted must be increased by the inability of individual workers to make extensive field observations for themselves and their appreciation of this is evidenced by the fact that reports have been surprisingly numerous.

Because of the necessity of keeping this summary within the briefest possible limit, information given in the current numbers of the Reporter have been given only incidentally to other discussions. Investigators interested in special diseases should consult the Index to the 1932 Reporter.

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METHOD OF PRESENTING WEATHER DATA

For convenience in reference, some of the available information regarding the weather conditions during 1932 are presented by means of graphs and maps. The method of presentation is essentially that used in 1931. (See Sup. 64: 6). The seasons have been considered arbitrarily as consisting of three calendar months, although the actual periods of growth and dormancy vary greatly in different parts of the United States. The climatic regions used by the Weather Bureau have, of course, been followed even though they are limited by State boundaries and often include widely different climatic areas. In most cases these conditions are well known to readers of this summary.

Mean temperature and total rainfall for the year are given in percentages of normal, regions approximately normal and above being further indicated by shading. Deviation from normal should furnish one means of correlating weather with unusual crop or disease conditions, since obviously "normal" indicates an average of the conditions to which the crops of the region have been subject during a series of years. In spite of admitted limitations of this method (see P. D. R. 17: p. 34) it seems to us the most convenient and practicable way of presenting in the small space available some of the most salient facts regarding the deviations from normal weather conditions during the year.

In addition a series of graphs have been prepared to show the temperature trend at Philadelphia for the past ten years, as compared with the fifty year normal.

THE WEATHER IN 1932

As shown by the maps, Figs. 1 - 8, precipitation was below normal during the spring months in most of the States east of the Rocky Mountains, and rainfall continued decidedly subnormal throughout the summer in the central Atlantic States. Nowhere, however, was there so severe a drought as that experienced during the summer of 1930 in this general region.

Spring and summer temperatures were, as indicated by the maps, close to normal over most of the country. Winter temperatures (December to February, inclusive) on the other hand were unusually high in practically all States east of the Rocky Mountains, particularly in the northeastern and northcentral States. The same thing is true, of course, of other recent winters. In fact so marked and long continued has been the prevalence of abnormally high winter temperatures in the central and eastern States that it may well influence, if indeed it has not already influenced, the abundance of some plant diseases.

The extent to which recent fall and winter temperatures have exceeded normal in the northeastern United States is shown by the Figs. 21 - 25 in which mean annual temperatures at Philadelphia for the seasons indicated for each of the past ten years are plotted against the fifty year normal. Only once during this period has the mean fall temperature been even one degree below normal, while since 1926 it has been consistently above normal culminating in a pronounced peak in 1931, just preceding the year now under review.

TEMPERATURE

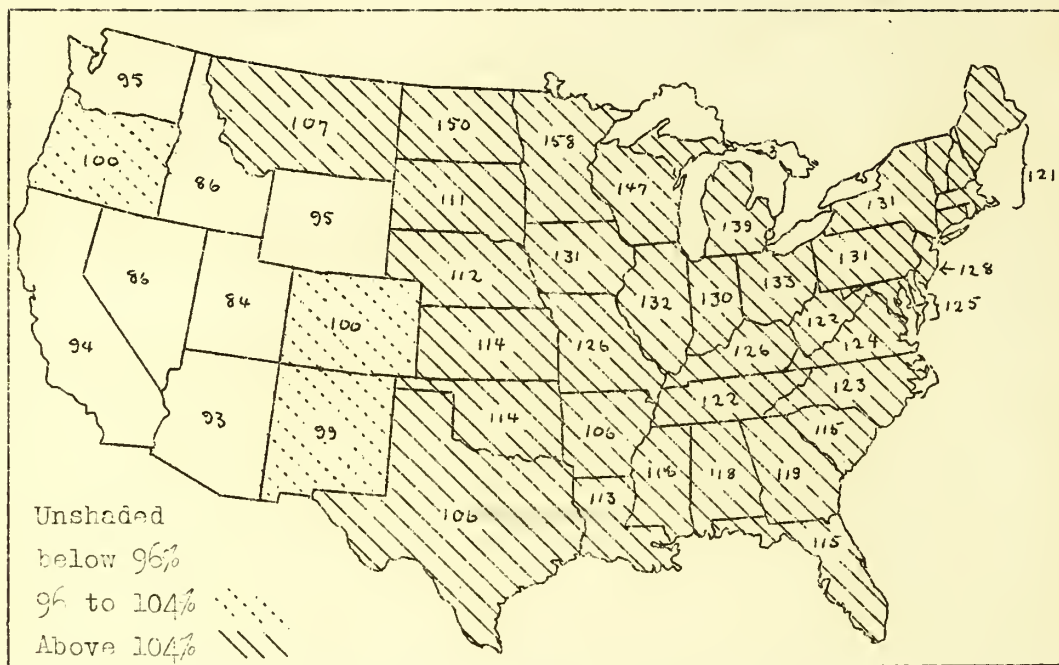


Fig. 1. Percentage of normal temperature for the winter (Dec. 1931, Jan. - Feb. 1932) 1932.

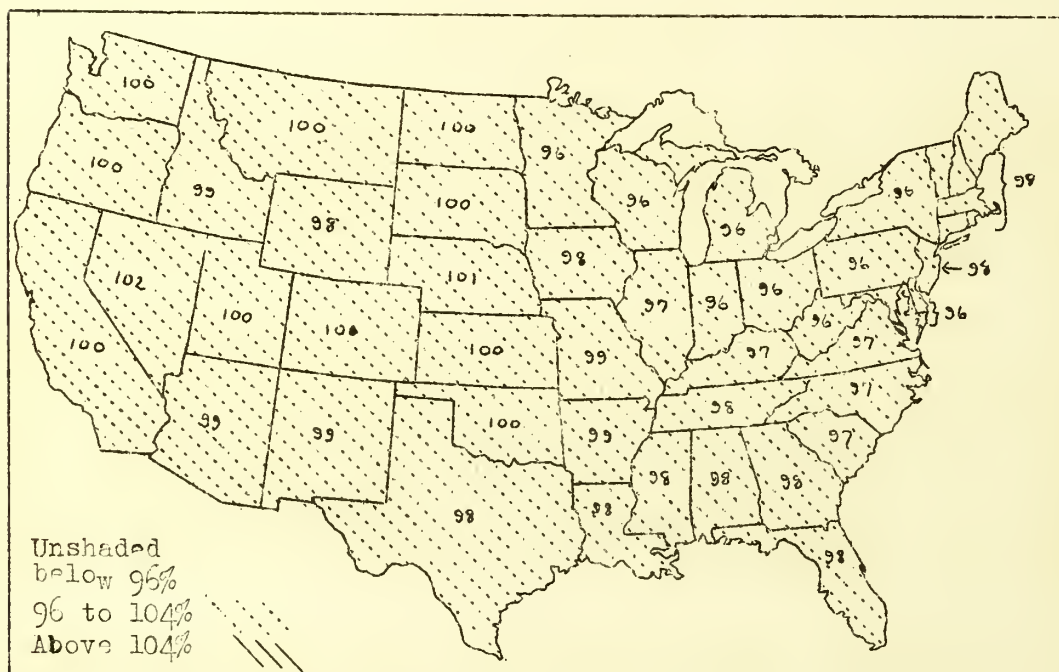


Fig. 2. Percentage of normal temperature for spring (Mar., April, May) 1932.

PRECIPITATION

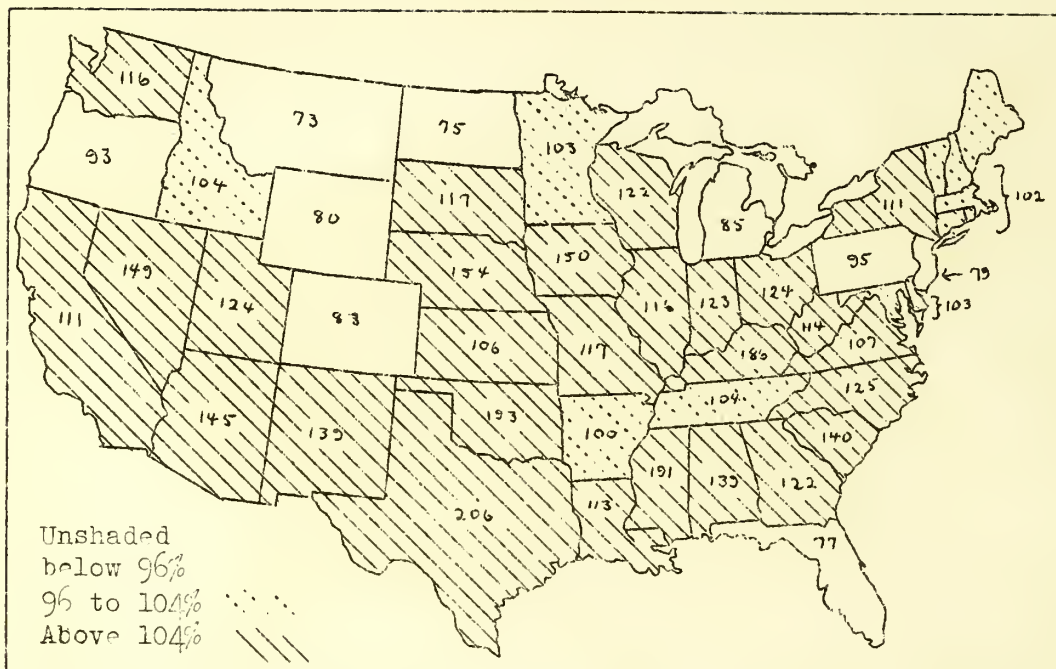


Fig. 5. Percentage of normal precipitation for the winter (Dec. 1931, Jan. - Feb. 1932).

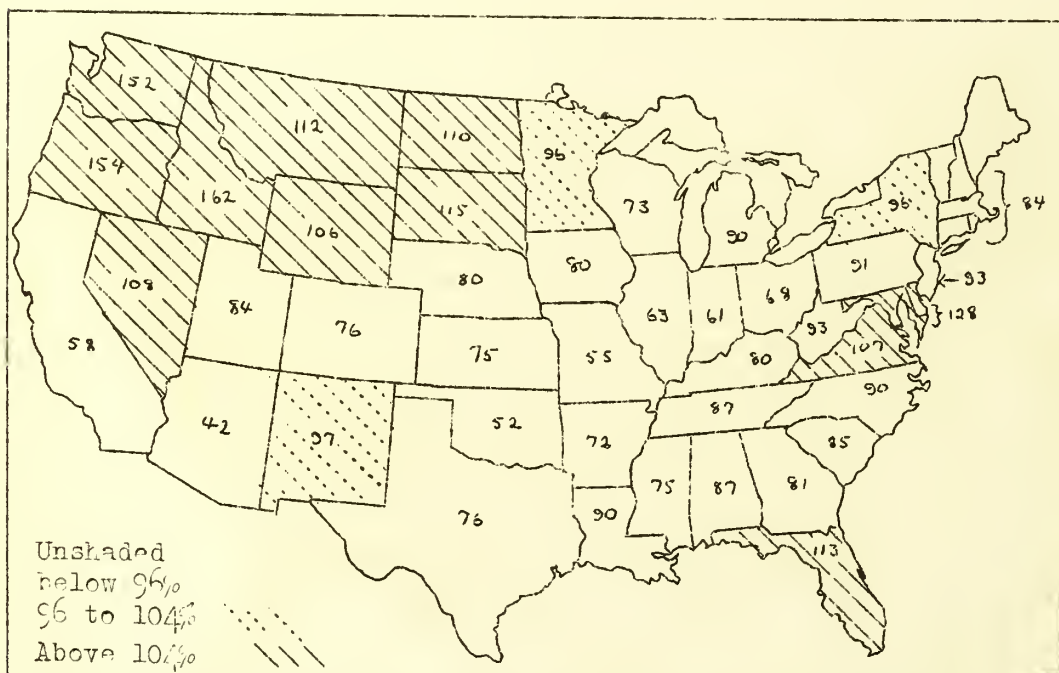


Fig. 6. Percentage of normal precipitation for the spring (Mar., Apr., May) 1932.

PRECIPITATION

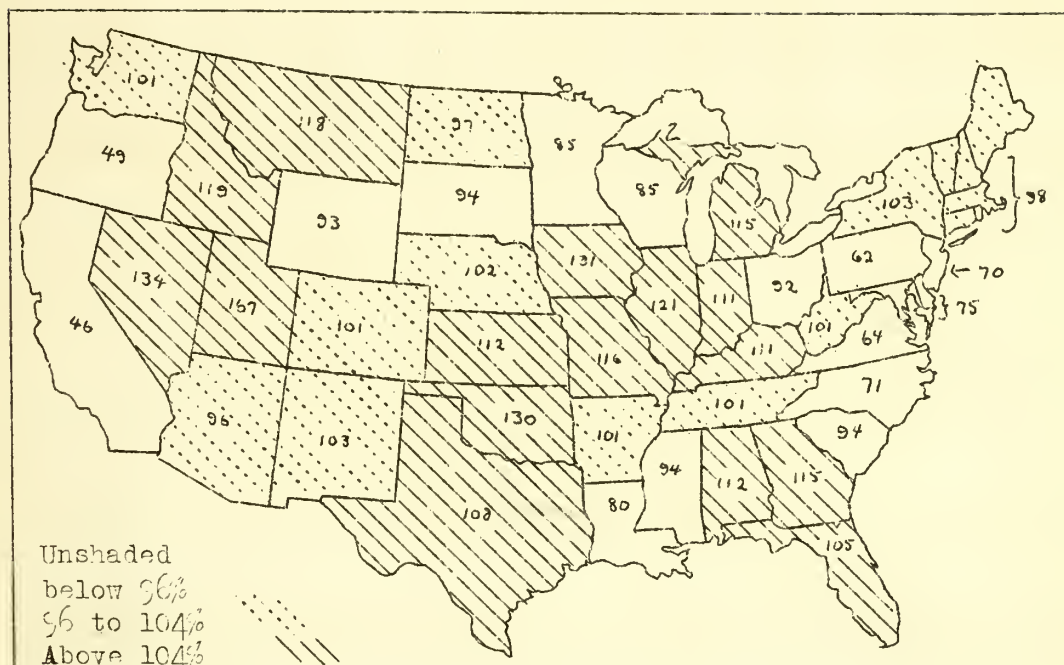


Fig. 7. Percentage of normal precipitation during summer (June, July, Aug.) 1952.

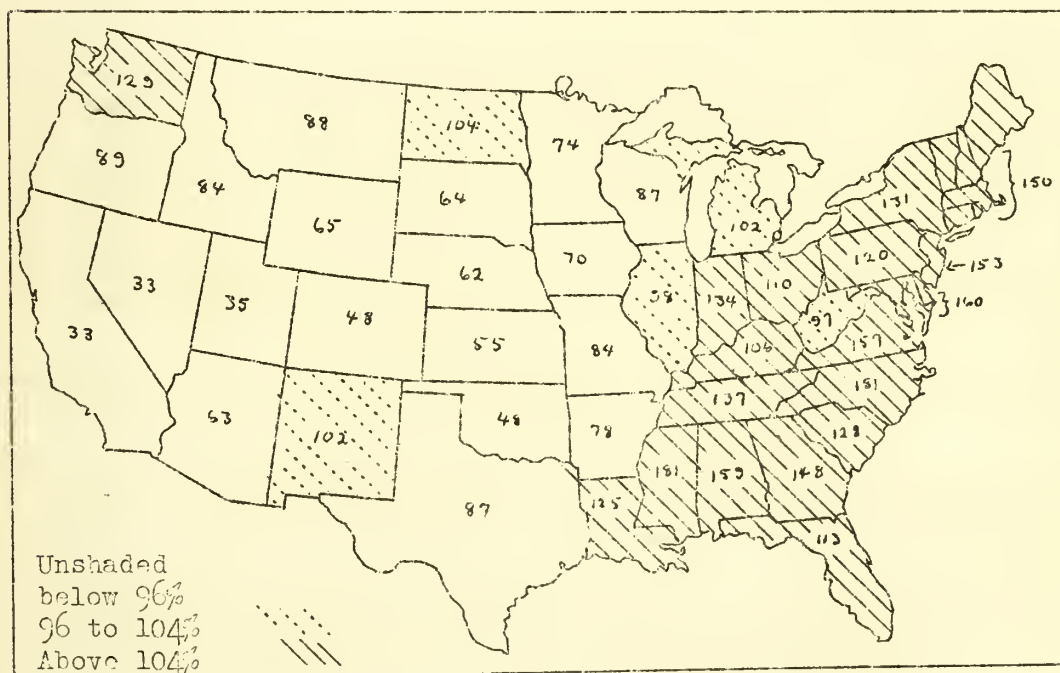


Fig. 8. Percentage of normal precipitation during fall (Sept., Oct., Nov.) 1932.

HARRISBURG, PENNSYLVANIA

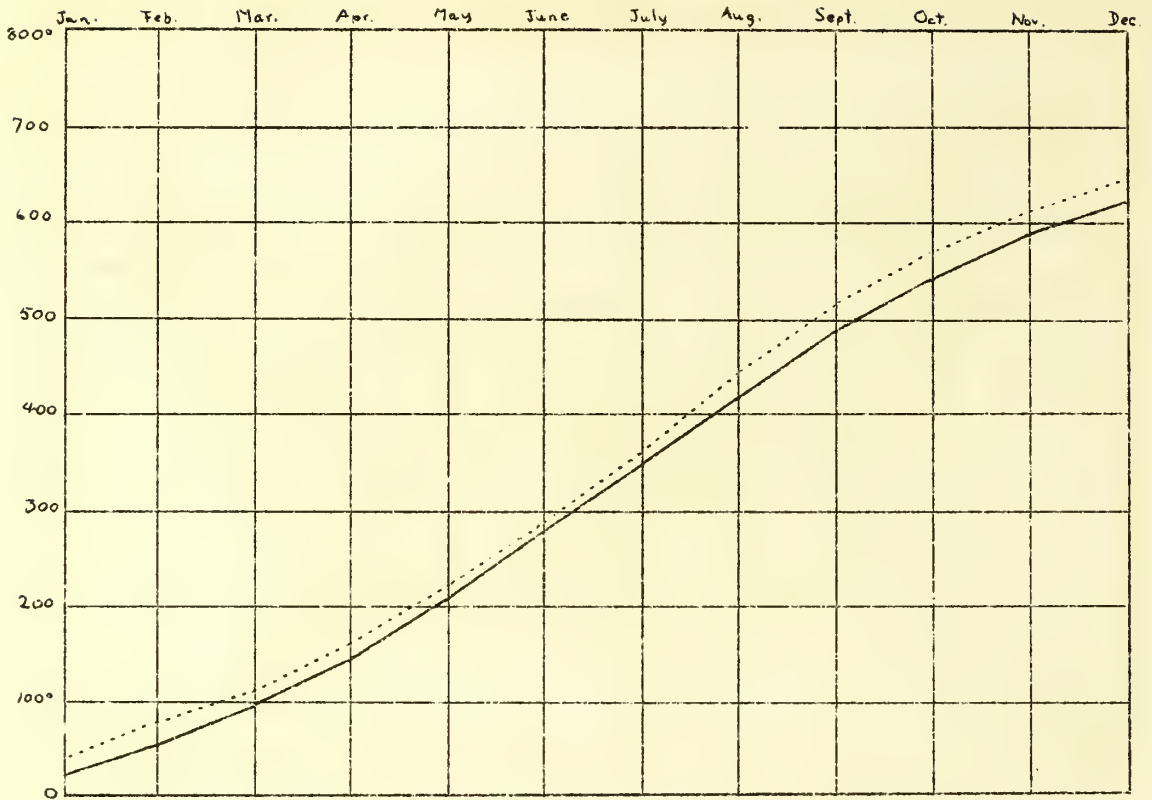


Fig. 9. Accumulated temperature in degrees F. for Harrisburg, Pennsylvania, 1932 (dotted line), compared with normal (solid line).

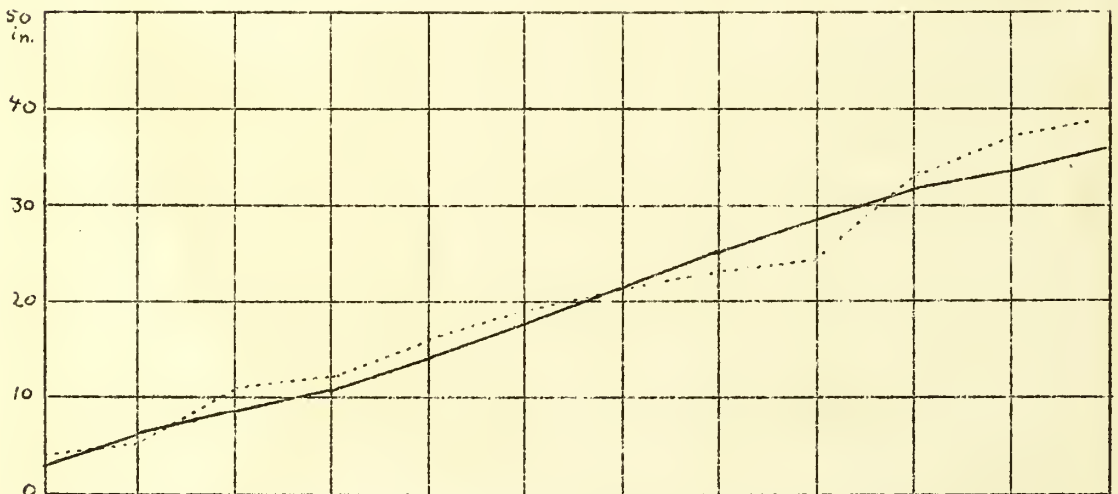


Fig. 10. Accumulated precipitation in inches for Harrisburg, Pennsylvania, 1932, (dotted line), compared with normal (solid line).

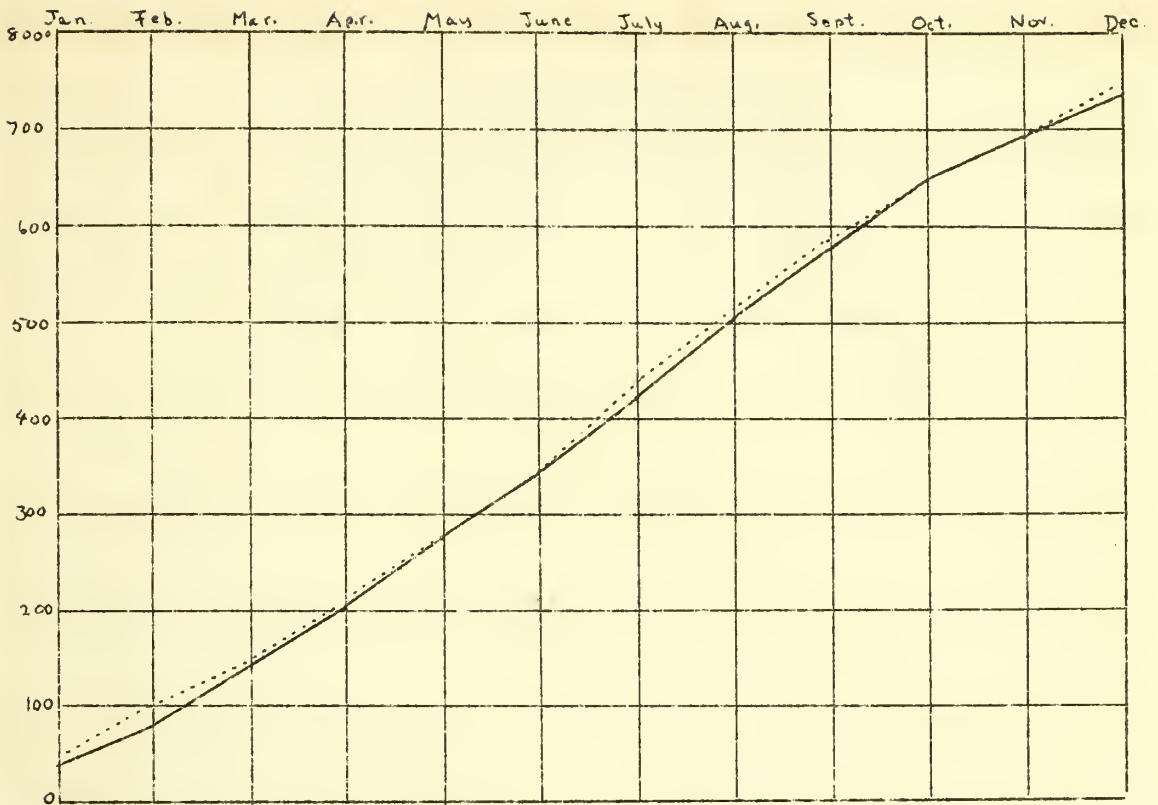


Fig. 11. Accumulated temperature in degrees F. for Atlanta, Georgia, 1952, (dotted line), compared with normal (solid line).

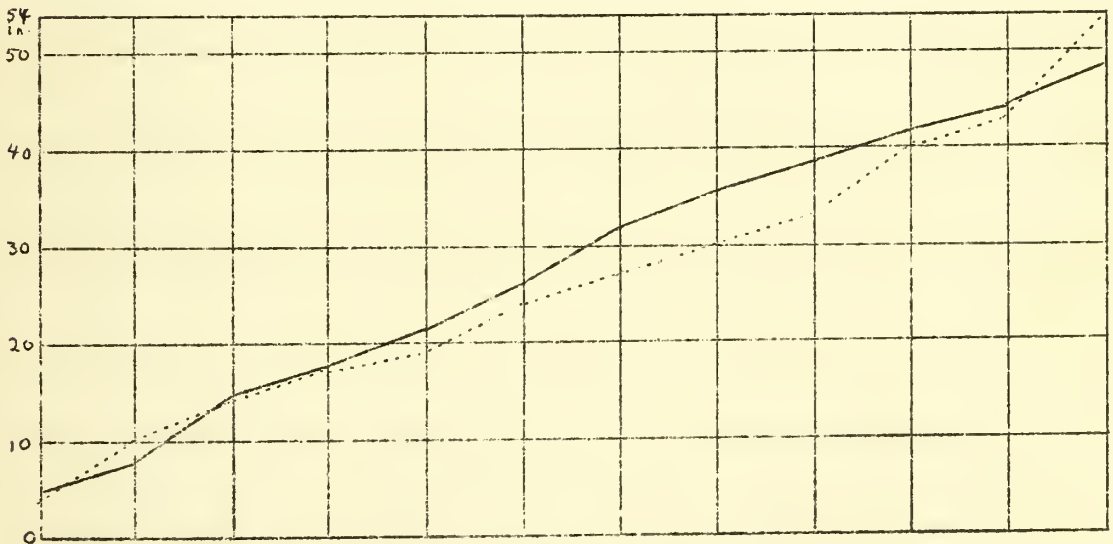


Fig. 12. Accumulated precipitation in inches for Atlanta, Georgia, 1952, (dotted line), compared with normal (solid line).

LITTLE ROCK, ARKANSAS

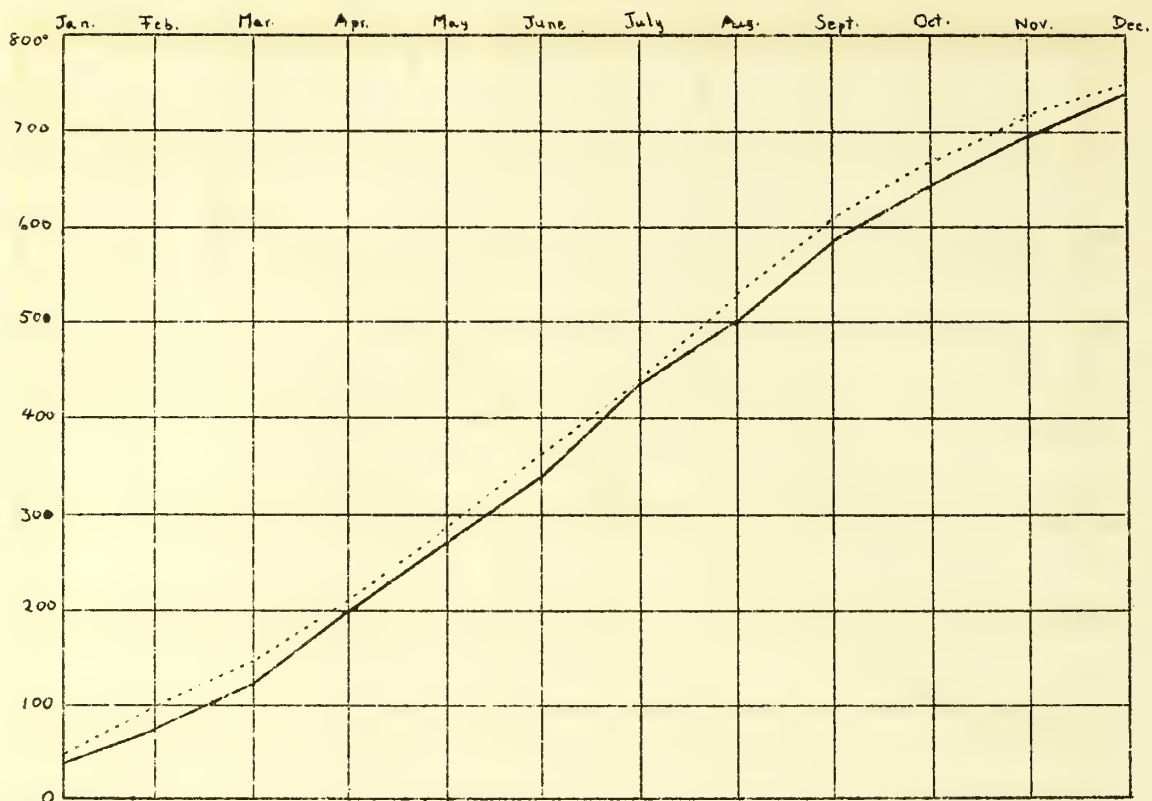


Fig. 13. Accumulated temperature in degrees F. for Little Rock, Arkansas, 1932, (dotted line), compared with normal (solid line).

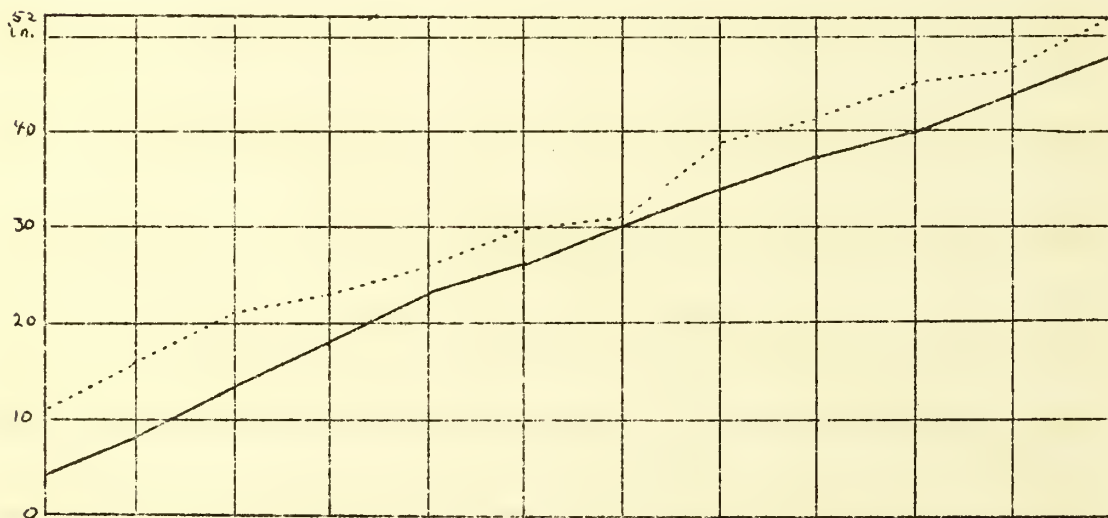


Fig. 14. Accumulated precipitation in inches for Little Rock, Arkansas, 1932, (dotted line), compared with normal (solid line).

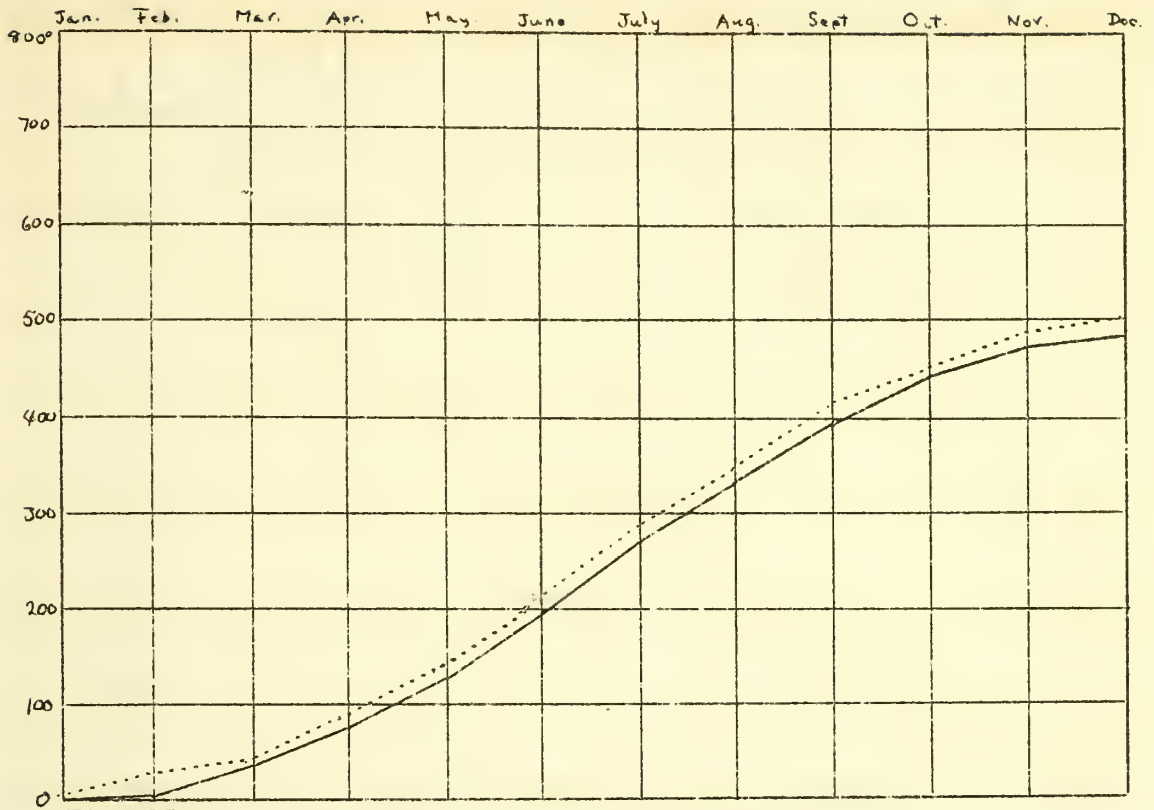


Fig. 15. Accumulated temperature in degrees F. for Bismarck, North Dakota, 1932, (dotted line), compared with normal (solid line).

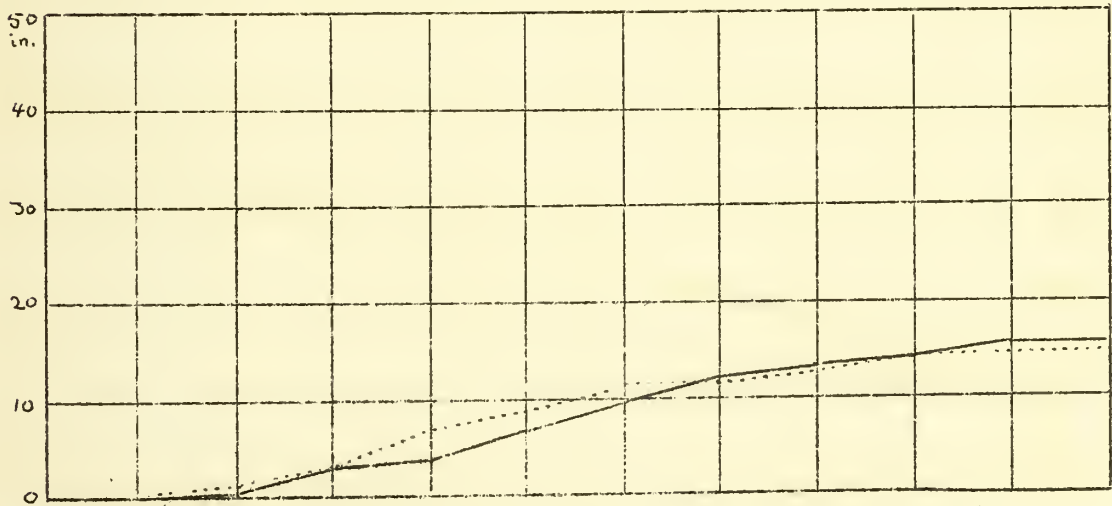


Fig. 16. Accumulated precipitation in inches for Bismarck, North Dakota, 1932, (dotted line), compared with normal (solid line).

PORTLAND, OREGON

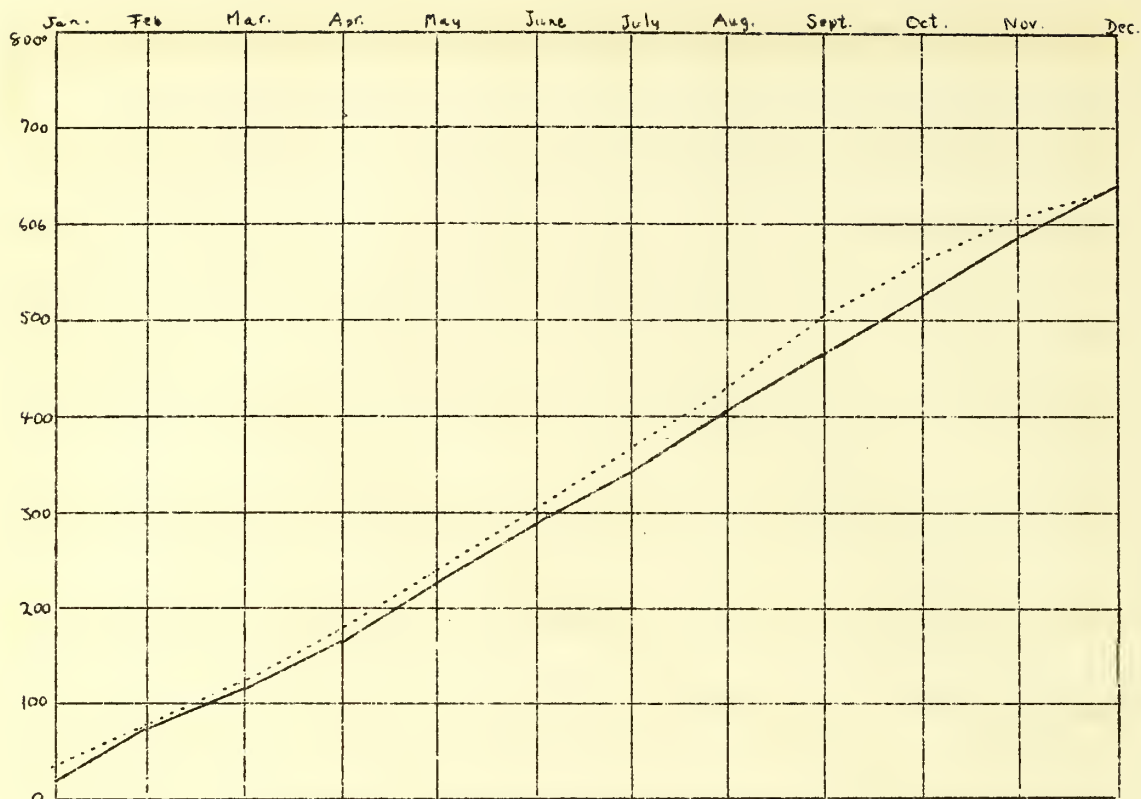


Fig. 17. Accumulated temperature in degrees F. for Portland, Oregon, 1932, (dotted line), compared with normal (solid line).

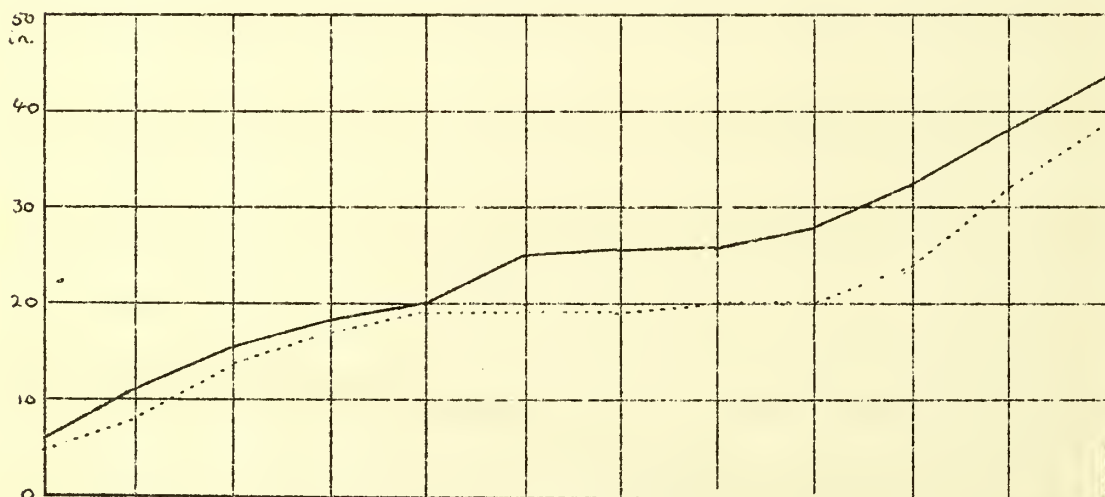


Fig. 18. Accumulated precipitation in inches for Portland, Oregon, 1932, (dotted line), compared with normal (solid line).

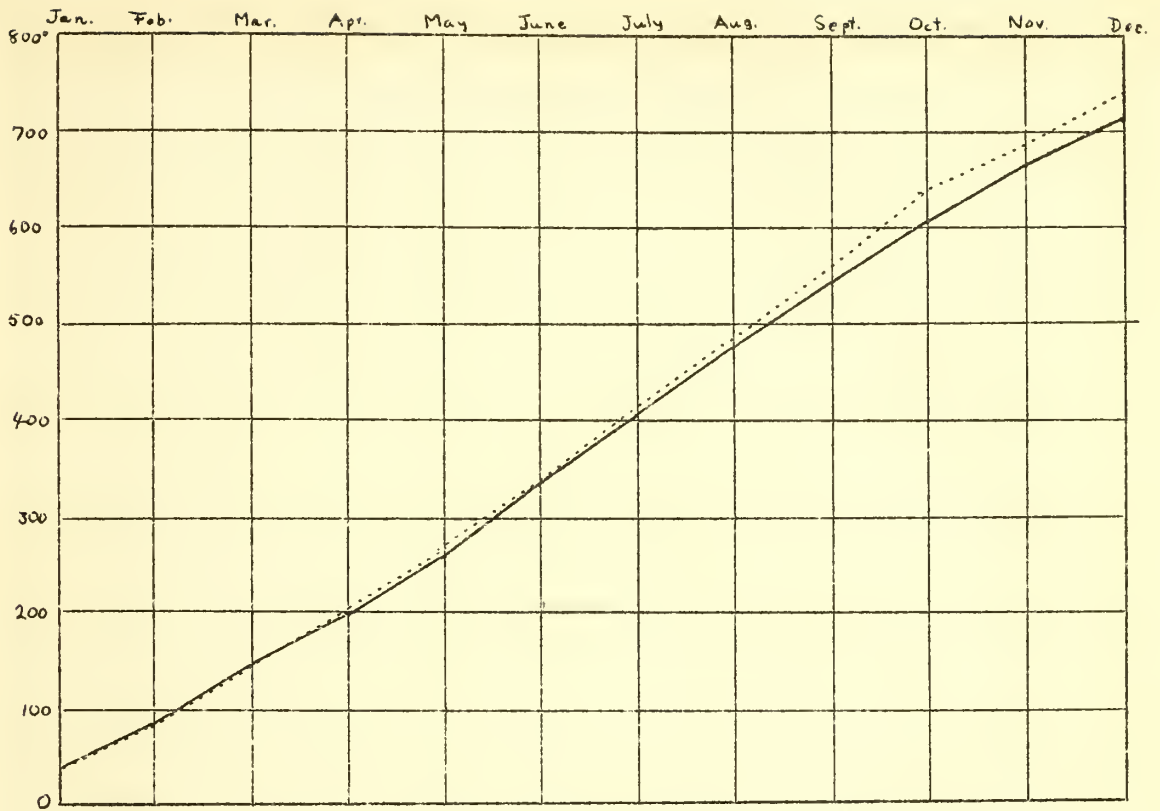


Fig. 19. Accumulated temperature in degrees F. for Sacramento, California, 1932, (dotted line), compared with normal (solid line).

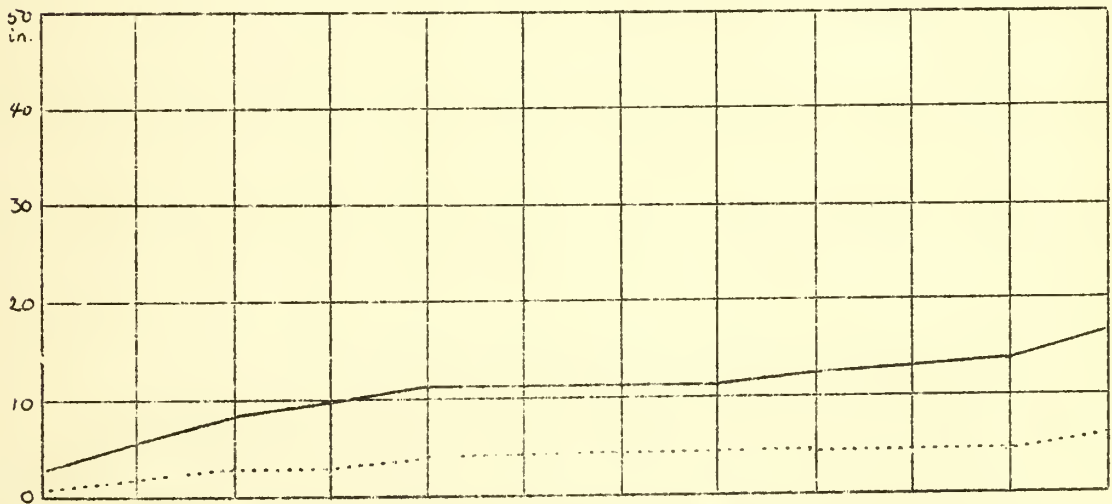
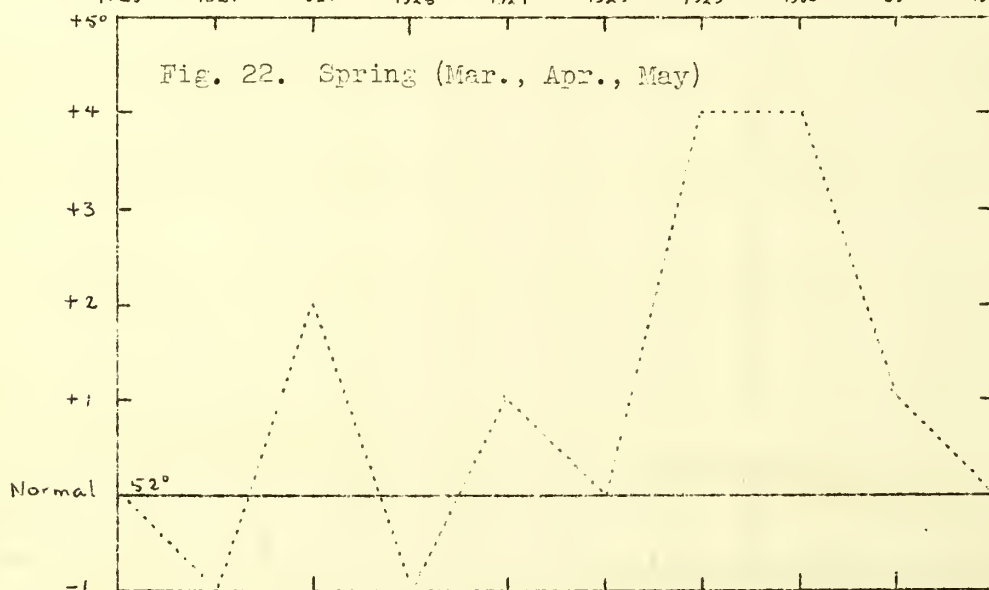
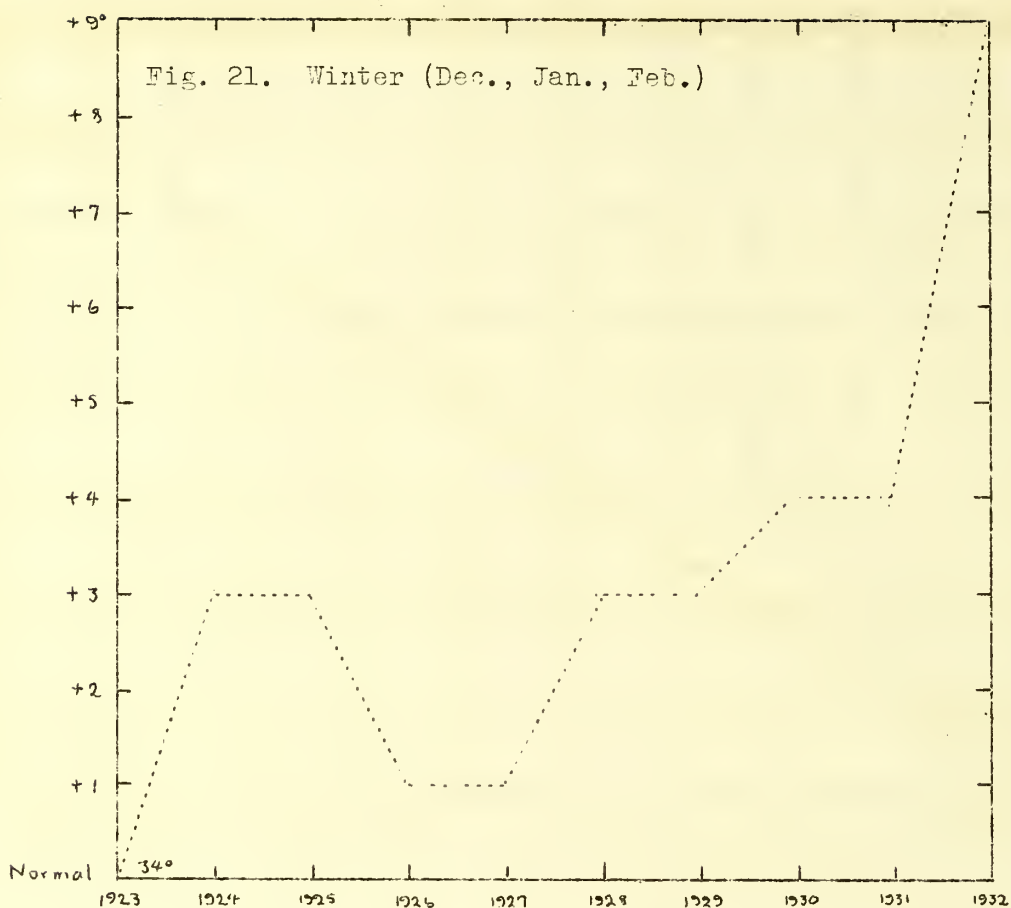
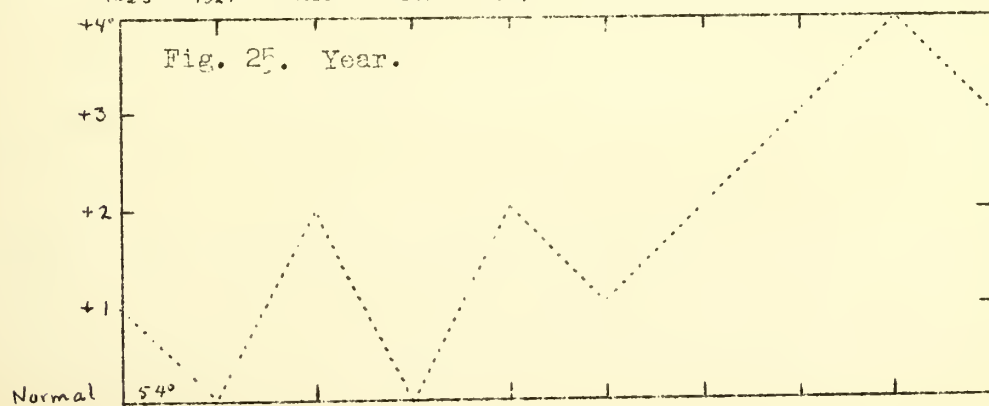
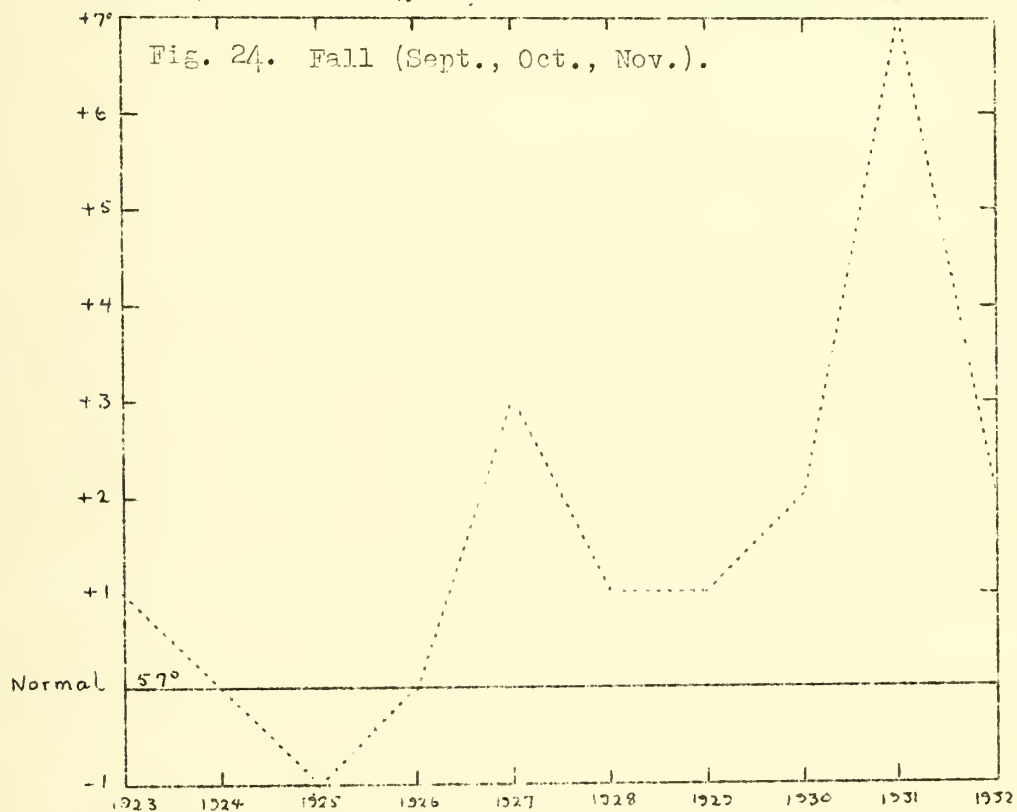
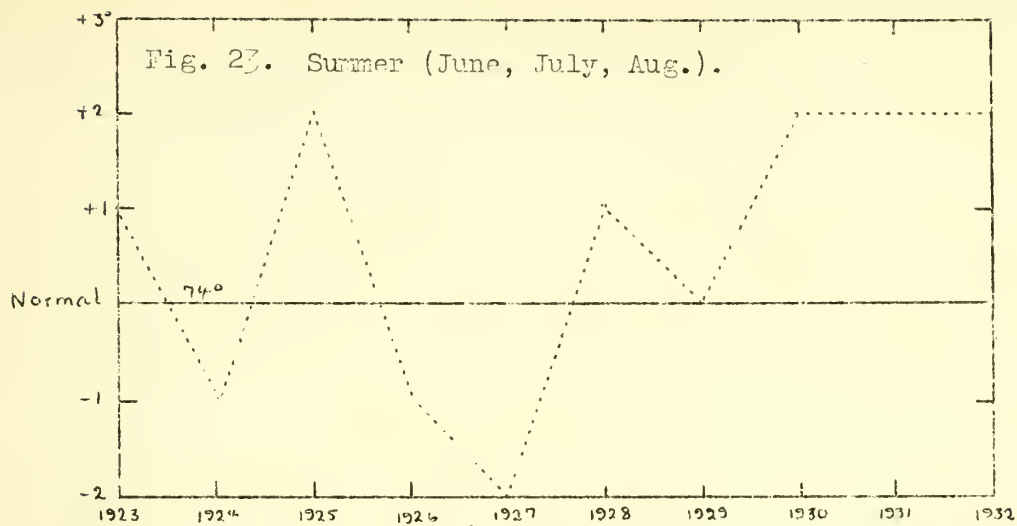


Fig. 20. Accumulated precipitation in inches for Sacramento, California, 1932, (dotted line), compared with normal (solid line).

PHILADELPHIA, PENNSYLVANIA



Figs. 21, 22, (and on next page) 23, 24, 25. Deviations of temperatures at Philadelphia, Pennsylvania, from the 50-year normal for the winter (Fig. 21), spring (Fig. 22), summer (Fig. 23), and fall (Fig. 24), and for the year (Fig. 25) during the past ten years, 1923 to 1932. Normal is indicated by a solid line, departures by a dotted line.



Winter temperatures have shown an even more marked and continued excess above normal. As shown by the curve for Philadelphia, since 1923, winter temperatures have been consistently higher than the fifty year normal. In seven of the ten years mean temperatures were three or more degrees above normal. In the winter of 1931 and 1932, just preceding the growing season reviewed in this summary, there was an excess of nine degrees.

Spring and summer temperatures show less marked and consistent deviations with the result that the mean annual temperatures remain at or above normal throughout the decade. In this connection the statement by J. B. Kincer, Chief of the Division of Agricultural Meteorology, Weather Bureau, Department of Agriculture, published in the Weekly Weather and Crop Bulletin for the week ending March 7, 1933, is informative:

Recent Temperature Trends

"Temperature trends in the central and eastern portions of the United States have been prevailingly high for a long time. When short-period fluctuations in the records are smoothed into long-time trends, the longer records covering more than 100 years in some cases, a primary depression in temperature is shown to have occurred for the eastern half of the United States about 70 years ago, since which time there has been an irregular, but rather definite trend, to warmer weather. For example, the mean annual temperature at St. Paul, Minnesota, for the 20 years ending with 1876 was some 2.5° lower than a like average for the 20 years ending with 1932. At Washington, D. C., the difference for the same period is about 2°.

"Records for New Haven, Connecticut, extending back to the time of the Revolutionary War, show three outstanding warm periods during the past 150 years. The first occurred early in the 19th century; the second about 75 years thereafter, and the third covers substantially the last quarter of a century. The present warm period is much more pronounced in point of time than its predecessors, as the smoothed curve came above the long time normal line about 25 years ago and no recession is yet in evidence.

"When records representing the mid-West and eastern portions of the country for the different seasons of the year are studied, it is found that trends for the winter are the most irregular, with the up-and-down fluctuations of greater frequency and shorter duration than for other seasons. For the spring and fall the trends have been more uniformly upward, with fewer interruptions by short cold spells. The curves for these seasons show a remarkably steady upward trend for more than half a century. The summer curve shows a slight recession from about 1875 to 1912, and thereafter a moderate rise. For the fall, winter, and spring seasons the averages in temperature for the past 20 years are from 2.5° to nearly 4° higher than similar averages up to 60 or 70 years ago. Temperature data for some other countries of the Northern Hemisphere show strikingly similar conditions.

"The records discussed above show unmistakably that the central and eastern United States are and have been for a number of years in the midst of a period of prevailing warm weather which has continued much longer than any other similar period of record, notwithstanding the occurrence of relatively short periods of subnormal temperatures, such as the winter 1917-1918."

WEATHER AND DISEASE

Perhaps partly as a result of the series of warm winters already discussed, both bacterial diseases and plant infesting nematodes were unusually abundant in the northeastern United States during the summer of 1932. The general situation was well described by Chupp as being characterized in New York State by the unusual destructiveness of "rare types of vegetable diseases."

TOBACCO DOWNY MILDEW. The outbreak of tobacco downy mildew (*Peronospora hyoscyami*) was both more widespread and more destructive in 1932 than in 1931. Losses in Georgia and the Carolinas were so serious as to materially reduce the crop, and the disease was found as far north as southern Pennsylvania. This outbreak, much worse than that of 1931, may well have been associated with the very mild winter which made possible the continued growth and sporulation of the fungus on volunteer plants in old tobacco beds in southern Georgia. P. D. R. 16: 10, 55, 94, 103.

POTATO LATE BLIGHT IN TEXAS. In sharp contrast to the conditions of the previous season in which blight was so severe in some fields in the Rio Grande Valley that the potatoes were not dug at all, it was, this year, neither common nor severe. According to Bach and Alsmeyer this is correlated with dry weather with abundant sunshine. P. D. R. 16: 21, 45.

CELERY EARLY BLIGHT IN FLORIDA. F. L. Wellman reports a very severe outbreak of celery early blight in the Sanford section during the winter 1931 and 1932 with destructive effects on the crop. This he attributes to ideal "blight" weather conditions which in the opinion of many experienced growers consist of bright warm days followed by slightly cooler nights, and dew so heavy that the plants did not dry off until noon. P. D. R. 16: 43, 44.

BACTERIAL WILT OF CORN. This disease was very destructive especially on the early "Yellow" varieties of sweet corn throughout the northcentral and northeastern United States. It was apparently more destructive in this region than at any time since the disease was described by Stewart in 1897. The disease has been increasing in importance for several years. This is believed to have been associated with the succession of unusually warm winters. In this connection, it should be noted that the early Yellow varieties of sweet corn were abandoned for canning in Maryland several years ago. P. D. R. 16: 104, 114, 134, 140, 143, 149, 151, 167, 179.

STRAWBERRY DWARF NEMATODE (*Aphelenchoides fragariae*). During the spring of 1932 it became evident that strawberry dwarf nematode had

wintered over at least one year on Cape Cod, Massachusetts, in sufficient abundance to cause apparent abnormalities on strawberry plants. It may well be in this case as in others that the warm winter of 1931 and 1932 was largely responsible for this condition. P. D. R. 16: 113.

TOMATO LATE BLIGHT IN MASSACHUSETTS. In September, tomato late blight was unusually destructive in Worcester and Bristol Counties as well as in the Connecticut Valley region of Massachusetts. This was attributed by O. C. Boyd to cool wet weather including clear nights with heavy dews. P. D. R. 16: 166.

LEAF BLIGHT OF ONIONS. An unusual outbreak of leaf blight of onions in Texas was reported by Taubenhaus. This is attributed by him to the severe freeze in early March followed by an attack of thrips which so weakened the foliage as to favor infection by *Macrosporium*. P. D. R. 16: 120.

EFFECTS OF DRY SUMMERS. The following notes by Dr. R. E. Poole on observed effects of the recent dry summers on crops in North Carolina are of such general interest that they are included at this point:

The effects of drought on plants in North Carolina was well marked during the past two seasons. Annual crops suffered severely but not more than many perennials. Crops such as corn and grasses were killed throughout the State. The blades parched on the stems and stalks before the crops were mature. The semi-parasites made excellent progress on these plants after sufficient moisture became available for their growth. *Fusarium moniliforme* and species of *Alternaria* and *Helminthosporium* were conspicuous on corn.

Leaves of agricultural crops blistered in the intercostal areas and on the margins. Shrubs and trees showed similar leaf symptoms. The red spider was very much more severe on *Retinospora*, *arborvitae*, and red cedar than in normal seasons. Tobacco, cotton, and many other crops showed prominent symptoms of nutritional deficiencies. Losses as a result of nematode infestations were worse, since the crops were delayed in growth so that the nematode had longer to work, and also the season was more favorable for the activities of the nematode.

Plants weakened as a result of the drought died in large numbers during the winter. Boxwood, red cedar, *arborvitae* and many transplanted ornamentals were quickly killed by the low temperatures of the past winter.

Roots of agricultural crops were partly girdled and failed to develop normally on hard soils resulting from the drought conditions.

Fertilizer injury on cantaloupes, watermelons, tobacco, cotton, sweet potatoes and other crops was very much more severe than in normal seasons.

GENERAL OBSERVATIONS IN NORTH CAROLINA

Interest in fertilizer injury and related problems is now so general as to make Poole's observations and opinions on conditions in North Carolina very timely. They are given in full below.

FERTILIZER INJURY TO PLANTS IN NORTH CAROLINA. There has been considerable complaint of fertilizer injury of crops in North Carolina. The injury is most prominent on young plants. Cotton, beans, potatoes, sweet potatoes, peppers, strawberries, and many other vegetable and field crops are affected. The symptoms are mostly alike. Stunting of the plant and even death results in instances where injury is severe. The plants frequently recover and make excellent growth but produce late crops. Leaves blister on the margins and in the intercostal areas, leaving the plant in a very ragged condition. The root system is sometimes destroyed, especially on young plants such as cotton and melons.

It is inevitable that large amounts of inorganic salts and acids, of which high grade fertilizers are composed, will cause plasmolysis of the cells in roots when brought into contact with them. Growers, under certain conditions have gradually increased the amounts of fertilizers to the acre. Agricultural chemists have also been interested in promoting concentrates, since it would be advantageous to the grower by lowering the cost of handling and the freight. But the farmer needs to be educated in the toxic properties of fertilizer ingredients. On heavy soils large amounts of fertilizers can be applied beneath the crop, as has been demonstrated in this State, but they cannot be applied in like amounts on sandy soils with any degree of safety. It is apparent that the agronomist would do well to study broken applications on sandy soils as a means of studying the injurious as well as yield effects on all agricultural crops.

ROOT KNOT IN NORTH CAROLINA IN 1932. Only recently was there any evidence that the nematode, Caecinema radiculicola, may become a problem in the Piedmont and mountain areas. It was found to cause severe injury on the sandy soils of the coastal area, but even here it had not infested all areas. During the 1932 season heavy infestation of tobacco was observed in Stokes County, in the foothills of the mountains. A survey of the eastern part of the State showed infestation in more than 85 per cent of the tobacco fields. It was much worse on some areas than on others. Tobacco was killed in many areas before all of the crop could be harvested. Heavily infested plants developed hollow stalks, dead tips, and dead margins on the leaves. The serious damage to the leaves is rarely suspected by the growers. They have lost thousands of dollars from the premature condition, since the leaves of infested stalks cure unevenly and are poor in quality. Heavy losses of other crops were due to heavily infested root systems.

Growers on many farms have noted the progress of the nematode infestation in their fields. Some report the spread by transplanting infested plants. Others have seen the spread as a result of plowing infected soils and dragging the soil into uninfested areas. Sweet potato, tobacco, and tomato plants have been an important means of dissemination.

The disease has been prominent on corn. It has been seen on rye, crimson clover, vetch, and Austrian winter peas. These plants were heavily infested although they are winter cover crops. Vetch was killed by the disease in some heavily infested areas. The character of infestation on vetch indicates that the nematodes did not cease to be active during the winter in the coastal areas.

(R. F. Poole).

DISEASES OF CEREAL CROPSW H E A T

STINKING SMUT (Tilletia levis and T. tritici). In Michigan the estimated loss from stinking smut jumped from 0.5 per cent in 1931 to 5 per cent in 1932. Somewhat greater losses were reported also from Pennsylvania, West Virginia, and North Dakota. In Minnesota and Montana, on the other hand, the disease caused less injury, and North Carolina reported much less than usual. Other States reported about the usual amount of loss. Estimates are 8 per cent in Maryland (3 per cent reduction in yield, 5 per cent in grade); 5, Michigan; 3.5 in winter wheat and 0.5 in spring wheat in Montana; 3, Pennsylvania, North Dakota, Washington; 2.5, Virginia; 2, Kansas; 1 to 2, West Virginia; 1.5 Ohio; 1 North Carolina, Wisconsin; 0.75, Minnesota; 0.5, Texas; 0.2, Iowa; traces in New York, South Carolina, Arkansas, Colorado. P. D. R. 16: 105, 181 (report of survey in Montana).

Inspection of 2,368 cars of Minnesota wheat arriving at Minneapolis from August 1 to November 1, 1932, showed 6.8 per cent grading smutty, while for the period August 1 to December 15, 1931, inspection of 4,300 cars showed 23.2 per cent smutty, according to a summary by R. C. Rose. In 1932, for the period stated, of the cars of durum wheat inspected 15.5 per cent were smutty, and of spring wheat, 7.2 per cent, while none of the cars of winter wheat graded smutty.

LOOSE SMUT (Ustilago tritici). Except in Pennsylvania, West Virginia, and Michigan, where they were considerably heavier, losses in States reporting did not vary greatly from the usual amounts. According to E. H. Leker, loose smut is becoming more prevalent and causing heavier losses each year in Kansas. Two collaborators mentioned possible effects of the weather on the disease. Muncie, in Michigan, remarked that "The mild winter allowed infected plants to survive and head." Brentzel, in North Dakota, said that "Dry weather in 1931 prevented infection somewhat." The percentages of loss reported are: 5, West Virginia; 3.5, Pennsylvania; 3, Michigan; 1, New York, Maryland, Virginia, North Carolina, South Carolina, Texas, Ohio, Wisconsin, Minnesota, Iowa; 0.5, North Dakota, Kansas; 0.3, Montana; trace, Arkansas, Colorado, Washington. P. D. R. 16: 70, 105.

FLAG SMUT (Urocystis tritici). The results of the flag smut survey conducted during May and June, 1932, in Illinois, Missouri, Kansas, and Oklahoma, are given in the Reporter (16: 99-103. July 1, 1932). No flag smut was found in Oklahoma. The disease was found in one field in one new county, Macon County, in Illinois. No new localities were found in Missouri. In Kansas four new locations were found in counties previously known to be infected. Although the number of new locations is not large it is evident that flag smut is increasing its range from year to year.

STEM RUST (Puccinia graminis) again caused abnormally low losses, although in a few States it was somewhat more injurious than last year. In 1932, as in 1931, collaborators mentioned dry weather, lack of infection on barberry, and late infection of wheat as possible explanations. In

Minnesota and North Dakota durum wheat was said to be more severely affected than common spring wheats. In Iowa there was no damage to winter wheat, whereas the loss in spring wheat was about 1 per cent. According to H. B. Humphrey a rather general epidemic in southwestern Virginia resulted from heavy infection of the wild barberry, Berberis canadensis. However, the wheat grown in that section is all winter wheat and it matured too early to suffer serious damage. Valleau in Kentucky reported that "Black stem rust was not found on the Station farm nor in the uniform rust nursery this year in spite of the open winter and the early spring. On one barberry bush on the Station farm about five infections were found." Losses estimated are as follows: 2 per cent, South Carolina, Texas; 1.5, Minnesota; 1.3, North Dakota; 1, Virginia, Michigan; 0.5, Ohio, Kansas; 0.1, Iowa; trace, New York, Pennsylvania, West Virginia, Arkansas, Wisconsin, Montana, Colorado, and Washington.

LEAF RUST (Puccinia triticina) caused heavy losses in several States, mostly on the Atlantic Coast, and was rather generally reported as more prevalent than usual. It is likely that the abnormally warm winter permitted an unusual amount of overwintering resulting in heavy infection wherever there was sufficient moisture. In North Carolina dry weather checked the disease before it caused much damage. Maximum infections of 60 to 90 per cent were observed often in Pennsylvania; 90 per cent in Minnesota; 50 per cent in North Dakota and Colorado; 100 per cent in South Dakota. P. A. Young reported that "Farmers in Cascade County, Montana, said they were colored red by spores in the wheat fields, according to county agents. There has been more rain in Montana than during the preceding three years." As quoted by E. A. Walker, Ray Bulger of Barberry Eradication reported the heaviest infection he had seen in ten years in South Dakota, and stated that winter wheat was more severely infected than spring wheat. In Minnesota there was said to be considerably more infection on Marquis and Marquillo than usual. Losses reported were 25 per cent in Pennsylvania; 10, West Virginia, South Carolina, Arkansas; 4, Virginia; 3, Maryland; 2, New York; 1.5, Kansas; 1, North Carolina, Texas, Minnesota; 0.5, Ohio, Michigan; trace to 0.2, Wisconsin, Iowa, North Dakota, Montana, Colorado, and Washington. P. D. R. 16: 70.

STRIPE RUST (Puccinia glumarum). According to W. M. Bever, in Charge of Stripe Rust Investigations, stripe rust occurred in severe epidemic form in the Flathead Valley, Montana, where many fields showed as much as 100 per cent infection prevalence and severity. Also reported from Washington and California.

SCAB (Gibberella saubinetii) was not important in 1932. Loss estimates of more than a trace are as follows: Maryland, 3 per cent (1.5 per cent reduction in yield), Iowa, 2 (1.5 per cent reduction in yield), North Carolina and Ohio, 1; Virginia, 0.5; and Wisconsin, 0.1.

GLUME BLOTCH (Septoria nodorum) and SPECKLED LEAF BLOTCH (S. tritici). The glume blotch caused a total loss of 5 per cent, of which 3.5 per cent was loss in grade, in Maryland. No other State reported more than a trace of loss from either disease.

BACTERIAL DISEASES. BASAL GLUME ROT (Bacterium atrofaciens) was said to be severe in eastern Kansas and around Manhattan. BLACK CHAFF

(Bacterium translucens undulosum) caused losses estimated at 3 to 5 per cent in West Virginia, and 0.5 per cent in Texas. Only traces were reported from other States.

ERGOT (Claviceps purpurea). Traces were reported from five States: Ohio, Michigan, Wisconsin, Minnesota, and North Dakota.

FOOT AND ROOT ROTS. Total losses from the various foot rots were estimated as follows: Montana, 10 per cent in winter wheat, 1 per cent in spring wheat; West Virginia, 5; Kansas, 4.5; Texas, 2; North Carolina and Minnesota, 1; North Dakota, 0.5; Ohio, 0.1; Pennsylvania, Arkansas, Michigan, Wisconsin, Colorado, and Washington, trace.

TAKE ALL (Ophiobolus graminis). According to Hurley Fellows, this disease occurs locally in Kansas where there is sufficient moisture and proper rotation is not practiced. High moisture over a considerable period favors the disease. The loss was estimated at 1.5 per cent. During the flag smut survey in Kansas and Oklahoma, take-all was found in many fields inspected in both States. Barrus reported less than usual in New York. P. D. R. 16: 116.

FOOT ROT (Helminthosporium sativum, Helminthosporium spp.). Due to late availability of seed loans, much spring wheat in Montana was planted between May 15. and June 1, so that it grew in warm weather and was severely damaged by foot-rot and drought, according to P. A. Young. This is the first report of serious injury to spring wheat in Montana. Most of the loss mentioned above for Montana was from this foot rot. Traces were reported from Ohio, Michigan, Wisconsin, North Dakota, and Colorado. Helminthosporium and Fusarium together caused 3 per cent loss in the dry land area of Kansas and 1 per cent loss in Minnesota. L. W. Boyle in Kansas states that the time of planting is an important factor in the prevalence and severity of the disease. P. D. R. 17: 7.

FOOT ROT (Fusarium sp.). Trace in Michigan, also occurred in Minnesota and Kansas (See above under Helminthosporium).

FOOT ROT (Cercospora herpotrichoides) Washington.

MOSAIC (virus). Kansas. P. D. R. 16: 115-116.

R Y E

STEM RUST (Puccinia graminis) caused losses of 1 per cent in Virginia and Texas. Other estimates were less than 1 per cent and in several cases no loss.

LEAF RUST (Puccinia dispersa). In December, 1931, Valleau reported, "On this date (Dec. 19) leaf rust is present and is causing extensive injury to rye in some fields in Kentucky. The weather has been warm and damp all fall. This is a very unusual condition." Loss estimates of 1 per cent or more from leaf rust include 10 per cent in Pennsylvania; 5, Florida; 2.5, West Virginia; and 1, Ohio. P. D. R. 16: 6, 70.

ERCOT (Claviceps purpurea) caused 1.5 per cent loss in Wisconsin. In other States only traces occurred.

SCAB (Gibberella saubinetii). Ohio, 1 per cent.

ANTHRACNOSE (Colletotrichum graminicolum). Kentucky, Wisconsin. P. D. R. 16: 50.

B A R L E Y

COVERED SMUT (Ustilago hordei). Losses of 1 per cent or more reported were 9 per cent in Maryland (7.5 per cent reduction in yield); 6, Pennsylvania; 5, West Virginia; 3, Virginia; 2, Montana; 1, North Carolina, Texas, Michigan, North Dakota, and Kansas. P. D. R. 16: 6, 70.

LOOSE SMUTS. Barrus reported that in New York "Ustilago nigra was found in several fields in the vicinity of Geneva by Mrs. M. Ruttel-Nebel and at Ithaca by Tapke. Mrs. Nebel also found several forms intermediate between U. nuda and U. hordei." Losses reported from U. nuda averaged somewhat higher than in 1931. Estimates of one per cent or more are 5 per cent in West Virginia and Kansas; 3, Pennsylvania, Virginia, Iowa; 2.5, Wisconsin; 1.5, Minnesota; 1, Maryland, North Carolina, Texas, Ohio, North Dakota, Montana, Colorado, Washington. Loose smut has become serious in Iowa since Velvet barley was introduced and farmers there are now abandoning the variety, according to Porter. P. D. R. 16: 6.

RUSTS. Texas reported 1 per cent loss from STEM RUST (Puccinia graminis). LEAF RUST (P. anomala) caused 4 per cent loss in Pennsylvania; 2, West Virginia; and 1.5, Ohio.

STRIPE (Helminthosporium graminum). Maryland, Iowa, Kansas, and California reported more than last year. In other States there was about the same amount or less. Muncie stated that early spring temperatures in Michigan were too high for seedling infection. Vaughan reported more early leaf striping than usual in Wisconsin, even resistant strains showing traces, but the progress of the disease was apparently checked later by unfavorable weather. Increased use of the resistant variety, Wisconsin No. 38, has reduced the amount of stripe in Wisconsin. Losses of 1 per cent or more are 10 per cent in West Virginia; 7, Pennsylvania; 5, Iowa; 2, Virginia, Minnesota, Kansas; 1, North Carolina, Wisconsin, and Montana. P. D. R. 16: 39, 105.

SPOT BLOTCH AND FOOT ROT (Helminthosporium sativum) caused 3 per cent loss in Iowa. The disease was not important in other States reporting. In Michigan, according to Muncie, there was little seedling blight and leaf infection was too late to cause appreciable loss.

SCAB (Gibberella saubinetii) was prevalent in certain sections of the Middle West including southern Minnesota and parts of Illinois and Iowa. In southern Wisconsin it started out to be severe but failed to develop on account of drought. Percentage losses reported are 6 in Iowa (1 per cent loss in grade, 5 per cent reduction in yield), 5, Ohio; 0.5 reduction in yield and an equal loss in grade in Wisconsin. P. D. R. 16: 143.

BACTERIAL BLIGHT (Bacterium translucens) was more prevalent than usual in Iowa where it caused a loss of 2 per cent.

O A T S

SMUTS (Ustilago avenae and U. levis). Losses from smuts seemed to be somewhat larger than usual for the country as a whole. Half of the States estimating losses reported 5 per cent or more, while only two estimated less than 1 per cent. In Kansas, E. H. Leker reported that heavy losses were more general than for several years. New York, Maryland, Wisconsin, Iowa, and California also reported more than usual. In Iowa, according to Porter, "There was a decrease in the practice of seed treatment which increased smut losses. Farmers believe in treatment but lacked the money." Similar reports were received from Michigan and Wisconsin. Percentage loss estimates were 10 in Massachusetts, New York, and West Virginia; 7, Iowa and Kansas; 6.6, Virginia; 6.5, Pennsylvania; 6, Maryland, Montana; 5, South Carolina, Florida, and Arkansas; 4, Ohio, Wisconsin; 3, Texas; 2.5, Minnesota; 2, Michigan, Washington; 1.5, Connecticut; 1, North Carolina, Colorado; 0.5, New Hampshire, North Dakota. P. D. R. 16: 6, 70, 142, 185.

STEM RUST (Puccinia graminis) was not important, the highest loss reported being 2 per cent from Texas. Other estimates of 1 per cent or more were 1.5 in Minnesota; 1 per cent in Virginia, South Carolina, Michigan, and Iowa. Johnston and Leker reported that in Kansas stem rust became very heavy on Kanota, late in the season just as the crop was turning.

CROWN RUST (Puccinia coronata) caused considerable loss in New York, in some of the States from Virginia and West Virginia south to Florida, and in Texas and Arkansas. The losses reported in these areas are 20 per cent in Florida; 10, West Virginia, Arkansas; 8, Texas; 6, Virginia; 4, New York; 2, South Carolina. In other regions the disease was unimportant, only Iowa reporting as much as 1 per cent loss. P. D. R. 16: 70, 105.

HALE BLIGHT (Bacterium coronafaciens) appeared earlier than usual in Iowa, according to Porter, who estimates 1 per cent loss. Melchers reported it as more abundant than usual in Kansas, but the loss was only a trace.

BLAST OR STERILITY (undetermined) was reported from New York, Arkansas, North Dakota, Kansas, and Montana. In Kansas 1.5 per cent loss was estimated, in Montana 3 per cent.

C O R N

SMUT (Ustilago zeae). Most of the reports from the northern part of the country, i.e., north of the Ohio and Missouri Rivers, stated that smut was more prevalent than usual. In all of the States reporting south of this area, and in New York and Wisconsin, there was said to be the usual amount. Several States including Delaware, Maryland, Michigan, and North Dakota reported an increase over last year, while Wisconsin reported less and Minnesota much less. Sweet corn was, as usual, most severely

affected. In New York it was said to be worst on earliest varieties, and in North Carolina it was severe on early planted corn. Losses reported on sweet corn were 15 per cent in Iowa; 10, Massachusetts; and 2 to 3, New York. Total State losses estimated were 5 to 7 per cent in Colorado; 5, Massachusetts, West Virginia, South Carolina, Texas, Michigan, Minnesota, and Iowa; 4, Pennsylvania; 3, Virginia, Ohio, North Dakota; 1.5, Connecticut, Wisconsin; 1, Arkansas, Kansas; others less than 1. P. D. R. 16: 174, 185.

RUST (Puccinia sorghi) widespread but unimportant.

ROOT STALK AND EAR ROTS (various organisms). The losses caused by these diseases are reported as follows:

ROOT ROTS. 5 per cent in Massachusetts; 3, Pennsylvania; 2, South Carolina, Florida; 1, Ohio; others less than 1 per cent.

STALK ROTS. 10, Pennsylvania, West Virginia; 3.5, Virginia; 2, Texas; 1, North Carolina, Louisiana, and Kansas.

EAR ROTS. 11, Florida; 10, West Virginia; 5.6, Iowa; 5, Louisiana; 4, Pennsylvania; 3, North and South Carolina; 2.5, Virginia; 2, Texas, Michigan, Kansas; 1, Ohio, North Dakota. P. D. R. 16: 180-181.

Gibberella saubinetii was reported as the cause of root rot in Maryland, Florida, Ohio, and Michigan; seedling blight in Wisconsin; dry rot in Iowa; ear rot in South Carolina. A loss of 5.5 per cent was estimated in Maryland.

Fusarium moniliforme caused root, stalk, and ear rot in North Carolina and Florida and ear rot in Arkansas, Michigan, and Southern Wisconsin. Poole reported "This disease was severe in eastern North Carolina despite the dry conditions. It was aided by the dry weather injury since the sources of entrance were widened." Five per cent loss was reported from Florida.

Fusarium spp. Root rot was reported from Michigan, Minnesota, Arizona; stalk rot from North Dakota; ear rot from Connecticut, Maryland, New Jersey, South Carolina, Minnesota, Iowa; kernel decay and seedling blight in Massachusetts.

Pythium sp. was reported as causing root rot in South Carolina.

Diplodia zeae was reported from Massachusetts, Maryland, South Carolina, Louisiana, Ohio, Michigan, Minnesota, and Iowa. Four per cent loss was reported from Iowa; 3, Florida; 1, Maryland. D. macrospora caused 3 per cent loss in Florida.

BLACK BUNDLE (Cephalosporium acremonium) was reported for the first time from Massachusetts and occurred also in Pennsylvania, where it caused 1 per cent loss, and in Virginia, Texas, and Arkansas.

STALK AND EAR ROT (Basisporium gallarum) was also reported from Massachusetts for the first time, and from Wisconsin and Iowa. In Iowa it caused a loss of 1.5 per cent.

KERNEL ROT (Penicillium sp.). Wisconsin.

SCUTELLUM ROT, caused by species of Fusarium, Rhizopus, Penicillium, Aspergillus, and Pythium, was reported from Massachusetts.

BACTERIAL STALK ROT (Bacterium dissolvens) was reported on sweet corn from West Virginia, where together with the bacterial wilt it has been epidemic for two or three years, and from Arkansas (P. D. R. 16: 142). An undetermined bacterial stalk rot occurred in South Carolina and on sweet corn in Michigan. In Michigan, Muncie reported that "It often accompanies bacterial wilt and sometimes follows corn root maggot work in the basal node." He estimated 10 per cent loss.

BACTERIAL WILT (Aplanobacter stewarti) of sweet corn. Although this disease had been observed to be increasing in importance in a number of States during the past two or three years, the widespread outbreak in 1932 was one of the outstanding disease events of the year. It was destructive as far north as the New England States and Ontario, Canada. Early planted and early varieties were attacked severely. Field and pop corn were affected in some cases but damage to them was usually not important. Details of the epidemic in New York and the New England States, Pennsylvania, West Virginia, New Jersey, Ohio, Indiana, Illinois, and Michigan have already been published in the Reporter, and only a few additional notes will be given here. In West Virginia, the wilt was accompanied by the stalk rot caused by Bacterium dissolvens; in Ohio by a browning and soft rot at the base of the stalk which may have been due to the wilt organism or at least was favored by it (P. D. R. 16: 104); in Michigan by an undetermined basal stalk rot (see above under bacterial stalk rot). In Illinois two kinds of leaf blight were associated with the wilt organism (P. D. R. 17: 6-7). In Kentucky, Valleau reported that "A stunting of field corn also occurred which may have been due to wilt but proof was not obtained." Chupp reported that the 12-spotted cucumber beetle was extremely abundant in New York. There is some evidence indicating that this insect is concerned in the transmission of the disease. The highest loss reported was 45 per cent in Pennsylvania (estimates given are for sweet corn). In Michigan the disease occurred as far north as the central part of the State and was general in the southern counties. The loss there was 15 per cent. In New York, Chupp estimated 10 per cent but stated that the loss was much higher in the southern part. Ohio also reported 10 per cent loss; Iowa, 5; Connecticut, 3; Massachusetts, 0.5; Maryland and Kansas, traces. The small loss in Maryland is due to the fact that varieties grown commercially are resistant. In Kansas the disease was very severe early in the season, especially in the eastern part of the State. Wilt is the limiting factor in early sweet corn production in New Jersey. Valleau reported it as severe in early varieties in Kentucky, and Poole stated that it seems to be increasing in importance in North Carolina. C. E. Scott in California reported that a specimen was received from Nevada City in that State. No wilt was found during a survey in Oregon, according to Barss. P. D. R. 16: 104, 114, 134, 140, 149, 167, 170, 174, 179; 17: 6-7.

BROWN SPOT (Physoderma zeae-maydis) caused a loss of 4 per cent in Florida, and was also reported from South Carolina, Louisiana, and Arkansas.

MOSAIC (virus) was reported from Louisiana.

R I C E

STEM ROT (Sclerotium oryzae) was less prevalent than usual in Arkansas due to cool weather. Cultural methods in rice growing result in water relations always favorable to this disease but partial control can be obtained through regulated flooding treatments (E. M. Cralley). Also reported from Louisiana.

OTHER DISEASES include LEAF SPOTS (Sclerotium sp., Helminthosporium oryzae), BLAST (Piricularia oryzae), and LEAF SHEATH SPOT (undet.) all reported from Louisiana, and STRAIGHTHEAD (non-par.) and ROOT KNOT (Caenema radiculicola) in Arkansas. Rice is a new host for the root knot nema. (P. D. R. 16: 146).

F L A X

WILT (Fusarium lini) was reported from Wisconsin, Minnesota, Iowa, and North Dakota. Early plantings of wilt resistant varieties in Minnesota and Iowa were free from wilt. Considerable wilt occurred in late plantings in Minnesota. In Iowa the late sown flax was so poor that wilt was negligible. Loss estimates were 4 per cent reduction in yield in Minnesota and North Dakota and an additional 2 per cent loss in grade in Minnesota.

RUST (Melampsora lini) was reported from Wisconsin, Minnesota, and North Dakota. None was observed in Iowa.

PASMO (Phlyctaena linicola) was reported from Wisconsin, Minnesota, Iowa, and North Dakota. In Minnesota it was only observed in experimental plots. In Iowa it caused 1 per cent loss.

HEAT CANCKER (non-par.). All late sown flax was damaged considerably in Minnesota where the loss was 5 per cent. In North Dakota 2 per cent loss was reported. Canker was also reported from Kansas, where flax is just beginning to be grown.

D I S E A S E S O F F O R A G E C R O P S

A L F A L F A

BACTERIAL WILT (Aplanobacter insidiosum). Only a few States reported on the occurrence of bacterial wilt. Boyd reported that there was more during the dry season of 1932 than during the unusually wet one of 1931 in Massachusetts. He estimated the loss at 7 per cent. In Wisconsin, Vaughan reported the usual amount. Melchers reported less than usual in Kansas and remarked, "Apparently seasonal conditions were less favorable for the disease and more favorable for the alfalfa crop." The loss in Kansas was 10 per cent. Wilt caused serious damage again in certain parts of Idaho. In California it is general in the San Joaquin Valley and occurs in some other sections as well, according to C. E. Scott. (P. D. R. 16: 151; 17: 7.).

DOWNY MILDEW (Peronospora trifoliorum) was reported from Washington and California. In Yuba County, California, some fields showed 100 per cent infection.

LEAF SPOT (Pseudopeziza medicaginis) was of minor importance.

LEAF BLOTCH (Pyrenopeziza medicaginis) caused 3 per cent loss in Kansas, where it was said to be the most common and injurious leaf spot of this host, 2 per cent loss in Minnesota, and was also reported from Mississippi.

BACTERIAL BLIGHT (Bacterium medicaginis) formerly disappeared in mid-summer in Arizona but now is occasionally holding over until autumn. (J. G. Brown).

VIOLET ROOT ROT (Rhizoctonia crocorum) was reported from Texas and Kansas. (P. D. R. 16: 75).

STEM ROT (Sclerotinia trifoliorum). Fall-sown alfalfa in Kentucky was much reduced in stand, while older plantings were but little injured, according to Valteau. Also reported from Washington.

ROOT ROT (Phymatotrichum omnivorum) was reported from Texas, Arizona, and California. In Texas it caused 10 per cent loss. In California it was found in San Diego County where it had not previously been known to occur. (P. D. R. 17: 15).

"BLACK STEM, caused by Phoma sp., was responsible for severe reductions in stand in both young and old plantings, especially the latter. The abundant growth of winter weeds made a constant moist chamber about the young shoots which came out following the freeze in the spring. These shoots were frequently killed back to a point where no more buds could be developed and the plants died. This condition because of abundant winter weed growth could be traced to the mild winter." (Valteau) P. D. R. 16: 28.

ROOT ROT (undet.) reported from Minnesota. Fusaria were isolated but their pathogenicity is not yet proved.

WITCHES' BROOM (virus) and YELLOW'S (virus), Washington. WHITE SPOT (non-par.), Connecticut. DWARF (undet.), southern California.

C L O V E R

POWDERY MILDEW (Erysiphe polygoni) was reported from several widely scattered States. Losses caused by a disease of this type are very difficult to estimate. Dr. E. A. Howell suggests, however, that it is probably more important than is generally believed.

ANTHRACNOSE. Valteau reported that in Kentucky "Colletotrichum trifolii" was found in isolated small spots in some first year red clover and in larger spots in some second year clover, but not in all fields. Red clover came through the winter in the best condition in several years except for Sclerotinia injury. Kentucky adapted clovers are being grown

in rapidly increasing acreages and this year several thousand bushels of adapted seed were harvested. Adapted clovers came through the second year with a good and in some cases an excellent stand and will make good clover next year (third). Unadapted clovers had in many instances disappeared after the second cutting, due in part to anthracnose." The northern anthracnose, Gloeosporium caulivorum, also occurred in Kentucky, on red clover in its third year. There was less than usual in Wisconsin, due to dry weather. (P. D. R. 16: 89).

STEM ROT (Sclerotinia trifoliorum) was said to be more prevalent than usual in a number of States. In Delaware large areas in many plantings of crimson clover showed severe infection with numerous sclerotia, according to Adams. In Kentucky, Valleau reported that "The warm open winter was very favorable for its development on red clover. The varieties Kentucky 101 and Tennessee Anthracnose Resistant are very resistant while those from the North and far West are susceptible. Kentucky clover was reduced about 15 per cent in stand and some western clovers as much as 65 per cent. Apothecia were found this fall on nearly every square foot examined in some two-year-old fields, but became scarce early in December. Leaf spot due to S. trifoliorum was very abundant all fall, especially directly above the apothecia. It is practically certain that direct infection and not a saprophytic stage occurs from ascospores." In Ohio, the disease was unusually abundant on red clover early in the year. Damping off caused by this fungus was common in late winter and early spring on alsike clover in North Carolina. Stem rot was also reported from New Jersey and Washington. (P. D. R. 16: 24, 89).

STEM ROT (Corticium vagum). A specimen was received from Oregon.

CHARCOAL ROT (Rhizoctonia bataticola) was isolated from red clover rootlets and from crowns of dead plants and from plants with decayed root centers, in Kentucky. It seems to be a weak parasite. (L. Hinson).

ROOT ROT (undet.) caused a 2 per cent loss in Minnesota. It occurred in most parts of the State but was more abundant in the southern and southeastern sections.

FIRST SUMMER DYING of red clover, cause unknown, occurred extensively in a few fields in Kentucky. By late fall some unadapted clovers had nearly completely disappeared. Insect injuries, leaf spots, and drought were found to have caused much damage in some of the fields examined. Colletotrichum trifolii occurred in slight amounts but the dying could not be attributed to it except in an occasional plot. Some other factor appeared to be operating. (Valleau).

S W E E T C L O V E R

DOWNY MILDEW (Peronospora trifoliorum), on Melilotus officinalis in Montana. (P. D. R. 16: 152).

ROOT KNOT (Caconema radiculicola), on Hubam clover in Arizona.

C O W P E A

WILT (Fusarium vasinfectum tracheiphilum) was reported from Mississippi and California.

ROOT ROT (Rhizoctonia bataticola), in California causes premature dying of Blackeye cowpeas, which are very susceptible when the plants reach maturity. (J. B. Kendrick).

SCAB (Cladosporium vignae), Mississippi.

ROOT KNOT (Caconema radicicola). California, only scattered cases of injury were noted. It seems to be restricted to definite areas in fields.

MOSAIC (unknown). New Jersey, Mississippi, Louisiana.

S O Y B E A N .

PUSTULAR SPOT (Bacterium phaseoli sojense) was very severe along the coast of North Carolina, especially on dark soils. In Louisiana heavy infection occurred on most of the varieties and strains imported from China, Japan, and Manchuria. Also reported from Delaware and Mississippi.

BACTERIAL BLIGHT (Bacterium sojae) common in North Carolina.

LEAF SPOT (Cercospora cruenta) was common in North Carolina. C. daizu was reported from Delaware for the first time. Septoria glycines also occurred in Delaware.

DOWNY MILDEW (Peronospora manshurica) was reported from Delaware and Louisiana.

WILT (Fusarium vasinfectum tracheiphilum) was common throughout eastern North Carolina and caused total loss in some fields. (Poole).

STEM ROT (Sclerotium rolfsii) is becoming so severe throughout eastern North Carolina that it is causing growers much concern. It is worse on lands where tobacco, peanuts, and soybeans are rotated, and less severe on black lands. (Poole). Also reported from Mississippi.

ROOT ROT (undet.). Mississippi.

MOSAIC (virus). General in Louisiana.

A U S T R I A N W I N T E R P E A

LEAF SPOT (Ascochyta pisi), more than usual in Georgia and Mississippi (P. D. R. 16: 74). POWDERY MILDEW (Erysiphe polygoni), heavy infection in parts of Georgia, also reported from Mississippi. ROOT ROT (Fusarium sp.), Mississippi. ANTHRACNOSE (Gloeosporium sp.) Louisiana.

DISEASES OF FRUIT AND NUT CROPS

APPLE

SCAB (Venturia inaequalis) was considerably more prevalent than last year and did more damage than an average year as evidenced by the fact that of the fifteen States reporting its presence, 9 reported more, 3 less, and 3 the same, as compared with an average year. Those States reporting as much as 5 per cent loss were: Wisconsin, 12; Michigan, 10; Iowa, 7; Maryland, South Carolina, Ohio, and Minnesota, 5. Apparently the ascospores developed in most localities earlier than usual, and this together with a series of well distributed spring rains gave very favorable conditions for primary infection. New York and Massachusetts noted less than usual. P. D. R. 16: 10, 11, 22, 47, 71, 86, 94, 106, 185.

BLOTCH (Phyllosticta solitaria). Delaware reports much more of this disease than usual, with a maximum infection in one orchard of 30 per cent.

RUST (Gymnosporangium spp.). If the abundance of galls on the red cedar is an indication of the severity of apple rust (G. juniperi-virginianae), next year should be a bad rust year, as there is apparently an unusually large number this season in the territory I have observed (Indiana, Virginia, and West Virginia). Incidentally, the heaviest infection found was a limb 18 inches long and 7 1/2 inches wide, at the widest point and weighing one pound, bearing 3,450 galls. (Paul R. Miller). Massachusetts noted an unusual abundance of galls on juniper caused by G. juniperi-virginianae, G. globosum, and G. germinale. New Jersey and Mississippi recorded the presence of G. germinale. Texas, Connecticut, Kansas, New Jersey, and Wisconsin noted about the usual amount of G. juniperi-virginianae. P. D. R. 16: 11, 133, 158.

For the results of an apple rust survey of Virginia, West Virginia, North Carolina, Georgia, and Pennsylvania see P. D. R. 16: 158-162.

BLACK ROT (Physalospora malorum). This disease seemed to be unusually severe on the leaves (frog-eye) in Iowa, Kansas, Michigan, New York, and Massachusetts, but generally there appeared to be less than usual on the fruit in all localities reporting. According to M. B. Waite the leaf spot was not as bad as usual from New Jersey to Virginia. P. D. R. 16: 11.

BITTER ROT (Glomerella cingulata). Except in southern Ohio and in Arkansas this disease was practically negligible this season. Poole in North Carolina commented, "Not important. Absent from most orchards. The dry summer probably resulted in natural control."

BLIGHT (Bacillus amylovorus) generally did about the usual amount of damage, although it was severe in some localities. Of the 21 States reporting, nine (New York, Connecticut, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Iowa) reported more than usual; seven (Mississippi, Arkansas, Ohio, Michigan, Wisconsin, North Dakota, and Kansas) the usual amount; and five (Pennsylvania, West Virginia, Kentucky, Illinois, and Minnesota) less. Poole commented, "Very severe in North

Carolina for the past three years. Bordeaux mixture applied during blossom period showed encouraging evidence of control." P. D. R. 16: 87, 91, 105, 118, 154.

CROWN GALL (Bacterium tumefaciens). An unusual type of gall was observed on Rome Beauty in Georgia. P. D. R. 16: 133.

POWDERY MILDEW (Podosphaera leucotricha) was severe in some orchards in California. There was more than usual in the East. P. D. R. 16: 119.

BLUE MOLD (Penicillium expansum) was very common in storage in Washington.

MEASLES (unknown) was more prevalent than usual in Illinois, Michigan, and California.

P E A R

BLIGHT (Bacillus amylovorus). As usual this disease seemed to be sporadic in occurrence. New York, Virginia, and Maryland reported more than usual, and Pennsylvania and West Virginia less. In Kentucky nearly all pear trees were severely killed back when in the bud or bloom stage to the extent of killing all one, two, and three-year old wood. These partly recovered by sending out shoots from dormant buds on older wood.

BLOSSOM BLIGHT AND CANKER (Green fluorescent bacteria). In California as high as 90 per cent of the blossoms were killed in one orchard of the Winter Nelis variety.

SCAB (Venturia pyrina). With the exception of Maryland, New York, and Ohio, which had 5, 5, and 4.5 per cent losses, respectively, the losses were below normal. California reported good control with Bordeaux mixture but not with lime sulphur.

LEAF SPOT (Fabraea maculata). In Illinois, following freezing in March when all fruit buds and young shoots were killed, a new crop of leaves was produced. These leaves were severely attacked and defoliation resulted which will probably have an injurious effect on next year's crop.

GENERAL NUTRITIONAL DISTURBANCES. California reported three physiological diseases, namely, lime induced CHLOROSIS, EXANTHEMA, and LITTLE LEAF, which may be cured with iron, copper, and zinc, respectively.

P E A C H

LEAF CURL (Exoascus deformans). Generally there occurred an unusual abundance of this disease. Twelve of the 17 States reporting its presence indicated more than normal. In Michigan, where it was very dry during the month of April, there was much less curl than usual even on unsprayed trees. One of the striking features about this disease was the extensive late infection (June) in Alabama. P. D. R. 16: 87, 93, 109, 110, 171.

BROWN ROT (*Sclerotinia fructicola*). Massachusetts reported 10 per cent loss; Maryland, South Carolina, and Ohio 5 per cent; Michigan and Colorado 3 per cent. In New York severe damage followed curculio injury. Poole reported that in North Carolina it was "Of very little importance. Drought conditions probably prevented its development."

BACTERIAL SPOT (*Bacterium pruni*). New York and Pennsylvania reported considerable injury. In other States there was less than usual. P. D. R. 16: 87.

SCAB (*Cladosporium carpophilum*) was bad in unsprayed orchards in Massachusetts. P. D. R. 16: 155.

VERTICILLIUM WILT (*Verticillium* sp.). New York. P. D. R. 16: 132.

YELLOW, LITTLE PEACH, AND RED SUTURE (virus). Michigan reported about 5 per cent loss from all three. Yellow was the least important, while little peach and red suture were more prevalent than usual. Rosette was also present. The introduction of this disease was traced to Georgia nursery stock.

MOSAIC, A NEW VIRUS DISEASE OF PEACH, was reported by L. M. Hutchins from two counties in Texas. See Science 76: 123. Aug. 5, 1932.

PHONY PEACH (virus). Extensive scouting by the Division of Phony Peach Eradication, Bureau of Plant Industry, during 1929, 1930, 1931, and 1932, have made available a very detailed picture of the distribution of this disease. While all trees showing clear phony infection have, of course, been eradicated, the map should be considered as giving the known distribution of the disease at the period indicated. It should be noted that because of the long incubation period before phony symptoms are apparent several years' inspection in a given region are necessary to accomplish complete eradication of this disease.

Table 1. Phony Peach Eradication. Summary of phony trees found during 1929, 1930, 1931, and 1932.

STATE	1929	1930	1931	1932	TOTAL
Alabama	289	3,383	5,100	136	8,908
Arkansas		5	285	278	568
Florida			321	2	323
Georgia	80,955	216,610	104,361	35,112	437,038
Illinois			2	12	14
Louisiana		36	741		777
Mississippi	159	376	633		1,168
Missouri				17	17
North Carolina		10	22	18	50
Oklahoma				3	3
South Carolina		89	47	60	196
Tennessee		5	35	19	59
Texas		16	204	413	633
Totals	81,403	220,530	111,751	36,070	449,754

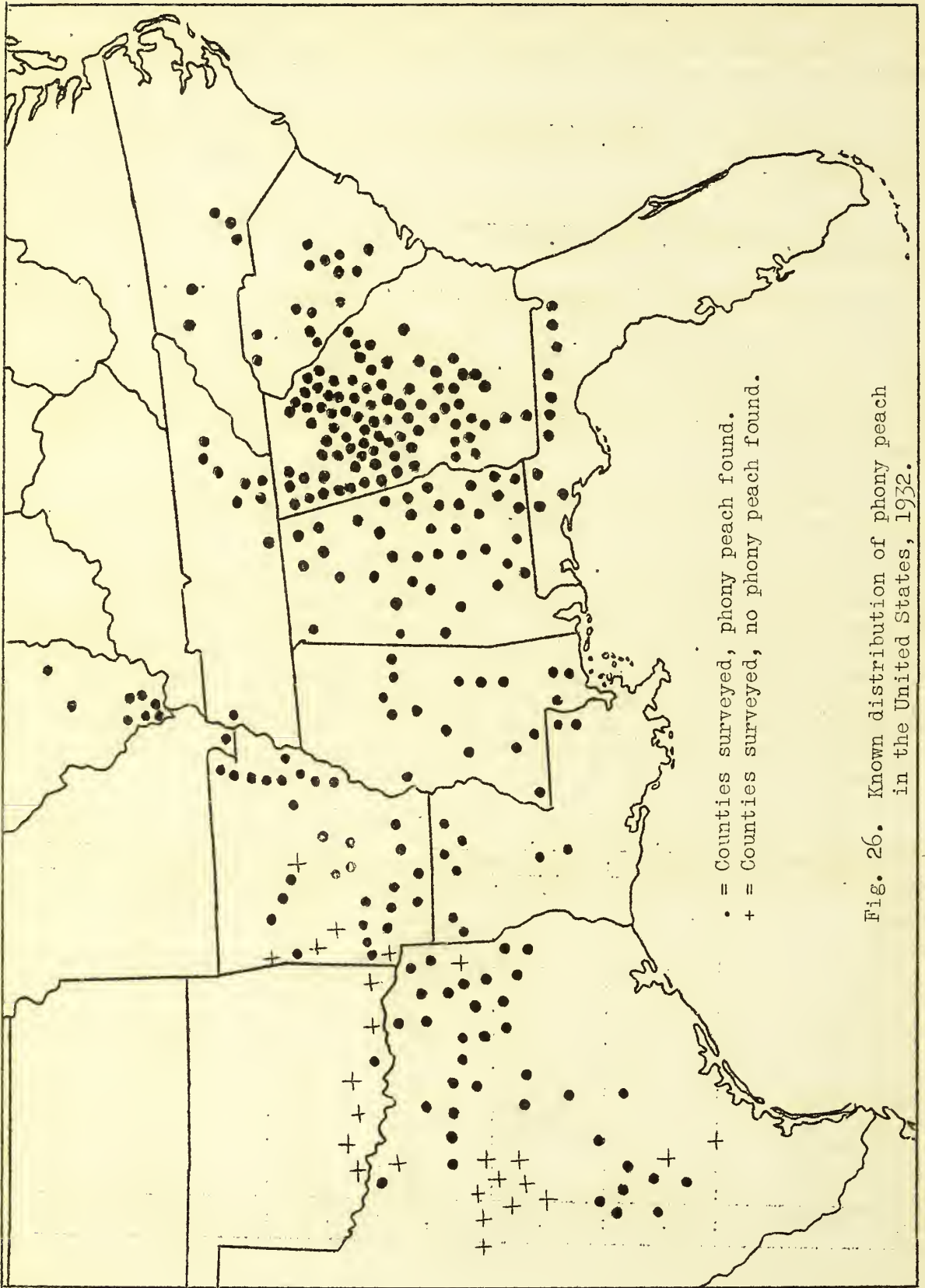


Fig. 26. Known distribution of phony peach in the United States, 1932.

The extent and thoroughness of the surveys is indicated by the fact that a total of 449,754 diseased trees distributed over 13 States have been detected and destroyed. See Table I and the map (Fig. 26). In addition extensive scouting was done during 1931 in many States where no indication of this disease was found. The number of trees inspected in these "disease-free States" is given in parentheses following the names of the States:

Connecticut (34,424), Delaware (86,260), Indiana (128,771), Kansas (19,363), Kentucky (98,899), Maryland (210,295), Michigan (313,256), New Jersey (194,015), New York (181,095), Ohio (141,961), Pennsylvania (326,850), Virginia (159,832), and West Virginia (96,333), a total of 1,993,358 trees.

ARSENICAL INJURY (Lead arsenate sprays). Michigan, Delaware and New York report considerable injury. In the majority of cases it seems to be due to too much lead and not enough hydrated lime and possibly the unusual weather conditions.

WINTER INJURY AND FROST INJURY. Illinois, Kentucky, Mississippi, Arkansas, New York, and Washington reported severe losses due to the freezing of the blooms. The extremely warm weather of February caused a decided advance in vegetation and in some cases caused the trees to bloom one month ahead of normal. Illinois estimated that 90 to 95 per cent of the buds of Elberta, which is the major variety of that State, were killed. In connection with the losses so generally reported as resulting from low temperatures in March, note should be made of Poole's report from North Carolina that peach trees affected with crown gall or root knot were much more readily killed by this freeze than healthy trees. According to M. B. Waite, in Southern Maryland peach buds were partly killed in the pink by frost in March. The majority escaped and bloomed in late March and early April, but were chilled by cold without freezing so that they did not set fruit.

CRACKED PITS. In Pennsylvania a peculiar condition occurred; the pits were split longitudinally and also cracked transversely. In addition to this the flesh of these peaches showed water-soaked areas which could be seen through the skin in some cases as dark green, slightly raised spots. Affected peaches dropped prematurely.

YELLOW LEAF, possibly due to weather conditions, Pennsylvania.
P. D. R. 16: 134.

P L U M

BROWN ROT (Sclerotinia fructicola) caused about normal losses. Those States reporting more than 1 per cent are: Ohio, 12; Maryland, 7; Massachusetts, 5; and Iowa, 2.

CROWN GALL (Bacterium tumefaciens). In Arizona more than 250 trees were killed in one orchard and about 150 in another. Crown gall was observed in Minnesota and Maryland.

BLACK KNOT (Plowrightia morbosa). Minnesota reported heavy infection on native plums. Also severe in Massachusetts and New York. P. D. R. 16: 120.

SHOT HOLE (Coccomyces prunophorae). In Minnesota a 2 per cent loss occurred and as high as 15 per cent infection was noted on trees at the University fruit farm.

C H E R R Y

LEAF SPOT (Coccomyces hienalis). Michigan, Wisconsin, and New York noted severe losses in unsprayed orchards.

DECAY (Penicillium sp.). Pennsylvania noted heavy losses due to decay occurring on badly bruised fruit caused by heavy wind storms. A large proportion of the crop in some orchards was injured and with the prevailing prices the crop was not worth picking.

G R A P E

BLACK ROT (Guignardia bidwellii) was more severe than usual in Massachusetts, Florida, Virginia, Maryland, and Ohio, where 25, 15, 10, 5, and 4 per cent losses, respectively, occurred. North Carolina, Arkansas, Illinois, Wisconsin, and Kansas reported less than usual. P. D. R. 16: 13, 111.

DOWNY MILDEW (Plasmopara viticola). With the exception of Maryland, Iowa, and Massachusetts, downy mildew was much less prevalent than usual. Losses did not exceed a trace in any State.

ROOT KNOT (Caconema radicicola). Arizona and California reported severe losses and apparent spreading of this pest.

BITTER ROT (Melanconium fuligineum). Florida reported 6 per cent loss with a maximum infection of 65 per cent.

S T R A W B E R R Y

LEAF SCORCH (Diplocarpon earliana) was much more prevalent in Louisiana where 8 per cent loss occurred. Florida reported good control of this disease with Bordeaux 4-4-50.

LEAF SPOT (Mycosphaerella fragariae) according to Zundel this year was the first time, at least in recent years, that leaf spot caused real damage to strawberry plantations in Pennsylvania. Louisiana noted 15 per cent loss which was considerably more than normal. Michigan reported it as being much more prevalent generally, and very severe in certain localities.

ROOT ROT (unknown) reduced stands as much as 50 per cent in some fields in Virginia. New York, Maryland, Michigan, Wisconsin, Minnesota, and California noted considerable damage. The cause has not been determined.

DWARF (Aphelenchoides fragariae). Florida noted an increase in 1932 in the number of dwarfed plants sent in from Arkansas over that for 1931. California reported this disease on plants coming from Tennessee and Arkansas, especially on the variety Klondike. Very little local spread was observed in California. P. D. R. 16: 113.

ANTHRACNOSE (Colletotrichum fragariae). In Florida this disease not only kills young plants in the nurseries but is also the cause of a sudden wilt of plants set in the fields in the fall, causing a rot of the crowns.

SCLEROTIUM ROT (Sclerotium rolfsii). In Florida this disease is fairly widespread during the summer and causes the death of plants in nursery beds and on higher drier land.

B L A C K B E R R Y

BLUE STEM (Verticillium sp., reported as V. ovatum) was recognized in Connecticut for the first time on dewberry and blackberry.

R A S P B E R R Y

ANTHRACNOSE (Plectodiscella veneta) was generally more severe than usual in Maryland, Kentucky, Arkansas, Illinois, and Michigan. It was about normal in occurrence in Wisconsin, Minnesota, Iowa, and Kansas.

LEAF SPOT (Mycosphaerella rubi) was very severe in Illinois, Massachusetts, and Kentucky where it caused from 50 to 100 per cent defoliation, and sometimes apparently the death of plants.

D E W B E R R Y

LEAF SPOT (Cercospora rubi) occurred late in the season in North Carolina, and thus had little effect on new cane growth.

ANTHRACNOSE (Plectodiscella veneta) caused a 25 per cent loss in North Carolina, which was an increase over the two previous seasons. Also reported from Arizona.

CANE BLIGHT (Leptosphaeria coniothyrium) is common in North Carolina. Satisfactory control is being obtained where vines are cut to soil level immediately after the fruit is harvested. (R. F. Poole).

BLUE STEM (Verticillium sp., reported as V. ovatum). Connecticut. (See under blackberry).

C R A N B E R R Y

According to reports, the Massachusetts cranberry crop, somewhat reduced in size compared with recent years, was generally of good keeping quality, but there were individual bogs which produced the poorest keeping berries of their history. Cultures from berries sent in by Dr. Bergman showed that Glomerella cingulata vaccinii was responsible for an extraordinarily large portion of the STORAGE ROT. Wisconsin produced one of

the largest crops of record. The season was exceptionally favorable in all respects, there being very little damage from frosts, insects, or diseases. The berries were of good keeping quality. FALSE BLOSSOM is being watched closely but with less apprehension than formerly; control measures for the leaf-hopper carrier are being taken where required. Reports from the Pacific Coast indicate that FROST DAMAGE materially reduced the crop in that section. P. D. R. 16: 25, 13.

B L U E B E R R Y

CROWN GALL (Bacterium tumefaciens) was reported from Massachusetts. This disease has only been reported once before on this host. See Barker and Neal, Quart. Bul. Miss. State. Pl. Bd. 3: 13-34. 1924.

C I T R U S

SCAB (Sphaceloma fawcettii) was more prevalent on grapefruit in Florida than usual. This may be explained by the fact that the drought during spring months retarded both the host and fungus. Rains occurred generally during May and June, while the fruit was still susceptible.

MELANOSE (Phomopsis citri) was very abundant in Puerto Rico.

B A N A N A

WILT (Fusarium cubense) was well distributed throughout Puerto Rico.

F I G

LEAF SPOT (Cercospora fici) caused defoliation of plants in North Carolina, but the disease occurred so late in the season that the damage was probably insignificant.

RUST (Cerotelium fici). Most trees in southern Louisiana are generally defoliated by the middle of August.

BLIGHT (Stilbum cinnabarinum) was observed for the first time in Louisiana.

P E C A N

SCAB (Cladosporium effusum). Poole reported for North Carolina, "On the increase. Although many growers spray more generally than in the past, others take chances, which usually results in heavy losses in plantings where infection is heavy and susceptible varieties are grown."

DIEBACK (probably Botryosphaeria berengeriana) was reported for the first time from Arizona.

W A L N U T

BACTERIOSIS (Bacterium juglandis). As high as 75 per cent infection was reported in California plantings.

A L M O N D

CROWN GALL (Bacterium tumefaciens). Practically 100 per cent infection occurred in one-year old plantings on 3 ranches in California.

D I S E A S E S O F V E G E T A B L E C R O P S

P O T A T O

Davis and Boyd summarize the potato disease situation in Massachusetts as follows: "In general, the diseases observed and losses were similar to those reported for 1931." This statement applies with slight modifications to most of the potato growing States from which reports were received. The most important exceptions are noted below.

LATE BLIGHT (Phytophthora infestans) was very locally distributed in some States. For example, in New Hampshire it occurred only in Coos County. Garrett County in western Maryland suffered 12 per cent loss although there was practically no loss in other parts of the State. In Michigan it was "Found only in the vicinity of Sault Sainte Marie, Chippewa County, on new land from imported tubers. The loss in small acreages was total in many cases." New York, Ohio, Wisconsin, Minnesota, and California reported only slight losses this year, a condition attributed to hot dry weather. In North Carolina there was very slight infection in the mountain areas where it causes severe damage nearly every year. For reports from Florida, Texas, Maine, and other States see P. D. R. 16: 14, 21, 45, 121, 145, 176.

EARLY BLIGHT (Alternaria solani) was much less prevalent and destructive than usual, which can probably be attributed to the dry and hot weather. Butler reported from New Hampshire, "Early blight, which was prevalent and destructive throughout the State in 1931, caused but slight injury in 1932." In North Carolina it was general and especially severe in some fields in the eastern part of the State. Michigan reported "Especially prevalent in northern counties," and New Mexico, "Serious in the higher altitudes where potatoes are grown." New York, Maryland, South Carolina, Virginia, Florida, Wisconsin, Ohio, Minnesota, Arkansas, and North Dakota all reported slight losses. P. D. R. 16: 45, 121, 136.

SCAB (Actinomyces scabies) was generally much more prevalent than in an average year. Nine of the twelve States reporting indicated more than usual. Wisconsin estimated 12 per cent loss for the State with a maximum infection of 100 per cent. In a detailed report on potato scab in New York State, Blodgett gives the following list of counties with the percentage of tubers affected in fields surveyed: St. Lawrence 47, Monroe 38.4, Clinton 28.5, Ontario 21.7, Genesee 19.7, Wyoming 11.3, Allegany 10.6, Erie 10.5, Oswego 10.2, Oneida 10.1, Franklin 9.8, Onondaga 9.5, Suffolk 9.4, Nassau 5.6, and Stauben 3.3. He summarizes his observations as follows: "Loss slight on Long Island. Average of 189 records in 15 counties in western, central and northern New York, 14.2 per cent. Very important due to dry weather and high temperatures." Poole in North

Carolina said that scab was "Common in soils where lime has been applied in large amounts." Other States noting over a trace of loss include Maryland, 3 per cent; Kansas, 1.5; Michigan and Iowa, 1; Florida and Ohio, 0.5. P. D. R. 16: 121, 136.

STEM ROT AND SCURF (Corticium vagum). The losses from this disease were more severe than those occurring during an average year. Barrus summarizes the losses from Rhizoctonia solani in New York State as follows: "Sprout rot occurred to about the same extent as last year. The amount of scurf on tubers in 189 fields in 15 counties was as follows: Oswego 52.8 per cent, Monroe 38.3, Suffolk 34.4, Wyoming 33.6, Genesee 27.2, Allegany 26.4, Steuben 26.2, Ontario 25.9, Nassau 23.2, Franklin 20.6, Onondaga 17.5, Oneida 17.1, St. Lawrence 8.0, Erie 7.9, and Clinton 6.6." Florida reported a stand reduction of 10 per cent and a loss of 25 per cent. Other losses were: Kansas, 6; Maryland and Iowa, 5; Colorado, 3; California and Ohio, 2. Wisconsin reported good control with corrosive sublimate and acid mercury. In North Carolina it was noted that the disease occurred in isolated wet spots.

POWDERY SCAB (Spongospora subterranea). In the potato tuber defect survey made in Franklin County, New York, on September 21, visits were made to ten fields. Powdery scab was found in five fields in amounts ranging from 1 to 67 per cent of tubers affected. This trouble has not been found in the central and southern counties of the State. (F. M. Blodgett).

BLACK LEG (Bacillus phytophthorus). Except in Arkansas, which reported more, this disease was generally less prevalent than usual. No loss estimates were above 1 per cent.

WILT (Fusarium sp.). Poole reported it as "Very abundant throughout the eastern part of North Carolina". Minnesota reported that three successive years of hot dry weather have increased the prevalence of this disease. P. D. R. 16: 135.

BACTERIAL WILT (Bacterium solanacearum). A severe outbreak occurred on the Red Bliss Triumph variety in Puerto Rico.

MOSAIC (virus), as usual, was widespread. Those States reporting more than one per cent were: Iowa, 7; Massachusetts and New York, 5; Maryland, 3; and Colorado, 2. New Jersey noted a decrease due to the use of certified seed and possibly to extensive plantings of Irish Cobbler.

LEAF ROLL (virus). Black sent the following report for New York. "Occurs throughout the State. Eighteen fields were rejected for certification in 1932 as compared with 11 in 1931. Loss 6 per cent." Other States reporting more than a trace of loss from this disease were: Ohio, 5; Maryland, 3; California, 2; and Michigan, 1.

TIP BURN AND HOPPER BURN (drought and leaf hopper). New York reported as follows: "The disease is much more important in western New York than in other sections. Where optimum results were obtained from spraying experiments there was a 35 per cent increase in yield with hopper burn the most important disease or pest and without complete control. Total

loss 15 per cent." Ohio reported a loss of 8 per cent; Michigan and Minnesota, 5; and North Dakota, 2.

T O M A T O

LEAF SPOT (Septoria lycopersici). In New Jersey there was a 30 per cent reduction in yield, but the severity was localized where rains and subsequent foggy humid weather favored infection. It was more prevalent than for several years in Maryland, where it was not observed at all in 1931, and there was only a trace in 1930. New York, Kansas, Michigan, and Wisconsin reported less than usual due to weather conditions. P. D. R. 16: 174.

FUSARIUM WILT (Fusarium lycopersici) was generally a little more prevalent and severe than normal. Maryland noted it as being more destructive this year than for many years. Even the resistant variety Marglobe was appreciably affected. The major State losses reported were: Virginia, 10 per cent; South Carolina, 5; Michigan, 3; and Kansas, 2. P. D. R. 16: 153.

BACTERIAL CANCER (Aplanobacter michiganense). In Kansas some fields were abandoned as total losses and actual losses were easily 75 per cent. New Jersey noted 100 per cent infection in some fields. The infection evidently came from diseased seedlings, and not from field infection. The disease was widely distributed in southeastern North Carolina. New York reported only a trace and Massachusetts 1 per cent. P. D. R. 16: 121, 144, 174, 175.

EARLY BLIGHT (Alternaria solani). In Massachusetts this disease was common and destructive in certain fields. Its seriousness was attributed to attacks of flea beetles. The loss for the State was estimated at 5 per cent. In New York it was "Always present to some extent in the field crop." (A. G. Newhall). The principal loss was caused by early defoliation and consequent sun scald of fruit.

LATE BLIGHT OR DOWNY MILDEW (Phytophthora infestans). In Connecticut and Massachusetts, where this disease has rarely been seen since 1890, it caused this year serious losses. It was the most important disease in Connecticut where it was general and serious on late tomato fruits, especially Marglobe. Hundreds of bushels were destroyed in Massachusetts. New York also reported much more than usual. P. D. R. 16: 166, 176, 184.

BACTERIAL SPOT (Bacterium vesicatorium) was observed for the first time in Arkansas. In Maryland it was general and caused considerable damage.

ANTHRACNOSE (Colletotrichum phomoides) was found for the first time in two sections of Iowa where a one per cent loss was estimated. It was also noted in Connecticut, New York, Kansas, and Puerto Rico.

ROOT-KNOT (Saemonema radicum) caused 7 per cent loss in South Carolina and was severe also in Mississippi, Arkansas, and Wisconsin.

MOSAIC (virus). In Massachusetts it was widely distributed and severe in dry weather, loss 20 per cent. Both in the green house (where it united with the potato virus to cause streak) and in the field, mosaic has been much reduced in New York in recent years by destroying weed hosts in the vicinity of the plant bed. P. D. R. 16: 174, 185.

BLOSSOM-END ROT (non-par.). Ohio, Maryland, and New York estimate 5, 4, and 2 to 3 per cent loss, respectively. There was more loss than usual in North Dakota where the water relations were disturbed in many instances by dry weather and attempts at artificial watering. P. D. R. 16: 144, 174.

CLOUDY SPOT (undet.). In several canning districts in western Ohio, what appeared to be tomato cloudy spot was present in epidemic form. This trouble was manifest by a white cloudy appearance, visible through the epidermis. When the fruit was peeled these whitish islands of glistening cells adhere to the epidermis, or when they are removed with a knife, leave the fruit pitted and unfit for the first grade. This seems to be the first appearance of this disease in Ohio. P. D. R. 16: 167.

B E A N

BACTERIAL BLIGHT (Bacterium phaseoli) generally caused about the normal amount of damage. The following losses were estimated by collaborators: Iowa, 3 per cent; Wisconsin, Michigan, and Ohio, 5; Maryland, 3; New York, 2 to 3; Colorado, 2 to 4; and Virginia, 1. Maryland and Colorado noted more injury from pod and stem infection than usual. In some fields in Maryland 100 per cent infection occurred. P. D. R. 16: 165, 173, 185.

HALO BLIGHT (Bacterium medicaginis phaseolicola) has become so serious in Red Kidney beans in Michigan that some farmers are discontinuing their culture. The acreage was greatly reduced this year, due largely to the destructiveness of halo blight in 1931. The loss in 1932 was estimated at 40 per cent, with a maximum infection of 100 per cent in some fields. P. D. R. 16: 88, 165.

ANTHRACNOSE (Colletotrichum lindemuthianum) was considerably less prevalent than usual as evidenced by the fact that 9 of the 13 States observing its presence noted less or much less. The majority of the collaborators attributed this to dry hot weather. It was severe in various localities in New York. P. D. R. 16: 165, 173.

ANGULAR LEAF SPOT (Isariopsis griseola) was reported from two counties in New York. P. D. R. 16: 165.

MOSAIC (virus). New York reported 10 per cent loss in the canning crop, and 1 per cent loss in garden beans, while only a trace occurred in the dry bean crop. Mosaic has become so severe in New York on the canner strains of Refugee that the canners have made strenuous objections to the seed companies. Promising results have been obtained from the first year's work under a fellowship financed by the seed companies to work on this problem. In Michigan also mosaic was serious on Refugee snap bean,

30 per cent loss being estimated while in field beans of which the resistant variety Robust is the principal one grown, there was only a trace. Colorado noted this disease as being prevalent on all susceptible varieties, some fields having as much as 40 to 50 per cent infection. In Maryland the disease is usually masked later in the season but this year it was apparent throughout the season, according to H. A. Hunter. In the Norfolk truck region of Virginia both spring and fall crops were affected. Fields with 100 per cent infection were observed in New York, Michigan, and California.

CURLY TOP (virus) was reported from Washington.

POWDERY MILDEW (Erysiphe polygoni) caused losses estimated at 5 per cent in the fall crop in South Carolina, and 2 per cent in Florida. It also occurred in Virginia and California.

ROOT AND STEM ROTS, (various fungi), were generally of about the usual importance. Louisiana reported 5 per cent loss, Maryland, 2.5 per cent. The dry root rot, Fusarium martii phaseoli, caused 5 per cent loss in New York and was also reported from Mississippi. Fusarium spp. were reported from Maryland, Virginia, South Carolina, and Louisiana. Sclerotinia sclerotiorum caused stem rot in Massachusetts and Washington. The ashy stem blight, Macrophomina phaseoli, was reported from North Carolina. Rhizoctonia bataticola caused serious losses in the seedling stage and to mature plants in the Sacramento and San Joaquin Valleys in California. Rhizoctonia sp. was reported from Maryland and Louisiana. Corticium vagum was reported from New York and New Jersey, and the Rhizoctonia solani stage from Mississippi and Michigan. In Michigan favorable growing conditions for the host were not conducive to infection by this organism. Southern blight, Sclerotium rolfsii, caused from 10 to 20 per cent loss in some fields in the Sutter basin in California. It was also reported from Virginia, Mississippi, Louisiana, and Puerto Rico. Black root rot, Thielavia basicola, was observed on beans in New York but is said to be rare on this host. Pythium sp. was reported from Louisiana.

HOPPERBURN, due to leafhoppers, was said to be very abundant in southern New Jersey. Affected leaves lack chlorophyll.

BLACK PITTING OF SEEDS, non-parasitic, was reported from New York. The centers of the seeds were black. It seems to be found only in varieties the seeds of which do not become hard when dry. (Chupp).

L I M A B E A N

BACTERIAL BLIGHT (Bacterium vignae) was reported from New York, Maryland, Virginia, Ohio, and Puerto Rico. In Maryland the most serious injury noted was in a field from home-grown seed, while an adjacent field planted with western seed was not injured.

ROOT ROT (Rhizoctonia bataticola) was observed occasionally in California. Lima beans appear to be more resistant to the early stages of this disease than ordinary beans. (J. B. Kendrick).

O N I O N

MILDEW (Peronospora schleideni) was very severe in New York, after being almost negligible for two years. The frequent showers in late June probably explain its early occurrence. The loss was estimated to be 20 per cent. Massachusetts reports much more than usual with losses ranging from 5 to 40 per cent. In California, on the other hand, there was less than usual in 1932, due probably to dry cool weather. L. D. Leach has compiled some data as to its fluctuating importance in that State:

	Percentage loss
1920: Moderately severe; localized; Maximum loss 30%	2
1921: Same as last year; seed crop, Santa Clara Valley	2
1922, 1923, 1924: No reports.	
1925: Very severe; general; both seed and bulb crops	60-80
1926: Severe in central California coastal section; Maximum	50
seed crop	40
1927: Localized on seed crop	3
1928: Widely distributed on seed crop	5
1929: Little or no loss	0
1930: Severe in localized areas	20-30
1931: Severe and general during March; little spread during April and May; severe in localized areas during June.	Approximately 10
1932: Practically no mildew on seed onions; early infection on bulb onions at Sacramento and light infection in June on McDonald Island. Loss less than	1

PINK ROOT (Fusarium sp) caused 4 per cent loss in Ohio, which is attributed to the low soil moisture in July and August.

RUST (Puccinia asparagi) was reported for the first time from California.

ROT (Sclerotium rolfsii). In California 100 per cent infection was observed in a field of white onions, adjacent to a field of yellow onions where none occurred.

YELLOW DWARF (virus) was found in two small plantings in California.

SUN SCALD (weather conditions). New York. It was extremely warm the last few days of August and the first days of September. Onions harvested at this time, and left lying in the sun for even a short period, later showed typical collapsing of the tissue, accompanied by flattening of the bulb on one side. A similar effect was produced in fields where rather large weeds were pulled up and the dirt removed so that one side of the onion was exposed to the sunlight. It was severe in seven fields visited in Genesee County.

SWEET POTATO

The results of cooperative surveys of the diseases of sweet potatoes in storage in Virginia and Maryland in February and of field surveys during the growing season in the same localities, conducted by pathologists of the United States Department of Agriculture and the States of Virginia and Maryland, are summarized in the Reporter, volume 16, pages 19 to 20, 182, 183.

BLACK ROT (Ceratostomella fimbriata) was about average in prevalence in most States. In North Carolina, according to Poole, "It was especially severe in storage tanks where losses up to 100 per cent were observed. Sweet potatoes were harvested later than usual. Laboratory studies have shown formaldehyde treatments of no control value." Losses reported are 10 per cent in Texas; 8, Iowa; 5, Arkansas; 4, Florida, Kansas; 3, North Carolina and South Carolina.

STEM ROT AND WILT (Fusarium batatatis and F. hyperoxysporum) was important in most sweet potato growing States, as usual. Maximum field losses of 80, 75, and 65 per cent were reported from Virginia, New Jersey, and North Carolina, respectively. In Louisiana the disease is said to be very destructive in a few places but is not very generally distributed. In Arkansas it is rather serious in many sections. Wilt caused a reduction in stand of probably 25 per cent in Merced and Stanislaus Counties, which comprise the main sweet potato area of California. It was also reported from Colorado. The variety Priestley is said to be tolerant of this disease in Iowa. Losses estimated are 15 per cent in eastern Virginia and in Iowa; 8, North Carolina; 5, Arkansas, Kansas; 2, Maryland, Florida; and 1, South Carolina.

POX (Actinomyces sp.) was reported from a number of States but the only appreciable loss estimate was 5 per cent in storage in Maryland where the disease is said to be increasing rapidly in prevalence and destructiveness.

STORAGE ROTs (various organisms including Ceratostomella, Rhizopus, Fusarium, Pythium, etc.) were reported as causing 40 per cent loss in South Carolina; 20, North Carolina; 15, Maryland, Arkansas; 12, Florida; and 6, Kansas.

ROOTLET ROT, RING ROT (Pythium ultimum) was reported from North Carolina and Mississippi. In North Carolina early harvested sweet potatoes were not affected but in late harvested crops there was as much as .5 per cent loss in the field and an equal loss in storage.

VIOLET ROOT ROT (Rhizoctonia crocorum) was reported from Texas, Kansas, and New Mexico. In New Mexico it was rather important in a few fields in one district. This disease is not common on sweet potato.
P. D. R. 16: 74; 17: 9.

CHARCOAL ROT (Rhizoctonia bataticola) was reported from Maryland and California.

ROOT KNOT (Caconema radicicola) was reported from Mississippi, Arkansas, and California.

MOSAIC (undet.) was of slight importance in Arkansas and Kansas.

C A B B A G E

YELLOW (Fusarium conglutinans) in general was probably a little more prevalent than usual. In New York it was very severe within a two mile radius of Phelps, Ontario County. In Michigan the disease continues to increase in importance. North Carolina noted a total loss in some gardens. It was much more prevalent in Minnesota than normal due to several successive seasons of hot dry weather. It was reported for the first time from Arizona. Maryland reported 7.5 per cent loss which was less than usual.

DOWNY MILDEW (Peronospora parasitica) caused a 50 per cent loss in Virginia. This disease was reported for the first time from Montana.

BLACK LEG (Phoma lingam). Much less in New York because of rather general seed treatment with hot water.

R A P E

CLUB ROOT (Plasmodiophora brassicae). New Jersey noted less during the past five years. The repeated heavy applications of lime seems to be the explanation.

C U C U M B E R

BACTERIAL WILT (Bacillus tracheiphilus) generally was about normal in occurrence and severity, although there was a severe outbreak in eastern Michigan which practically ruined the pickle crop, causing a 30 per cent reduction in yield for the State. Other loss estimates were: Massachusetts, 20 per cent; Iowa, 8; and New York, 7. Colorado noted good control in the greenhouse from fumigation with naphthalene. It was very severe on cucumbers at Arlington, Virginia, where it caused 50 per cent loss.

DOWNY MILDEW (Pseudoperonospora cubensis). The following losses which were more than usual for these States, were estimated: Florida, 19 per cent; Virginia, 15; Massachusetts, 10; Ohio and Maryland, 1. The disease was also observed in Connecticut, Mississippi, and Wisconsin. Puerto Rico reported good control with Bordeaux. P. D. R. 16: 152, 177.

POWDERY MILDEW (Erysiphe cichoracearum) was very common and destructive in greenhouses in Massachusetts. Much damage is done by fungicides used to control it.

C A N T A L O U P E

BACTERIAL WILT (Bacillus tracheiphilus) was much more severe in Iowa than usual, causing a 6 per cent loss. This was thought to be due

to the heavy carryover of stiped beetles from 1931 due to the mild winter. Massachusetts reported 10 per cent loss and New York 3 to 4 per cent. It was also present in Connecticut and Kansas.

ANTHRACNOSE (Colletotrichum lagenarium) was more severe in Iowa, Ohio, and Maryland, where 0, 1, and 0.5 per cent losses, respectively, occurred. North Carolina noted severe blighting toward the end of the season, more severe than any of the past three seasons. Connecticut, Wisconsin, and Kansas reported less than normal. It was unusually severe at Arlington, Virginia, during the latter part of the season (30 per cent loss).

LEAF SPOT (Macrosporium cucumerinum) was somewhat more prevalent than usual. Those States estimating losses were: Florida, 14 per cent; Iowa, 5; Maryland, 3; and Ohio, 2. P. D. R. 16: 136.

CHLOROSIS (cause unknown). In New York, in the counties along Lake Ontario, a trouble has appeared, which each year is increasing in virulence. The leaves between the vines are uniformly yellowish with a very dark green margin bordering each side of the principal veins, and sometimes even along the smaller veins. The plant is stunted in growth, the yield reduced and the taste of the melon made insipid. It has proved impossible to transmit the trouble by manipulating the plants as though they had been infested with mosaic. There is some circumstantial evidence that the trouble is seed-borne.

GUMMY STEM BLIGHT (Myccosphaerella citrullina) was much more prevalent than usual in New York causing 100 per cent loss in some fields.

DOWNY MILDEW (Pseudoperonospora cubensis) caused an unusual amount of premature defoliation of late maturing varieties and plantings in Massachusetts. The loss was estimated at 10 per cent.

W A T E R M E L O N

ANTHRACNOSE (Colletotrichum lagenarium) seemed to be much more severe in some localities and much less in others, e. g., Massachusetts noted it as being the most common and damaging disease of the crop this season. It caused severe defoliation as well as poxed fruit. Iowa reported much more, estimating 15 per cent for the State loss, and some fields with a maximum infection of 75 per cent. Arkansas, Florida, New Jersey, and North Carolina noted much less due to the unfavorable season for its development. Connecticut, Maryland, Colorado, and New York reported about the normal amount. P. D. R. 16: 22, 177.

FRUIT ROT (Phytophthora spp.). In Arizona this disease, which is new for the State, caused as high as 40 per cent loss in some fields.

MOSAIC (unknown) was reported for the first time as a field disease in Florida.

WILT (Fusarium nivium) caused heavy losses throughout North Carolina.

C E L E R Y

EARLY BLIGHT (Cercospora apii) was generally prevalent and about normal in occurrence. It was much more severe than usual in Michigan, where it was said to be "The most destructive disease of the crop this year. It was present in all sections and everywhere reported as difficult to check. Many fields in the Kalamazoo section were a total loss. High night temperatures and fogs provided ideal conditions." The total reduction in yield in Michigan was estimated at 20 per cent, and there was another 10 per cent loss in grade. A very severe outbreak occurred also in the Sanford section of Florida favored by somewhat similar weather conditions. The loss in Florida was estimated at 15 per cent. In Massachusetts, where the loss was 5 per cent, the disease was unusually scarce on early celery but spread rapidly in the late crop. New York noted a 5 to 7 per cent loss which was more than usual. P. D. R. 16: 43, 170.

LATE BLIGHT (Septoria apii and S. apii-graveolentis) seemed to be somewhat less prevalent than usual, although it became rather severe late in the season in some States. Due to the economic depression and low prices, growers omitted the usual spraying or dusting, and late rains brought on a heavy outbreak. In New York it has been very scarce during the past two years. Evidently it has not been so abundant on the seed. One county in Oregon lost 50 car loads of celery on account of blight. Both species were reported from Massachusetts, New York, and Michigan. The small-spotted form (S. apii-graveolentis) was said to be killing umbels in the seed crop in Monterey County, California. It occurred also in Santa Clara County. P. D. R. 16: 177.

PINK ROT (Sclerotinia sclerotiorum) caused as much as 60 per cent loss in stored celery in Colorado. It was also reported from New York, Michigan, and California.

ROOT ROT (Phoma apicola). In New York this disease caused as high as 50 per cent loss in two or three lots in cold storage.

YELLOWTS (Fusarium sp.) was reported from New York, Ohio, Michigan, Wisconsin, Minnesota, and Colorado, in practically all cases as more prevalent than usual. Both New York and Minnesota mentioned successive hot dry summers as having favored the spread and development of the disease. In Minnesota it had been observed previously on only one or two bogs, while in 1932 it was found on a dozen or more farms. In New York it became more severe after a very warm spell in late August. In Michigan, on the other hand, moisture and temperature after July were not favorable and losses were confined to the summer crop at Kalamazoo. The report for Wisconsin was the first for the State. Losses estimated were 5 per cent in Michigan, 4 per cent in Colorado, and 1 per cent in Minnesota and Ohio. P. D. R. 16: 10.

YELLOWTS (virus) was reported from Wisconsin and California. The disease in California has been found to be due to the California aster yellows virus which is distinct from the eastern form. It occurred in Yolo, Sacramento, Santa Clara, and Monterey Counties and caused severe losses in some instances.

MOSAIC (virus) was more severe in Florida than it had been during the past two years, according to S. P. Doolittle.

L E T T U C E

BOTTOM ROT (Corticium vagum) caused a loss of 27 per cent in New York, and 35 per cent loss in Orange and Oswego Counties. Newhall reported excellent control on 400 acres dusted by growers using a commercial brand of 2 per cent ethyl mercury phosphate. The disease was also severe in some New Jersey fields.

DROP (Sclerotinia sclerotiorum). Florida noted a 15 per cent loss with a maximum infection of 100 per cent. In New York this disease caused a 1 per cent loss with a 10 per cent loss in Orange County. In Arizona three large fields grown without crop rotation showed losses from a trace to 50 per cent or more. The disease occurred in California and Ohio also.

ROOT ROT (Sclerotium rolfsii) destroyed 50 to 75 per cent of mature seed plants in one area in California. There was a trace also on fall-planted seedling lettuce.

TIP BURN (non-par.) caused from 10 to 20 per cent loss in New York. It also occurred in New Jersey, Wisconsin, and California.

WHITE HEART (non-par., due to unproductive muck soil) is gradually being reduced in amount in New York by the use of copper sulfate and lime.

VIRUS DISEASES. MOSAIC caused a loss estimated at 4 per cent in New York. YELLOWS caused 5 per cent loss in New York and was also reported from California.

P F A

SEED DECAY (various microorganisms). In New York there was 40 per cent reduction in yield. Peas are usually planted early and most of them were in the ground by May 1, but a few were up. Incessant rain during early May permitted rot organisms to operate so that stands were reduced 40 to 60 per cent, and the pea crop was the poorest in many years. Fields up before May 1 were little affected. (Horsfall).

BACTERIAL BLIGHT (Bacterium pisi). With the exception of Maryland and Virginia, which reported much more, this disease caused about the normal amount of loss. The following States reported its presence: New Jersey, New York, Maryland, Virginia, Wisconsin, Colorado, Washington, and California.

ROOT ROT (Aphanomyces euteiches) generally caused about the usual amount of damage. In New Jersey there was less than usual but the pea crop was so poor due to unfavorable weather conditions, that diseases were of secondary importance. Maryland noted 5 per cent loss. In Wisconsin damage from this disease is confused in the field with injury from wilt, aphid, and hot weather. Horsfall stated that he has not seen many cases

of this root rot in New York. The disease is common in sandy soils on the coastal plain of North Carolina.

ROOT ROT (Pythium spp.) was an important factor in reducing stands in New York. Together with Fusarium it caused heavy losses in two fields in California, where high temperatures and high moisture from irrigation favored its development.

ROOT ROT (Fusarium martii pisi) was reported from Connecticut, New York, New Jersey, North Carolina, Ohio, Wisconsin, Colorado, and California. Losses generally were not important. In New Jersey it was severe where peas were grown without rotation. In Colorado it occurred in practically all fields and caused losses varying from 5 to 30 per cent. According to W. C. Snyder it is general throughout the pea growing areas of California but is usually not of economic importance. A severe outbreak occurred in two fields in Contra Costa County, grown out of the usual season so as to mature in late summer (see Pythium). Horsfall reported that in New York "It is relatively rare but shows up early in the season and may open the way for later developing fungi."

ROOT ROT (Fusarium moniliforme) was reported on English peas in Mississippi.

WILT (Fusarium orthoceras pisi) was reported from Maryland where the loss was estimated at 1.5 per cent, and from Wisconsin.

RCOT ROT (Thielavia basicola) was reported from New Jersey.

STEM ROT (Corticium vagum). Horsfall reported that this seemed to be the most serious offender in killing pea roots in New York, where several severe outbreaks occurred. It caused heavy losses of garden peas in North Carolina. It was also reported from New Jersey and Washington (Rhizoctonia sp.).

BLIGHT, POD SPOT, FOOT ROT (Ascochyta spp. and Mycosphaerella pinodes). Because of the much greater care in selecting the source of the seed, blight has been reduced to a very low percentage in New York, according to Chupp. In Maryland the disease is general but not serious. Ascochyta pisi was reported from New Jersey, Colorado, Washington, and California; Mycosphaerella pinodes from North Carolina, Wisconsin, and California. Mycosphaerella on the stems was said to be very destructive to the early spring crop in Alameda County, California. When it was found on fall peas it was in coastal areas where heavy fogs provided sufficient moisture.

POD SCAB AND LEAF BLIGHT (Cladosporium sp.). In California a leaf, stem, and pod disease of market peas, due to a species of Cladosporium, was observed for the first time during the past season. The disease so far has been found only in the coastal area in the vicinity of Salinas, Monterey County, where the fields are frequently subject to heavy fogs in the summer months. Lesions upon the leaves are often marginal, causing leaf distortion, but also occur over the leaf surface as light straw colored spots well defined by a brown border, and on the stems

as long narrow scars. Most conspicuous are the symptoms of infected pods, manifest by prominent scabbing, making the appearance of the product unfit for market use. The scabs are raised, black, and irregular in shape and under proper moisture conditions are tufted with olive-grey conidiophores and spores. That the disease is seed-borne is suggested by the fact that the fungus has frequently been isolated from the seed coats of pea seed originating beneath pod lesions. The amount of loss resulting from this pod scab seems to be dependent on environmental conditions.

POD DISEASE (Oospores in pea pods (undet.)). Pea growers in the Salinas region, Monterey County, California, were visited by a severe outbreak of a pod disease characterized by a profuse development of oospores within the pod wall and upon the lining of the pod cavity. Infected pods evidenced no consistent external symptom except where the fungus was developed extensively in the wall tissue. In such cases a yellowish blotch was apparent on the unopened pod, but even in such instances there was no macroscopic evidence of fungal growth upon the outer surface nor of a break in the surface. Upon opening a diseased pod there is viewed a soft mealy substance which may involve the entire surface of the pod cavity, either white or tan colored, depending upon the maturity of the fungus. Microscopic examination has shown the coating to be almost entirely made up of oospores, and likewise infested tissues of the pod wall. The flare-up of the disease appeared to be directly associated with a spell of very foggy weather in early fall, as it practically disappeared during a warm sunny period which followed.

MOSAIC (virus) was reported from New Jersey, Washington, and California. As high as 90 per cent diseased vines was observed in some fields in California. Plants infected late in growth were not damaged very much but an appreciable percentage of the pods became distorted and unfit for market.

STREAK (virus) was reported from California.

SCORCH (high temperature, low rainfall). Wisconsin reported 50 per cent loss.

A S P A R A G U S

RUST (*Puccinia asparagi*) was noted as causing some injury in Massachusetts, New Jersey, Connecticut, Maryland, Wisconsin, and North Dakota. Chupp reported that it "Could not be found in New York this season."

B E E T

SCAB (*Actinomyces scabies*). Five per cent loss occurred in Massachusetts which was more than usual. The disease was also reported from New Jersey and New York. LEAF SPOT (*Cercospora beticola*) occurred widely but was reported as unimportant except under glass on beet greens in New Jersey. DAMPING OFF (*Pythium*, *Rhizoctonia*, et. al) caused a loss of 70 per cent in New York. In New Jersey, *Rhizoctonia* was severe during

high temperatures in a few houses on beets grown for greens. The Pythium was also severe on untreated plots. DOWNY MILDEW (Peronospora schachtii) occurred on garden beets grown for seed in California. LEAF SPOT (Phoma betae) is controlled under greenhouse conditions in New Jersey by seed treatment with hot water at 55° C. for 30 minutes. RUST (Uromyces betae) was abundant in garden beet seed fields in the Sacramento Delta region in California. ROOT ROT (Caconema radicicola) was reported from Long Island, New York. CURLY TOP (virus) was severe on garden beet seedlings near Sacramento, California.

C A R R O T

LEAF BLIGHT (Macrosporium carotae) generally was more destructive than usual. Florida, Massachusetts, New York, and Ohio reported 10, 5, 2, and 1 per cent losses, respectively. It was present in Connecticut and New Jersey.

WATERY SOFT ROT (Sclerotinia sclerotiorum). California and New York each reported 5 per cent loss.

E G G P L A N T

FRUIT ROT (Phomopsis vexans) generally did about the normal amount of damage. Florida and Virginia noted 10 and 3 per cent loss, respectively. It was observed also in Connecticut, New Jersey, Mississippi, and Puerto Rico.

WILT (Verticillium albo-atrum). New York. Chupp reported "Have in late years not seen a field that did not contain some wilt. A big percentage of the crop is lost because of this disease. Besides, the acreage has been reduced to almost nothing because of the difficulty in keeping away from wilt." In New Jersey it was found that the application of calcium cyanide in the hill failed to give any control. Many varieties and selections tested showed only slight differences in susceptibility. Certain species of Solanum are very resistant and one hybrid has been obtained.

J E R U S A L E M A R T I C H O K E

RUST (Puccinia helianthi) was very severe in one large planting in Massachusetts.

O K R A

WILT (Verticillium albo-atrum) is a limiting factor in okra production in New Jersey.

P E P P E R

MOSAIC (virus) generally was much more destructive than usual. Florida noted 20 per cent loss with total infection in some fields. Massachusetts recorded 10 per cent loss and New York, 2 to 3 per cent. It was also noted as severe in New Jersey, Kansas, Colorado, and Puerto Rico.

R H U B A R B

ROOT ROT (Armillaria mellea) was observed in California in an area which had previously been in pears, which were taken out because of Armillaria root rot.

S P I N A C H

DOWNY MILDEW (Peronospora effusa) was very severe in limited localities. Virginia and Michigan noted 5 and 15 per cent losses respectively. Considerable loss occurred in California, Ohio, Maryland, New Jersey, New York, and Connecticut.

D I S E A S E S O F S P E C I A L C R O P S

T O B A C C O

Due to the unusual interest shown in tobacco diseases during 1932 extensive reports were received, of which the majority were printed in the Reporter (See P. D. R. 16: 6, 7, 8, 9, 16, 25, 27, 50, 55, 69, 90, 94, 103, 122, 145). A brief summary of downy mildew (Peronospora hyoscyami) is given on page 20 of this Supplement.

Through the courtesy of T. G. Major, Tobacco Specialist of the Central Experimental Farm, Ottawa, Canada, it is possible to present a summary of the tobacco diseases in Canada for 1932 compiled by R. A. Boothroyd.

TOBACCO DISEASES IN CANADA IN 1932

R. A. Boothroyd

SEED-BED.

DAMPING-OFF (Pythium de Baryanum Hesse). Much damage was reported in the Farnham district, and in the l'Assomption area where the seedbeds were sown too thickly. Very few cases were reported in southwestern Ontario.

BLACK ROOT-ROT (Thielavia basicola Zopf.). A few isolated cases were reported from the Farnham district, but in l'Assomption-Montcalm 40 to 50 per cent of the plant beds were affected to a greater or lesser degree. The disease was general on Burley tobacco in the Ontario district with most damage occurring in Malden, around Chatham and east of Blenheim.

SEEDBED MOULD (Pyronema confluens (Pers.) Tul.). One or two cases reported in the Farnham district. Formaldehyde (1:1,000) used as seedbed control.

FIELD.

BLACK ROOT-ROT (Thielavia basicola Zopf.). Numerous cases reported in the Quebec districts, and considerable damage caused by the disease in southwestern Ontario. In this area the varieties Judy's Pride and Kelly were most adversely affected, but due to the hot spell after planting, a remarkable recovery was noticed in other varieties.

WILDFIRE (Pseudomonas tabacum (Wolf and Foster) Stev.). A number of plants, notably of the Belge varieties, were affected with this disease at the Central Experimental Farm. In the commercial districts a case at Farnham was the only one reported. This crop was ploughed under.

ANGULAR LEAF-SPOT (Pseudomonas angulata (Fromme & Murray)). No cases reported from the Farnham district, and less damage than usual from this disease in the l'Assomption-Montcalm area. In the New Belt of southwestern Ontario many mature crops were infected, one case at Teeterville showing 75 per cent infection. A correlation appeared to exist between the severity of infection and the amount of precipitation and wind.

MOSAIC (virus). Heavy infections reported from l'Assomption, Quebec, and southwestern Ontario; less mosaic observed in the Farnham area than usual. The mature leaves of infected plants showed severe damage, though there were signs of recovery in many cases following topping. In a number of fields in the l'Assomption district infestations ran as high as 60 per cent. At the Central Experimental Farm the percentage of infection was very low.

FRENCHING (Nitrogen deficiency). In the Old Belt of Ontario sections subjected to temporary restricted drainage showed considerable frenching, notably in the Windham district.

PHYSIOLOGICAL LEAF SPOTS. A few fields in the New Belt of Ontario, particularly in the vicinity of Vittoria and Teeterville, showed considerable spotting.

WIND AND HAIL. Hail damaged a strip of about 200 acres of Burley tobacco in the vicinity of Cedar Springs and Blenheim, Ontario. High winds did slight damage around Albana and Blythwood, Ontario, during the second week of August.

IMMATURE SUN-YELLOWING AND FIRING. This condition was prevalent in the Old Belt of Ontario, especially on the variety Standup Resistant when grown on light, gravelly soils and spring-ploughed fields.

CURING BARN.

POLE BURN. Slight damage was reported in some localities in the province of Quebec.

C O T T O N

WILT (Fusarium vasinfectum) was generally reported, mostly in about the usual amounts. In North Carolina, however, Poole stated that it was more severe than it had been in the past three years. Selections from Mexican Big Boll showed higher resistance than many other varieties planted throughout the State. In Arkansas the planting of resistant and semi-resistant varieties and the use of potash fertilizers are giving considerable control, according to V. H. Young.

ROOT ROT (Phymatotrichum omnivorum) caused a loss estimated at 12 per cent in Texas. It was serious in a limited area in Little River County, Arkansas, according to V. H. Young.

SEEDLING INJURY, STEM ROT (Corticium vagum). There was less complaint of seedling damage than was noted the two previous years in North Carolina. Where damage occurred it was on plants developing from seed sown while the soil temperatures were still low (Poole). Stem rot was of little importance in Arkansas. Sore shin was reported from Mississippi and Texas.

SEEDLING INJURY due to Rhizoctonia, Fusarium, nemas, etc., caused a loss estimated at 4 per cent in South Carolina, which was less than usual.

MALNUTRITION, usually referred to as Rust (non-par.) always presents a serious problem in Mississippi, Louisiana, and Arkansas in certain poor soils.

BLACK LEAF SPOT (potash deficiency and Macrosporium nigricantium) was very severe in North Carolina, resulting in complete defoliation and prematuring in many fields. (Poole).

LEAF SPOT (Alternaria sp.). J. G. Brown reported that this was so bad in 1931 on Pima cotton in the Eloy-Coolidge district in Arizona, in conjunction with rust (Aecidium gossypii=Puccinia hibisciata) that dusting was tried as a preventive this season.

RUST (Puccinia hibisciata), Arizona (see Alternaria) and Texas. In Supplement 84, page 41, the report from Arkansas should read Arizona instead.

ANTHRACNOSE (Glomerella gossypii) was unimportant in all States reporting its occurrence.

BOLL ROT due to Diplodia gossypina was severe in Louisiana where rains came late in the fall. It was also reported from Mississippi and Texas. Olpitrichum carpophilum occurred in Louisiana.

ANGULAR LEAF SPOT (Bacterium malvacearum) was generally reported. LEAF SPOT (Phyllosticta gossypina) and BLIGHT (Ascochyta gossypii) were reported from North Carolina. LEAF SPOT (Helminthosporium gossypii), Puerto Rico. WILT (Verticillium alboatrum), California. ROOT KNOT

(Caconema radicicola) of considerable importance in Arkansas; also reported from South Carolina.

P E A N U T

Peanut diseases have been the subject of several special surveys, the data of which were published in the Reporter, Volume 16: 24, 163, 164.

S U G A R B E E T

LEAF SPOT (Cercospora beticola) was about normal in occurrence, the losses being less than one per cent with the exception of Iowa which reported 10 per cent.

SEEDLING DISEASES AND ROOT ROT (Rhizoctonia spp., Phoma betae, Pythium spp.). Wisconsin, Michigan and Ohio noted less than usual, while Iowa recorded much more with a loss of 3 per cent. Phoma betae occurs in the Sacramento Valley in California, where dry conditions throughout the growing season favor infection, but is not very important.

ROOT ROT (Fusarium conglutinans var. betae) was reported from southern Colorado as doing extensive damage in a few fields in the area from which it was first reported. This is the first indication of extension of this pathogen, its outbreaks previously having been occasional in fields. (G. H. Coons).

SOUTHERN ROOT ROT (Sclerotium rolfsii). California estimated a loss of 6,000 tons, valued to the grower at \$40,000. Severely infested fields were not replanted but the disease appeared in several new areas. The peak of the damage came a few weeks later than in 1931, probably accounted for by high temperature coming later. (Stout and Leach).

ROOT ROT (Rhizoctonia bataticola) also occurred in California in the Sacramento Valley, where it caused greatest damage in the Sutter Basin. It has been noted in fields infested with Sclerotium rolfsii and probably some of the losses were incorrectly attributed in the past to the latter fungus. (C. M. Tompkins).

ROOT ROT (Phytophthora spp.) occurred in the Sacramento Valley in California. A late root rot, of a decidedly wet type, was especially severe in certain parts of the Delta region. Some fields were not harvested. (C. M. Tompkins).

CURLY TOP (virus). W. C. Cook estimated the loss in the Sacramento Delta section of California at 15 per cent (total acreage 15,000) and in the region north of the Delta at 1 per cent (total acreage 45,000). In July he reported crop damage in the worst areas as follows: Union Island, 25 to 30 per cent; Victoria Island, 35 to 40; and Bates Tract, 15 to 20. The virus was of a very severe type (H. H. P. Severin). Curly top losses in Idaho, Utah, and western Colorado areas were much smaller than usual, causing less than 5 per cent crop reduction. (G. H. Coons).

MOSAIC (virus). Mosaic in sugar beets occurred in western beet areas about as in other years. Specimens definitely shown to be a mosaic were collected in Ohio by J. E. Kotila, making the first report of mosaic from eastern beet growing districts. (G. H. Coons).

SUGAR CANE

MOSAIC (virus) in Puerto Rico is very common and abundant, but can be controlled by planting resistant varieties. Lutken reported that in South Carolina 90 per cent of the cane he observed in three counties was affected. In Louisiana, according to Tims, mosaic is becoming much more prevalent on CO 281 which remained practically free for two or three years.

RED ROT (Colletotrichum falcatum) was very severe in some sections in Louisiana. Infection almost always follows borer damage in susceptible varieties. POJ 234 showed much heavier infection than usual. (Tims). It was reported in Puerto Rico and Mississippi also.

ROOT ROT (various organisms). Most of the new varieties now used exclusively in the sugar belt in Louisiana are fairly resistant to root disease. POJ 213 is failing badly due to red rot infection and some root disease. (Tims).

POKKAH-BONG (undet.) is not important on commercial varieties in Louisiana, with the possible exception of POJ 234. (Tims). It was also reported from Puerto Rico, where Fusarium moniliforme was said to be the cause.

BROWN SPOT (Cercospora longipes) was reported from Florida. P. D. R. 17: 8.

RED STRIPE (Phytophthora rubrilineans) is prevalent on some new seedlings being introduced into Louisiana for testing. It is of little importance on commercial varieties (Tims). Cook reported it as unimportant in Puerto Rico. MOTTLED STRIPE (Phytophthora rubrisubalbicans) was said to be unimportant in Louisiana and Puerto Rico.

OTHER DISEASES include EYESPOT (Helminthosporium sacchari), Mississippi, Puerto Rico. BROWN STRIPE (Helminthosporium stenospilum) confined almost entirely to scattered plantings of D 74 and Purple in Louisiana; unimportant in Puerto Rico. Numerous diseases were reported from Puerto Rico, of which the most important were GUMMOSIS (Bacterium vascularum), a severe outbreak on Vieques Island and small outbreaks on the mainland; SEEDLING DISEASE (Rhizoctonia grisea) occasionally severe on seedlings and ratoon plants; ROT OF SEED CUTTINGS (Thielaviopsis paradoxa) severe in cold, wet soil; SHEATH BINDING (Marasmius sacchari) undoubtedly a parasite under favorable conditions.

D I S E A S E S O F T R E E S

EPIDEMIC TREE DISEASES

The following summary is furnished by R. Kent Beattie and G. F. Gravatt of the Division of Forest Pathology.

DUTCH ELM DISEASE (Graphium ulmi). No new cases of this disease were found in America during 1932. Intensive search was made in 1932 around the two spot infections at Cleveland and Cincinnati, which had been eradicated in 1930, and very limited scouting was carried on in Ohio and adjoining States by O. N. Liming. All specimens suspected of having this disease were cultured and studied at the Dutch Elm Disease Laboratory at Wooster, Ohio, which is being conducted jointly by the Ohio Agricultural Experiment Station and the Division of Forest Pathology of the Bureau of Plant Industry under the direction of Curtis May. An extensive survey of the elm States is needed before we can be sure the country has been freed of this disease.

The study of specimens suspected of having the Dutch elm disease has shown that the wilt disease due to Verticillium is widely distributed.

The wilt disease of elms described by Curtis May as due to Cephalosporium sp. is also found widely distributed over the Lake States and eastern States, and a few cases in the middle western States. This seems to be a rather serious disease, as most of the trees found infected in 1931 were progressively worse in 1932.

EUROPEAN LARCH CANKER (Dasyscypha willkommii). No new infections of this disease were found during 1932 and the two original spot infections have been eradicated. Much inspection work remains to be done before there is definite assurance of the successful eradication of this disease. G. G. Hahn, of the New Haven, Connecticut, Office of the Division of Forest Pathology, is doing the laboratory work on this disease and M. A. McKenzie the survey work.

WILLOW SCAB (Fusicladium saliciperdum and Physalospora miyabeana). These imported diseases, which occur in the eastern Canadian Provinces and New England, were noted in various places in the New England States in 1932. The Fusicladium occurs as far west as Ithaca, New York, and probably careful scouting would show it to be very widely distributed. In some areas it has caused the death of a large part of the willows. This death of the willows in parts of the United States may result in increased stream erosion since willows have a valuable place in holding stream banks.

WOODGATE RUST (Peridermium sp.). This disease, which is destructive to the Scotch pine, (Pinus sylvestris), is now widely distributed in the Adirondack Mountains in New York State and has been reported from Nova Scotia, Quebec, and Ontario. Dr. H. H. York is still in doubt as to the identity of the fungus causing this trouble. A number of species of pine have been found by inoculation to be susceptible to this gall rust. There is some danger that it may cause very extensive losses, if it were to obtain a foothold in the southern States.

BEECH DISEASE (Nectria sp.). This disease is caused by an undetermined species of Nectria. According to the researches of Mr. Ehrlich, of Harvard University, the Nectria fungus obtains entrance into bark through injuries caused by the Cryptococcus insect, a European pest which first came to attention on this continent at Halifax, Nova Scotia, in 1914. The insect and fungus are widely distributed over Nova Scotia and New Brunswick, and in Nova Scotia over 40 per cent of the stand of beech already has been killed. The insect has been found in Massachusetts, New Hampshire, and Maine in this country. The fungus has been found in Maine only. T. T. Ayers, of the New Haven Office, is doing laboratory work on this disease.

PINE CANKER (Atropellis pinicola). This disease of Scotch and Corsican pine (Pinus sylvestris and P. nigra poiretiana) was found to be causing severe losses in forest plantings in one place in Ohio by May and Liming. The trouble has also been reported in plantings from Delaware, Pennsylvania, and New Hampshire, and on native pitch pine (P. rigida) in Ohio and near Greenwood Furnace, Pennsylvania. The causal organism appears identical with Atropellis pinicola, which Zeller and Goodding have described as causing a canker of various pine trees on the Pacific Coast.

CHESTNUT BLIGHT (Endothia parasitica). This disease continued to spread over the southern Appalachians during 1932. Infections were noted in northern Alabama and Mississippi by Clapper. The disease is prevalent in the western half of Tennessee and a large part of the stand has been killed in eastern Tennessee. On the Pacific Coast no new infections were found around the spot at Gunther, Oregon, where the disease was eradicated in 1929. Hotson reports five trees of American chestnut infected with the blight at Seattle, Washington, and he is eradicating this infection. Chestnut is being planted in increasing quantity on the Pacific Coast, and the inspection of nursery trees and plantings needs to be intensified if the blight is to be kept from becoming established.

NECTRIA CANKERS IN THE SOUTHERN APPALACHIANS

G. F. Gravatt contributes the following statement:

During 1932 Nectria cankers on forest trees were brought to the attention of pathologists by the report by Faull and Ehrlich of a Nectria disease on beech in the Maritime Provinces of Canada and Maine and by reports from forest pathologists and foresters of increasing damage from Nectria cankers on maple, birch, and black walnut. The beech Nectria is considered elsewhere in this report (see above). At the December 1932 meetings of the Phytopathological Society, D. S. Welch reported Nectria on Acer rubrum, A. spicatum, Fraxinus nigra, Populus grandidentata, Prunus serotina, Rhus typhina, and Tilia americana in New York State. In view of the increasing economic importance of these Nectrias, it seems advisable to record some collections made in 1932 and in previous years.

The earliest specimen of a Nectria canker on black walnut (Juglans nigra) in the collections of the Division of Forest Pathology was collected

by Dr. Arthur H. Graves near Balsam, North Carolina, in 1910. In 1924, F. E. Brooks reported the disease as very serious on black walnut near French Creek, West Virginia, and Gravatt and Baxter, in the course of their chestnut-blight inspection work, examined this infection. This *Nectria* canker was found to be prevalent on young walnut trees over an area of 40 to 50 acres. Most of the trees seemed to be more or less seriously damaged, and insects and decay were entering the open wounds. Fruiting bodies of the *Nectria* were present on many of the cankers but there were also a large number of cankers which showed no fruiting bodies. In the course of the chestnut-blight inspection in 1924 Gravatt noted and collected the disease at different points in West Virginia, Virginia, North Carolina, Georgia, and Tennessee.

The most severe infection of the black walnuts other than that at French Creek, West Virginia, was found on the National Forest near Sarah, Georgia. The disease had evidently been there for many years. There were indications that where the black walnuts were making vigorous growth on rich land the canker showed a greater tendency to heal over.

Sassafras (*Sassafras variifolium*) is severely affected by a canker disease very similar to the canker of black walnut, and *Nectria* pustules have been found on some of these cankers. The cankers on sassafras are more irregular than those on black walnut. Frequently the sassafras and black walnut cankers occur in the same vicinity.

Tulip poplar (*Liriodendron tulipifera*) is also affected by the *Nectria* canker in West Virginia and Georgia. Several collections were made in 1924 in the immediate vicinity of the heavily infected black walnut planting. A marked characteristic of the cankers on tulip poplar was the abundance of fruiting bodies. Recently Bedwell and Hartley found a *Nectria* canker on this host near Asheville, North Carolina.

At Sarah, Georgia, in the immediate vicinity of the cankers on black walnuts, some spreading cat-face cankers were also found on several species of oaks and on the sour gum (*Nyssa sylvatica*). However, no fruiting bodies of *Nectria* were found. The trouble on these hosts was not sufficiently frequent to be of material economic importance. Cankers collected by Gravatt and Baxter on sumach and sourwood (*Oxydendron arboreum*) in the immediate vicinity of the heavy infection of *Nectria* on walnuts at French Creek, West Virginia, are suspected of being caused by the same fungus.

Nectria fruiting bodies have also been observed on one tree each of magnolia and beech in the District of Columbia.

The above data are from observation only, as no cultural or experimental work has been conducted with the cankers on sassafras, black walnut, and tulip poplar. Orton and Ashcroft, who have found the *Nectria* canker of walnut prevalent in most parts of West Virginia, have demonstrated by inoculation that this canker is caused by *Nectria* sp.

These *Nectria* cankers are undoubtedly of very great practical importance on the black walnut. They are so infrequent on tulip poplar as not to be considered a menace to this species at the present time.

The sassafras tree is undoubtedly being very seriously injured by this canker trouble, but sassafras is of no importance from the forestry standpoint.

DISTRIBUTION OF WHITE PINE BLISTER RUST IN 1932

The following statement on the distribution of the white pine blister rust (Cronartium ribicola) and the map (fig. 27) were furnished by Roy G. Pierce of the Division of Blister Rust Control:

The northeastern section of the country is generally infested with blister rust. However, the rust situation in this region is being rapidly brought under control by the general and systematic eradication of Ribes on valuable pine areas. These control measures have been applied to about 9,000,000 acres. This figure includes both the acreage of white pine and of the protective zones.

In the Appalachian region the rust was again found on Ribes near Frostburg, Maryland. It was also located on Ribes for the first time near Luray in Page County, Virginia. This marks the advance edges of the southward spread of the disease.

In the Lake States region there was considerable spread of the rust. In Michigan the counties of Antrim, Benzie, Leelanaw, Mason, and Mainstee in the Lower Peninsula, and Houghton and Ontonagan in the Upper Peninsula, were found infected for the first time. In Wisconsin the newly infected counties are Portage, Vernon, and Wood where the rust was found on white pines and Ribes, and Ashland, Brown, Door, Grant, Kewaunee, La Crosse, Lincoln and Marinette where it was found only on Ribes.

In the West the disease is rapidly intensifying in the western white pine region. Fifteen new pine infection centers were located in Idaho: four on the Clearwater National Forest, five on the Coeur d'Alene National Forest, two on the Clearwater Timber Protective Association, three on the Middle Fork of the St. Maries River, and one on the Upper Ruby Creek near Niva Springs. While many of the new centers consist of one or two diseased trees, some of them cover several square chains in area.

A study has been made of the blister rust in Mt. Rainier National Park in Washington. On Fish Creek, where it is estimated that many trees have 1,000 cankers each, the infection covers approximately 1,000 acres, while on the Muddy Fork of the Cowlitz, infection is generally distributed over an area of 1,700 acres.

In Oregon a new pine infection center was found at Government Camp above Rhododendron in Clackamas County, on Pinus monticola and P. albicaulis. The southernmost pine infection in the State is located near Minto Creek on the Santiam River in Linn County. The infected pines are Pinus monticola. Blister rust was found for the first time in Coos County, a fairly heavy concentration of the rust being located on Ribes 7 miles north of Marshfield. Scouting in Curry County, which lies between Coos County and California, failed to reveal the rust at the two

original locations where it was found in 1929. Though considerable scouting was carried on in California during the year, particularly in the northern section of the State, no blister rust was found.

DROUGHT INJURY AND SUN SCORCH

Clinton reported sun scorch in Connecticut on the following: Picea sp., Prunus sp., Ulmus americana, Acer platanoides, Acer saccharum, Aesculus hippocastanum, Cornus florida, and drought injury on Tsuga canadensis, Ulmus americana, and Thuja occidentalis.

C Y P R E S S (CUPRESSUS SP.)

BLIGHT (Macrophoma cupressi) was reported from Florida with the comment, "More specimens than usual were sent in for identification with reports of injury."

J U N I P E R (JUNIPERUS SPP.)

RUST (Gymnosporangium spp.). For notes on the cedar rusts see page 34.

BLIGHT (Phomopsis juniperovora) is said to be destructive in seedling beds of juniper in Kansas though somewhat less prevalent than usual. Winter injury, probably as a result of a March cold spell was much more prevalent than usual. New York and New Jersey both reported blight of J. virginiana present though rather scattered. In Williamstown, Massachusetts, severe dying out of densely planted beds of prostrate junipers was caused by this disease. The species affected with Phomopsis twig blight in Massachusetts were J. sabina tamariscifolia, J. japonica (J. chinensis procumbens), and J. horizontalis.

S P R U C E (PICEA SPP.)

CANKER (Cytospora sp.?) of blue spruce (Picea pungens glauca). May wrote that in Ohio "Many single trees and hedges in the northern part of the State continue to die of this disease." In Massachusetts, according to Boyd, "The disease is scattered over the State. Marked damage occurred this year due no doubt to copious infections that took place during the wet spring of 1931."

P I N E (PINUS SPP.)

BLISTER RUST (Cronartium ribicola). See page 64.

LEAF SPOT (Septoria acicola) was reported from Mississippi and Ohio. In the latter State it was "Very severe in one nursery on Scotch pine (P. sylvestris) this year."

CANKER (Dasyscypha fusco-sanguinea) of white pine (P. strobus) was reported from Michigan as follows: "Occurs in several small areas in the Keeweenaw Peninsula from Mohawk to Fort Wilkins, some just south of Calumet. It appears to be an aggressive parasite especially on shaded, understory-trees."

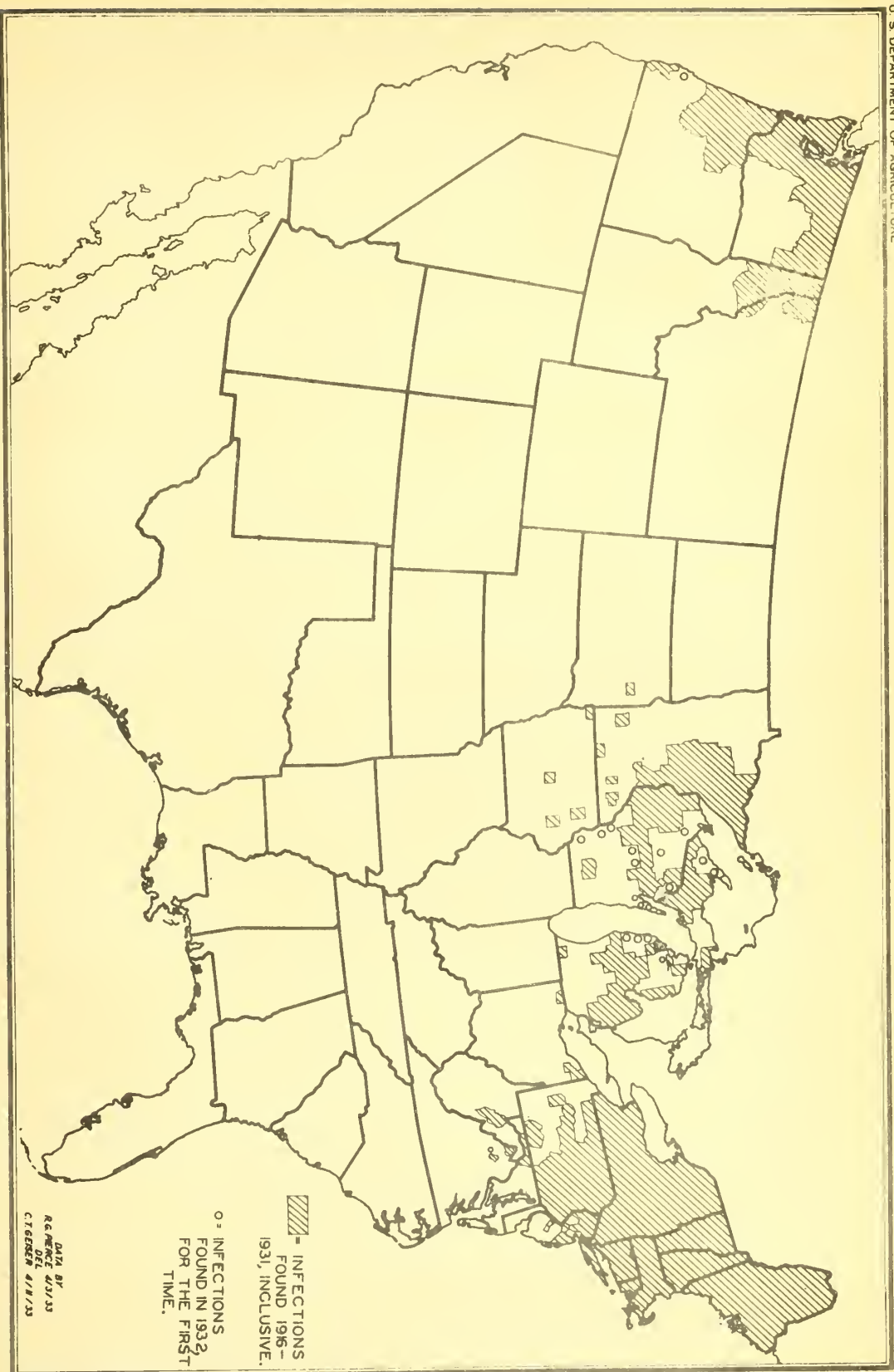


Fig. 27. Distribution of white pine blister rust (Cronartium ribicola) in the United States in 1932.

CANKER (*Diplodia megalospora*) on Scotch pine (*Pinus sylvestris*). Boyd reported "Some of the Scotch pines on the campus of the Massachusetts State College at Amherst show marked dying of the twigs and limbs this year. Cankers occur on both the 1931 and 1932 wood. Both 1932 and 1931 cankers show an abundance of pycnidia." (The fungus on the cankers appears to be *Diplodia megalospora* B. & C. N.E.S.)

M A P L E (ACER SPP.)

VERTICILLIUM WILT (*Verticillium* sp.) was reported by Gravatt and Clapper (P. D. R. 16: 96-98) in June as being unusually prevalent in Rhode Island, New Jersey, and Virginia.

R. P. White summarized his observations in New Jersey during the past year as follows:

"The third disease which has appeared in severe form is the group of *Verticillium* wilt diseases, particularly on maple. I conservatively estimate over 100 trees having been lost in 1932. In one town 32 trees were showing definite symptoms in midsummer. This same organism, which I take to be *Verticillium dahliae* Kleb., due to the production of micro-sclerotia, has also been isolated from the following hosts in 1932: *Berberis thunbergii*, *Dahlia variabilis*, *Chrysanthemum* sp., *Antirrhinum* sp., and *Lathyrus odoratus*, the latter being a rather unusual occurrence."

Guba noted that a planting in eastern Massachusetts known to be infected at least six years was completely killed in 1932. Strong reported that Norway maple (*A. platanoides*) appears to be the most susceptible in Michigan, and estimated that less than 2 per cent of Norway and 1 per cent of other species of maple are infected.

WINTER KILLING. Vaughan reported winter injury as much more common than usual in Wisconsin: "More than 50 trees were killed in Milwaukee County by low March temperatures following a winter so warm that cut trees would bleed all winter."

H O R S E C H E S T N U T (AESCULUS HIPPOCASTANUM)

LEAF BLOTCH (*Guignardia aesculi*). This disease, which was very important in Massachusetts and New York in 1931 causing 50 per cent defoliation in some places, was very much less important in these States during 1932. Davis and Boyd noted that trees partly defoliated in (recent) previous years in Massachusetts hardly showed the disease this year.

T U N G O I L (ALEURITES FORDI)

A ROOT ROT apparently caused by certain fungi following injury was reported as becoming increasingly prevalent in Mississippi.

TUNG OIL DISEASES IN FLORIDA: According to R. J. Haskell and Erdman West, specimens and records in the herbarium of the Department of Plant Pathology, Agricultural Experiment Station, Gainesville, Florida, show the occurrence of the following diseases on tung oil in Florida:

MUSHROOM ROOT ROT, Clitocybe tabescens, the most serious disease; THREAD BLIGHT, Corticium stevensii; LEAF SPOT, Phyllosticta sp., the most common leaf spot; and Cercospora sp.; Colletotrichum sp. on twigs and fruit; Bacterium sp.; ROOT KNOT, Caconema radiclecola; and BRONZING due to soil conditions.

H A W T H O R N (CRATAEGUS SPP.)

BLIGHT (Bacillus amylovorus) is reported as more common than usual on this host in Connecticut and as generally distributed in New Jersey. (See page 68).

P L A N E T R E E (PLATANUS SP.)

ANTHRACNOSE (Gnomonia veneta or other fungi) reported from Connecticut, New Jersey, Kansas, and Michigan as less prevalent than usual but from Delaware as much more.

P O P L A R A N D C O T T O N W O O D (POPULUS SPP.)

ROOT ROT (Phymatotrichum omnivorum) was found on cottonwood in California, near Jacumba, in San Diego County (see P. D. R. 17: p. 17).

CANKER (Dothichiza populea). The report from Massachusetts indicated that this disease was much more prevalent than usual in that State, Davis and Boyd's comment being "Worst year known. P. alba var. bolleana is highly susceptible. On most of the trees one-third of the twigs are killed." It was also reported from Connecticut, New Jersey, Delaware, Mississippi, and Wisconsin.

CANKER (Cytospora chrysosperma) was reported from New Jersey and Massachusetts.

O A K (QUERCUS SPP.)

Twig BLIGHT. Boyd reported a heavy infection of twig blight on roadside trees of Quercus rubra in Norfolk County, Massachusetts, and lighter infections on Q. rubra, Q. nigra, and Q. prinus at Amherst. (The fungus apparently causing this canker is the Sphaeropsis quercina of Cke. & Ell. though there are undoubtedly older names for this fungus. A synonymy will be published at a later date. N. E. S.).

ANTHRACNOSE (Gnomonia veneta) was reported as less severe than usual in New Jersey, Michigan, and Wisconsin.

DROUGHT INJURY to oaks is reported from Connecticut. In Wisconsin it was said to be important in association with Armillaria root rot and winter injury.

D I S E A S E S O F O R N A M E N T A L S

NOTEWORTHY DISEASES OF ORNAMENTALS IN NEW JERSEY

The following statement was contributed by R. P. White:

Three diseases have been outstanding in 1932 on ornamentals. The organism Sclerotium delphinii Welch seemed to take everything within reach in annual and perennial gardens during August, when it reached its peak of destructiveness. We have reported this year the following hosts: Aconitum napellus, Ageratum, Campanula medium, Eupatorium, Iris germanica, Delphinium and Phlox. Some of our correspondents, however, who forwarded specimens of a single species which was attacked, would state that their annuals and perennials in general were all "going the same way."

Fire blight (Bacillus amylovorus) has also been severe in New Jersey on various ornamental hosts which usually escape. For example, we have reported this year various species of Cotoneaster, Sorbus americana, Malus floribunda, Pyracantha coccinea, Crataegus oxyacantha, Mespilus germanica, and Stranvaesia davidiana, the latter being a new host, I believe.

The third disease which has appeared in severe form is the group of Verticillium wilt diseases. (This is quoted under maple; see page 66).

HOSTS OF CURLY TOP AND YELLOWS IN CALIFORNIA

Lists of ornamental plants naturally and experimentally infected with the virus diseases, curly top and yellows, compiled by Henry H. P. Severin and Julius Freitag, have been published in the Reporter (17:1-5. Jan. 15, 1933).

A S T E R (CALLISTEPHUS CHINENSIS)

RUST (Coleosporium solidaginis) was generally not very important. In Massachusetts it caused severe defoliation in some cases late in the season in the Connecticut Valley. In Michigan it occurred in abundance on plants grown in cloth houses. Other States reporting its occurrence were California, Wisconsin, Minnesota, and New Jersey.

WILT (Fusarium conglutinans var. callistephi). With the exception of Colorado, which noted much more, this disease was about normal in prevalence and severity. In Michigan late summer and fall rains decreased the amount of wilt below that in 1931. It was observed also in Ohio, New Jersey, Mississippi, Wisconsin, North Dakota, Washington, California, and Minnesota.

STEM CANCER (Phomopsis callistephi). Wisconsin.

YELLOWS (Virus) generally seemed to be as prevalent and destructive as usual. Massachusetts noted 30 per cent loss. Cloth houses to prevent infection are used with success by some growers in Michigan and in Wisconsin.

several new commercial cloth covered gardens have been established. Besides the States mentioned, yellows was reported from Connecticut, New Jersey, Pennsylvania, Delaware, Ohio, Minnesota, and California. The disease in California has been shown to be due to a different virus from that causing the eastern yellows.

A Z A L E A

FLOWER SPOT (undet.). The 1932 status of this disease is reported by Freeman Weiss of the Division of Horticultural Crops and Diseases as follows:

This exceedingly destructive flower spot, apparently of fungous origin, appeared again in the famous gardens of the Charleston, South Carolina, district. The flowers of evergreen azaleas (Azalea indica Hort.) become spotted and blighted very generally in affected plantings and wither or drop off prematurely. The foliage and stems are not affected.

ROSE BLOOM (Exobasidium azaleae) was reported from Washington. GALL (E. oxycocci) on A. hinodegiri in New Jersey; on A. indica in New Jersey, also reported as severe in one house on Long Island on Mme. Petrick variety of this species.

LEAF SPOT (Cercospora sp.), Mississippi. LEAF SCORCH (Septoria azaleae), New Jersey. POWDERY MILDEW (Microsphaera alni), New Jersey. DODDER (Cuscuta gronovii), New Jersey. CHLOROSIS (undet.) was reported from New Jersey. It can be corrected by spraying with 1/2 per cent ferrous sulfate. BURNING due to excess fertilizing with manure was reported from Washington.

B A R B E R R Y (BERBERIS SPP.)

FRUIT BLIGHT (Phoma berberina Sacc.) occurred generally in Japanese barberry (Berberis thunbergii) plantings in Massachusetts. The organism forms cankers on the stem and turns the fruits black. The maximum infection observed was 40 per cent, and the average for the State 20 per cent. This is the first record of this disease in Massachusetts.

B O X (BUXUS SEMPERVIRENS)

CANKER (Volutella buxi) caused injury in Connecticut, New Jersey (on B. sempervirens suffruticosa), the District of Columbia, and Georgia. This is the first record of its occurrence in Connecticut. Freeman Weiss of the Division of Horticultural Crops and Diseases reported a destructive occurrence on the Bliss Estate, Washington, D. C., where box plantings valued at several hundred thousand dollars are threatened.

C A L L A L I L L Y (ZANTHEDESCHIA SPP.)

ROOT ROT (Phytophthora richardiae). Numerous specimens and reports of heavy damage have been received from greenhouse men in New York, New Jersey, Pennsylvania, Ohio, and Illinois. (Freeman Weiss). In one planting of Z. aethiopica near Santa Cruz, California, there was

10 per cent infection of the bulbs. A near-by planting of about two acres in low, poorly drained soil was entirely destroyed (L. M. Massey). The disease is becoming serious in New Jersey.

SOFT ROT (Bacillus aroideae) was serious in a planting of yellow callas, Z. elliotiana, near Santa Cruz, California.

CANTERBURY BELLS (CAMPANULA MEDIUM)

STEM ROT (Sclerotium delphinii). In New Jersey a severe infestation occurred in one locality, killing 200 plants.

CARNATION (DIANTHUS CARYOPHYLLUS)

LEAF SPOT (Alternaria dianthi) was very destructive on susceptible varieties in Massachusetts. It is a limiting factor in the production of light colored varieties grown under lath near Los Angeles, California. Other States noting its presence are Michigan, New York, New Jersey, and Connecticut.

RUST (Uromyces caryophyllinus) was reported from Connecticut, New Jersey, and Wisconsin. For list of susceptible varieties for Massachusetts see P. D. R. 16: 184.

BACTERIAL SPOT (Bacterium woodsii) was reported for the first time from Massachusetts where it was observed in several greenhouses. (Davis and Boyd).

ROOT ROT, WILT (Fusarium sp.) was reported by Guba as very destructive in certain ranges in eastern Massachusetts and was also reported from Connecticut, New Jersey, and Colorado. In Colorado it is an important disease, but in 1932 there was much less than usual.

CHRYSANTHEMUM

LEAF SPOT (Septoria chrysanthemella) was reported by Guba as common in greenhouses in eastern Massachusetts, especially where growth is dense and too frequent watering is practiced. It was also reported in New Jersey. S. chrysanthemi occurred in Connecticut and Texas.

POWDERY MILDEW (Erysiphe cichoracearum) was more prevalent than usual in Delaware. It was also noted in New Jersey and Connecticut.

RAY BLIGHT. Ascochyta chrysanthemi was said to be more prevalent than usual in Mississippi. Cladosporium sp. occurred in a damp house in Lowell, Massachusetts, according to Guba.

RUST (Puccinia chrysanthemi) was reported from California.

ROOT ROT (Phymatotrichum omnivorum) was reported from Arizona and Texas.

MOSAIC (Virus). About 10 per cent infection occurred in November in plantings under cloth in San Mateo County, California. (L. M. Massey).

DWARF ORANGE (CITRUS TAITENSIS)

ANTHRACNOSE (Colletotrichum gloeosporioides). This is the dwarf orange commonly grown by florists for pot plants. A rather severe outbreak in one field occurred in New Jersey. The fungus was forwarded to Dr. H. S. Fawcett who verified our diagnosis. This particular grower has not imported any stock from California for many years and has not been troubled with the disease for several years. He states, however, that while he was importing stock from the West, he had observed the same trouble. (R. P. White).

COTONEASTER

BLIGHT (Bacillus amylovorus) was reported in 1932 from a number of eastern States, including Pennsylvania, New Jersey, Mississippi, Texas, and Arkansas, and a report from Illinois stated that it had been found there in 1931. Previously it had not been reported east of the Rocky Mountains. Species affected were C. pinnosa in Arkansas and California, C. racemiflora in Illinois, and C. salicifolia and C. horizontalis in Pennsylvania. P. D. R. 16: 129, 143.

CREPE MYRTLE (LAGERSTROMIA SP.)

POWDERY MILDEW (Oidium sp.) was more prevalent than usual in Florida and Mississippi. It was also noted in Texas and Virginia.

DELPHINIUM

POWDERY MILDEW (Erysiphe polygoni). Mature perithecia with differentiated spores were observed in California. The disease occurred also in Connecticut, Delaware, and Minnesota.

CROWN ROT. Sclerotium delphinii was reported from Connecticut and New Jersey. Sclerotinia sp. was destructive in Michigan during wet periods in May.

FIRETHORN (PYRACANTHA SPP.)

BLIGHT (Bacillus amylovorus) was reported from California on P. angustifolia, P. crenulata, and P. formosiana; from New Jersey on P. coccinea and P. gibbsii yunnanensis; and from Delaware.

SCAB (Fusicladium sp.) was reported from California on P. formosiana.

FLOWERING QUINCE (CYDONIA JAPONICA)

BLIGHT (Bacillus amylovorus) was reported from New Jersey and California.

GLADIOLUS

SCAB (Bacterium marginatum) with the exception of Michigan, which reported much more (7 per cent loss and some fields 100 per cent infected),

this disease was about normal in occurrence and severity. It was reported for the first time from Connecticut. Other States noting its occurrence were Massachusetts, Minnesota, Kansas, New Jersey, Ohio, and California.

H O L L Y H O C K (ALTHAEA ROSEA)

RUST (Puccinia malvacearum) was much more prevalent than usual in Connecticut, Minnesota, Michigan, and Massachusetts. Nelson reported it as "Widespread and extremely destructive in Michigan this year." Massachusetts noted 30 per cent loss. Wisconsin recorded good control with sulfur dust and sanitation.

LEAF-SPOT. Cercospora althaeina occurred in Connecticut and Michigan. In the latter State it is said to be the most common leaf spot of hollyhock. Colletotrichum sp. and Phyllosticta althaeina were reported from New Jersey. Septoria fairmani was observed in numerous plantings in Michigan.

I R I S

LEAF SPOT (Didymellina iridis). In Massachusetts this disease was very prevalent and destructive after July 15. It was severe locally near Berkeley, California. It was also very common and destructive in Michigan. Other States noting its presence were Connecticut, Mississippi, Wisconsin, and Pennsylvania.

SOFT ROT (Bacillus carotovorus) was more severe than usual in Massachusetts and Minnesota. The weather was probably too dry for its development in California, Wisconsin, and Mississippi.

CROWN ROT (Sclerotium rolfsii) occurred on bulbous iris in southern Oregon. (F. Weiss).

BLIGHT (Alternaria and Mystrosporium) was exceptionally destructive to the bulbous iris, Yellow Queen, in southwestern Oregon. (F. Weiss).

MOSAIC (virus) was found in one planting of German iris in Berkeley, California, where it was apparently doing little damage. (L. M. Massey).

L I L Y (LILIUM SPP.)

BLIGHT (Botrytis elliptica) caused very serious damage in many plantings in Michigan. However, it was controlled where Bordeaux plus soap was used properly. It was second in importance to mosaic in Wisconsin. It was reported from New Jersey and Washington.

BULB AND STEM ROT (Phytophthora sp.) was reported from New Jersey. In Michigan Phytophthora is associated with a neck canker of L. regale, causing breaking over of the stem just below the flower buds.

BASAL ROT (undet.) is a serious trouble of Lilium candidum on poorly drained soil in Michigan.

MOSAIC (virus) was reported from Florida, Mississippi, Wisconsin, and California.

N A R C I S S U S

BULB NEMATODE (Tylenchus dipsaci) was reported on narcissus from New York, New Jersey, Maryland, Virginia, Tennessee, North Carolina, South Carolina, Georgia, Florida, Ohio, Michigan, Wisconsin, Missouri, Washington, Oregon, and California. It was found in many new sites in Virginia and North Carolina according to Weiss. Similar symptoms are caused by Aphelenchus and other nematodes.

ROOT ROT (Sclerotium rolfsii), California. BASAL ROT (Fusarium sp.), New Jersey, Mississippi, Wisconsin, California. MOSAIC (virus), California.

N A S T U R T I U M (TROPAEOLUM MAJUS)

BACTERIAL LEAF SPOT (Bacterium aptatum). Maine, Pennsylvania. P. D. R. 16: 125, 169.

P E O N Y (PAEONIA SP.)

BLIGHT (Botrytis paeoniae) was widely reported. Botrytis and Phytophthora caused damage in Minnesota.

ROOT KNOT (Caconema radiculicola). According to Nelson, root knot is increasing yearly in commercial plantings in Michigan. Much early fall infection was noted in 1932. Vaughan reported that there is need for research work on this problem in Wisconsin. Root knot was also reported from New Jersey.

STEM ROT (Sclerotinia sclerotiorum) was reported from New Jersey.

LEAF SPOT. Cladosporium paeoniae caused serious spotting in some varieties and also affected the stems severely in some cases in Michigan. It was also reported from New Jersey and Wisconsin. Septoria paeoniae was reported from Washington.

MILDEW (Microsphaera alni), New Jersey. DODDER (Cuscuta gronovii), New Jersey. CHLOROSIS (undet.) was reported from New Jersey. It can be corrected by spraying with 1/2 per cent ferrous sulfate. BURNING due to excess fertilizing with manure was reported from Washington.

P H L O X

NEMATODES. Aphelenchoides fragariae was found on Phlox decussata in the District of Columbia, and Tylenchus dipsaci on the same species at Baltimore, Maryland. P. D. R. 16: 137.

STEM ROT (Sclerotium delphinii) was reported from New Jersey. P. D. R. 16: 148.

R H O D O D E N D R O N

CANKER AND DIEBACK (Phytophthora cactorum) was severe in one block of hybrids on Long Island, New York, and was also reported from New Jersey. WILT (Phytophthora cinnamomi). A very severe case was noted on two year old hybrid plants on Long Island. It was reported from New Jersey on R. ponticum. (R. P. White).

CANKER (Phomopsis sp.) was reported from New Jersey and Pennsylvania. (R. P. White).

BASAL CANKER (Rhizoctonia solani). Plants of R. carolinianum shipped from Tennessee showed individual branches dead and dying. Isolations from the wood gave Rhizoctonia in pure culture. (R. P. White).

BUD BLAST (Sporocybe azaleae) on R. maximum in Pennsylvania. (R. P. White).

LEAF SPOT. Cercospora rhododendri, on R. ponticum in New Jersey; also on Long Island, New York. Pestalozzia macrotricha, New Jersey. Phyllosticta maxima, on R. maximum in Connecticut; also in New Jersey. Phyllosticta saccardoi, New Jersey.

LEAF SPOT (Exobasidium vaccinii), New Jersey. GALL (E. oxycocci), Pennsylvania. RUST (Pucciniastrum minimum) on R. ponticum in New Jersey.

R O S E (ROSA SPP.)

BLACK SPOT (Diplocarpon rosae) was widespread. It caused severe defoliation in some places in California while none was found in other sections. Abundant late summer and fall rains provided conditions for a general outbreak in Michigan. In Louisiana this disease occurs the entire year.

BACTERIAL LEAF SPOT (Bacterium sp.) occurred on greenhouse roses in New Jersey. The pathogenicity of the organism has been proved. It was also reported to me from New York on Talisman and Souvenir. (R. P. White).

RUST (Phragmidium sp.). In Michigan wild roses were heavily infected in many cases, and many specimens were received on both hybrid tea and perpetual varieties. (R. Nelson). Also reported from Wisconsin and on wild roses from Kansas. P. disciflorum was severe in all plantings in the vicinity of San Diego, California. (L. M. Massey). P. rosae-californicae was reported from Washington.

ANTHRACNOSE. From three varieties of climbers outdoors and also from greenhouse roses, what appears to be Halsted's Cloeosporium rosae has come to light again in New Jersey. (R. P. White). Heavy infection of Sphaceloma rosae occurred on the variety Silver Moon at San Diego, California. (L. M. Massey).

POWDERY MILDEW (Sphaerotheca pannosa) was generally present. Nelson stated that in Michigan it was the most frequently reported disease

of all plants in 1932. According to Massey it was severe in all plantings in California where, along with rust, it is said by growers to be the worst disease of rose.

CANKERS. Coniothyrium fuckelii was reported from New York, New Jersey, and California. CROWN CANKER (Cylindrosporium scoparium). In association with another organism, plants have been killed in large numbers, particularly on own rooted stock, in New Jersey. (R. P. White). BROWN CANKER (Diaporthe umbrina), New Jersey, California. DIE-BACK and STEM GIRDLE (undet.), again observed this year, as last, on the climber Albertine in Arkansas. (H. R. Rosen).

MOSAIC, INFECTIOUS CHLOROSIS (virus). New Jersey, California.

S N A P D R A G O N (ANTIRRHINUM MAJUS)

RUST (Puccinia antirrhini) generally caused about the usual amount of damage. A severe outbreak occurred in Texas. Connecticut and Louisiana noted more than usual, while California, Colorado, Kansas, Minnesota, Wisconsin, Mississippi, New Jersey, and Massachusetts reported about normal amounts. Michigan observed less than usual due to night temperatures being too high for summer infection. P. D. R. 16: 125.

T U L I P (TULIPA SPP.)

BLIGHT (Botrytis tulipae) is very destructive in old plantings but is seldom important in new beds in Michigan and Wisconsin. It was also reported from New Jersey, Mississippi, Ohio, and Washington.

BULB ROT. Penicillium ochraceum was reported from New Jersey. Rhizoctonia tuliparum occurred in Connecticut.

Z I N N I A (ZINNIA ELEGANS)

STEM ROT. Sclerotinia sclerotiorum was reported from Washington and Oregon. P. D. R. 16: 168. Rhizoctonia solani occurred in New Jersey.

LEAF SPOT (Cercospora zinniae and C. atricincta) occurred in Florida.

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Prepared by Nellie W. Nance

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 willkommii, larch, 61.
Diaporthe umbrina, *Rosa* spp., 75.
Didymellina iridis, *Iris*, 72.
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Diplocarpon earliana, strawberry, 39.

Diplocarpon rosae, *Rosa* spp., 74.
Endothia macrospora, corn, 28.
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Pecthichiza populea, *Populus* spp., 67.
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 Drought injury, 21.
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 Quercus spp., 67.
 Thuja occidentalis, 65.
 Tsuga canadensis, 65.
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E

Ear rot, corn, 28.
Endothia parasitica, chestnut, 62.
Erysiphe cichoracearum, *chrysanthemum*,
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 bean, 46.
 clover, 31.
 Delphinium, 71.
Eranthema, pear, 35.
Excascus deformans, peach, 35.
Exobasidium azaleae, *Azalea*, 69.
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 Flower spot (undet.), *Azalea indica*,
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Fusarium sp., Austrian winter pea, 33.
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 Dianthus caryophyllus, 70.
 Narcissus, 73.
 onion, 47.
 potato, 43.
 sweet potato, 48.
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Fusarium sp. (yellows), celery, 51.
 batatatis, sweet potato, 48.
 conglutinans, cabbage, 49.
 callistephi, *Callistephus*
 chinensis, 68.
 cubense, banana, 41.
 hyperoxysporum, sweet potato, 48.
 lini, flax, 30.
 lycopersici, tomato, 44.
 martii phaseoli, bean, 46.
 pisi, pea, 53.
 moniliforme, corn, 21, 28.
 pea, 53.
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 niveum, watermelon, 50.
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 vasinfectum tracheiphilum,
 cowpea, 33.
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Fusicladium sp., *Pyracantha formosiana*,
 71.
 saliciperdum, willow, 61.

G

Gibberella saubinetii, barley, 26.
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Gloeosporium sp., Austrian winter pea,
 33.
 caulivorum, clover, 32.
 rosae, *Rosa* spp., 74.
Glomerella cingulata, apple, 34.
 vaccinii, cranberry, 40.
Gnomonia veneta, *Platanus* sp., 67.
 Quercus spp., 67.
Graphium ulmi, elm, 61.
Guignardia aesculi, *Aesculus hippo-*
 castanum, 66.
 bidwellii, grape, 39.
Gymnosporangium spp., apple, 34.
 Juniperus spp., 65.
 germinale, apple, 34.
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H

Heat canker, flax, 30.
Helminthosporium sp., corn, 21.
 wheat, 25.
 gramineum, barley, 26.

Helminthosporium oryzae, rice, 30.
sacchari, sugar cane, 60.
sativum, barley, 26.
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Hopperburn, bean, 46.
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I

Isariopsis griseola, bean, 45.

L

Leaf roll, potato, 43.
 Leaf sheath spot, rice, 30.
 Leaf spot, clover, 32.
Leptosphaeria coniothyrium, dewberry,
 40.
 Little leaf, pear, 35.
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M

Macrophoma cupressi, *Cupressus* sp., 65.
Macrophomina phaseoli, bean, 46.
Macrosporium sp., onion, 21.
 carotae, carrot, 55.
 cucumerinum, cantaloupe, 50.
Marasmius sacchari, sugar cane, 60.
 Measles, apple, 35.
Melampsora lini, flax, 30.
Melanconium fuliginum, grape, 39.
Microsphaera alni, Azalea, 69.
 Paeonia sp., 73.
 Mosaic, bean, 45.
 celery, 52.
 chrysanthemum, 70.
 corn, 30.
 cowpea, 33.
 Iris, 72.
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 Lilium spp., 73.
 Narcissus, 73.
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 potato, 43.
 Rosa spp., 75.
 soybean, 33.
 sweet potato, 49.
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Mycosphaerella citrullina, cantaloupe,
 50.
 fragariae, strawberry, 39.
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Mystrosporium sp, Iris, 72.

N

Nectria sp., *Acer rubrum*, 62.
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 Sassafras variifolium, 63, 64.
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O

Oidium sp., *Lagerstroemia* sp., 71.
Ophiobolus graminis, wheat, 25.

P

Penicillium sp., cherry, 39.
 corn, 29.
 expansum, apple, 35.
 ochraceum, *Tulipa* spp., 75.
Peridermium sp., *Pinus sylvestris*, 61.
Peronospora hyoscyami, tobacco, 20.
 manshurica, soybean, 33.
 parasitica, cabbage, 49.
 schachtii, beet, 55.
 schleideni, onion, 47.
 trifoliorum, alfalfa, 31.
 Melilotus officinalis, 32.
Pestalozzia macrotricha, *Rhododendron*,
 74.
Phlyctaena linicola, flax, 30.
Phoma sp., alfalfa, 31.
 apiicola, celery, 51.
 berberina, *Berberis thunbergii*, 69.

- Phoma betae*, beet, 55.
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Phomopsis sp., *Rhododendron*, 74.
 callistèphi, *Callistephus chinensis*, 68.
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 horizontalis, 65.
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 sabina tamariscifolia, 65.
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 disciflorum, *Rosa* spp., 74.
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Phyllosticta sp., *Aleurites fordii*, 67.
 althaeina, *Althaea rosea*, 72.
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 Rhododendron maximum, 74.
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Phymatotrichum omnivorum, alfalfa, 31.
 chrysanthemum, 70.
 Populus sp., 67.
Physalospora malorum, apple, 34.
 miyabeana, willow, 61.
Physoderma zeae-maydis, corn, 29.
Phytomonas rubrilineans, sugar cane, 60.
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Phytophthora sp., *Lilium* spp., 72.
 regale, 72.
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 ponticum, 74.
 infestans, potato, 20, 42.
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 aethiopica, 69.
Piricularia oryzae, rice, 30.
Plasmodiophora brassicae, rape, 49.
Plasmopara viticola, grape, 39.
Plectodiscella veneta, dewberry, 40.
 raspberry, 40.
Plowrightia morbosa, plum, 39.
Pod disease, pea, 54.
Podosphaera leucotricha, apple, 35.
Pokkah-bong, sugar cane, 60.
Pseudoperonospora cubensis, cantaloupe, 50.
 cucumber, 49.
Pseudopeziza medicaginis, alfalfa, 31.
Puccinia anomala, barley, 26.
Puccinia antirrhini, *Antirrhinum majus*, 75.
 asparagi, *asparagus*, 54.
 onion, 47.
 chrysanthemi, *chrysanthemum*, 70.
 coronata, oats, 27.
 dispersa, rye, 25.
 glumarum, wheat, 24.
 graminis, barley, 26.
 Berberis canadensis, 24.
 oats, 27.
 rye, 25.
 wheat, 23.
 helianthi, artichoke, 55.
 malvacearum, *Althaea rosea*, 72.
 sorgi, corn, 28.
 triticea, wheat, 24.
Pucciniastrum minimum, *Rhododendron ponticum*, 74.
Pyrenopeziza medicaginis, alfalfa, 31.
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- Red suture, peach, 36.
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 pea, 53.
 bataticola, bean, 46.
 clover, 32.
 cowpea, 33.
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 sweet potato, 48.
 crocorum, alfalfa, 31.
 sweet potato, 48.
 grisea, sugar cane, 60.
 solani, bean, 46.
 potato, 43.
 Rhododendron carolinianum, 74.
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Rhizopus sp., corn, 29.
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 alfalfa, 31.
 bean, 46.
 clover, 32.
 corn, 28.
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 sugar cane, 60.
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S

Sclerotinia sp., Delphinium, 71.
 fruticicola, peach, 36.
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 sclerotiorum, bean, 46.
 carrot, 55.
 celery, 51.
 lettuce, 52.
 Paeonia sp., 73.
 Zinnia elegans, 75.
 trifoliorum, alfalfa, 31.
 clover, 32.
Sclerotium sp., rice, 30.
 delphinii, Aconitum napellus, 68.
 Ageratum, 68.
 Campanula medium, 68, 70.
 Delphinium, 68, 71.
 Eupatorium, 68.
 Iris germanica, 68.
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 oryzae, rice, 30.
 rolfsii, bean, 46.
 Iris, 72.
 lettuce, 52.
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 onion, 47.
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 Scorch, pea, 54.
 Scutellum rot, corn, 29.
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 apii, celery, 51.
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 azaleae, Azalea, 69.
 chrysanthemella, chrysanthemum, 70.
 chrysanthemi, chrysanthemum, 70.
 fairmani, Althaea rosea, 72.
 glycines, soybean, 33.
 lycopersici, tomato, 44.
 nodorum, wheat, 24.
 paeoniae, Paeonia sp., 73.
 tritici, wheat, 24.
Sphaceloma fawcettii, citrus, 41.
 rosae, Rosa spp., 74.
Sphaeropsis quercina, Quercus spp., 67.
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Sphaeropsis quercina, Quercus prinus, 67.
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Sphaerotheca pannosa, Rosa spp., 74.
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 Stem girdle, Rosa spp., 75.
 Stem rot, bean, 46.
 Sterility, oats, 27.
Stilbum cinnabarinum, fig, 41.
 Storage rots, cranberry, 40.
 sweet potato, 48.
 Straighthead, rice, 30.
 Streak, pea, 54.
 Sun scald, onion, 47.
 Sun scorch, Acer platanoides, 65.
 saccharum, 65.
Aesculus hippocastanum, 65.
 Cornus florida, 65.
 Picea sp., 65.
 Prunus sp., 65.
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T

Thielavia basicola, bean, 46.
 pea, 53.
Thielaviopsis paradoxa, sugar cane, 60.
Tilletia levis, wheat, 23
 tritici, wheat, 23.
 Tip burn, lettuce, 52.
 potato, 43.
Tylenchus dipsaci, Narcissus, 73.
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U

Urocystis tritici, wheat, 23.
Uromyces betae, beet, 55.
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 caryophyllus, 70.
Ustilago avenae, oats, 27.
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 tritici, wheat, 23.
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V

- Venturia inaequalis*, apple, 34.
 pyrina, pear, 35.
Verticillium sp., *Acer* spp., 66.
 platanoides, 66.
 blackberry, 40.
 dewberry, 40.
 elm, 61.
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albo-atrum, egg plant, 55.
 okra, 55.
dahliac, *Acer* spp., 66.
 Antirrhinum sp., 66.
 Berberis thunbergi, 66.
 Chrysanthemum sp., 66.
 Dahlia variabilis, 66.
 Lathyrus odoratus, 66.
ovatum, blackberry, 40.
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W

- White heart, lettuce, 52.
 White spot, alfalfa, 31.
 Winter injury, *Acer* spp., 66.
 Juniperus spp., 65.
 peach, 38.
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Y

- Yellow dwarf, onion, 47.
 Yellow leaf, peach, 38.
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