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THE PLANT DISEASE REPORTER

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THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey

BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

AGRICULTURAL RESEARCH ADMINISTRATION

UNITED STATES DEPARTMENT OF AGRICULTURE

1950 SUMMARY OF RESULTS OF FUNGICIDE TESTS ON CROPS OTHER THAN FRUIT TREES

Supplement 210 March 15, 1952

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

PLANT DISEASE REPORTER SUPPLEMENT

Issued by

THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station — Beltsville, Maryland

1950 SUMMARY OF RESULTS OF FUNGICIDE TESTS ON CROPS OTHER THAN FRUIT TREES

Compiled by
The Fungicide Committee of the American Phytopathological Society:
Sub-Committee on Testing and Results of Newer Fungicides[1]

Plant Disease Reporter
Supplement 210 — March 15, 1952

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1950 SUMMARY OF RESULTS OF FUNGICIDE TESTS ON CROPS OTHER THAN FRUIT TREES

The summary of fungicide tests for 1950 has been long delayed because of publication difficulties, but, thanks to the cooperation of Dr. P. R. Miller and the Plant Disease Survey, it is now possible to release much of the information which has been accumulated. Unfortunately, the fruit tree data are not in final form and will have to be presented separately or combined with the 1951 report.

The information herein contained is based on reports submitted by many contributors throughout the country, most of whom are mentioned in connection with the particular report concerned. The committee is grateful to all of those who have contributed.

Nearly all materials used in the 1950 tests were also used in 1949 tests, and are listed, together with the manufacturers, in the 1949 report (Plant Disease Reporter Supplement 192. 1950.)

FUNGICIDE EVALUATION STUDIES - 1950

VEGETABLE CROPS

BEANS

FUSARIUM and RHIZOCTONIA -- Pinto UI#111

Soil treatment with seed at planting: Small plots. Colorado -- W. D. Thomas, Jr., W. J. Henderson, and W. E. Stratton.

Order of Disease Control: (1) Dithane Z-78 at 4 lbs./acre, (2) Ceresan M at 1 lb./acre, (3) Dow 9B at 4 lbs./acre, (4) Crag #531 at 3 lbs./acre, (5) Phygon XL at 2 lbs./acre, (6) Orthocide 406 at 4 lbs./acre, (7) Arasan at 3 lbs./acre.

Plant Safety: Dithane Z-78, Orthocide, Crag, Arasan, Phygon, Ceresan M, Dow 9B.

Yields: Dithane Z-78, Orthocide, Phygon XL, Ceresan M, Arasan, Crag, Dow 9B.

Overall Preference: Dithane Z-78, Orthocide, Crag, Ceresan M, Phygon XL, Arasan, Dow 9B. Need more dosage studies with Dow 9B.

DAMPING-OFF -- Round Pod, Kidney Wax

Seed treatment: Field plots. Michigan -- D. J. DeZeeuw and A. L. Anderson.

Order of Disease Control: Phygon XL, Arasan, Panogen, Ceresan M, Carbide & Carbon L-224, C & C L-640, C & C 5400, Dithane Z-78, Bioquin 1, Panogen S, Check.

Overall Preference: (1) Arasan, Ceresan M, Phygon XL, and Panogen; (2) three C & C company numbers.

SNAP BEAN

Phytotoxicity test: Ohio -- J. D. Wilson.

Tribasic copper gave somewhat larger yield than Zerlate in one field experiment of 4 applications of spray.

In another on control of bacterial blight, only Methasan S and F1189, out of 11 compared, gave better yields than check.

Others in order were: Dithane D-14 + $ZnSO_4$, MnEBD + Triton, Robertson Cu, Orthocide 406, Zac x 6, COCS, Vancide 51, Tribasic, Parzate, Zerlate, Zac x 6 + p.e.p.s. Blight not very severe, so fungicides probably injured host.

CABBAGE

DOWNY MILDEW

Field plots: Hand duster, 6 applications 5 days apart, mildew present at start. South Carolina -- W. M. Epps.

Order of Disease Control: (1) Spergon 4.8% active at 18 lbs. per acre/application, (2) Phygon 1.% active, at same rate, (3) Dithane Z-78, 3.9% active at same rate, (4) Check.

Overall Preference: (1) Spergon, (2) Phygon and Dithane.

CARROTS

LEAF SPOTS AND VIRUS YELLOWS

Field plots: Eight sprays July 5-September 13. Ohio -- J. D. Wilson.

Some Cercospora and a little Macrosporium (Alternaria) appeared late. All 11 fungicides gave better yields than check, but only Dithane + $ZnSO_4$ at 4-1-100 was significantly better. In order others were Bordeaux 6-6-100; COCS + DDT, 5-day 4-2-100; Methasan W 1 1/2-100; COCS + Parathion 1; Zerlate 2-100; Parzate 2-100; COCS + DDT, 10-day; Robertson Cu 2.2-100; Tribasic 4-100; F-1124, 5-100; Zac 6-100; Orthocide 406, 2-100. A 5-day interval better than 10-day for yellows control by DDT. Foliage condition best with Parzate. Dithane and Robertson Cu caused bronzing. Orthocide and F1124 also slightly injurious. More yellows in copper treatments than in organics.

CELERY

EARLY AND LATE BLIGHTS

Field plots: Power sprayer, 10-day applications, July 20-September 19. Ontario, Canada -- L. K. Richardson. Blights abundant at start.

Order of Control and Percentage of Blight: (1) Karbam at 2-100, 10%; (2) Bordeaux 10-10-50, 12.5%; (3) Robertson Cu 15%; (4) Phygon 1-100, 17.5%; (5) Basicop 5-100, 20%; (6) Tricop 5-100, 25% (7) Dithane Z-78, 2 qts.-100, 30%; (8) Crag 341 SC, 1 qt.-100, 85%; (9) Crag 341 C, 1 qt.-100, 95%; (10) Check, 100%.

CERCOSPORA LEAF SPOT

Field plots: 10 sprays between July 5-August 28. Ohio -- J. D. Wilson.

Little disease, came in late. Two best were Tribasic 4-100, and Methasan W at 1 1/2-100, while lowest increases over check were secured with Orthocide 406 at 2-100 and Fung. 1124 at 5-100. Others included Methasan B, MnEBD, COCS, Parzate, Robertson Cu, and Fungicide A in that order.

ONIONS

SMUT

Seed treatments, pelleting and sticker: Small field plots. Illinois -- M. B. Linn.

Order of Control: (1) Thiram at 1 lb. to 1 of seed, (2) Same at 3/4 lb., (3) Same at 1/2 lb.; (4) Arasan SF at 1 lb.; (5) Arasan at 1 lb.; (6) Tersan at 1 lb.; (7) Arasan SF at 3/4 lb.

Order of Preference: (1) Thiram at 1/2 lb., (2) Same at 3/4 lb.; (3) Arasan SF at 3/4 lb.; (4) Tersan at 1 lb.; (5) Arasan SF at 1 lb.; (6) Arasan at 1 lb.

DOWNY MILDEW AND THRIPS

Field plots: 5 sprays July 7-August 16. Ohio -- J. D. Wilson.

Dithane Z-78 plus 10 different insecticides, and Parzate + DDT all gave conspicuously better control and yields than check. Others giving significantly better yields in order were Methasan W + DDT, Orthocide 406 + DDT, and 1124 + DDT. Others not quite significant included DDT alone, Zerlate + DDT, Bordeaux + DDT, Zac x 6 + DDT, Tribasic + DDT, 1189 + DDT, and COCS + DDT. Parathion better than Dilan, Aldrin, BPR, DDT, Chlordane, EPN, C4049, and Toxaphene in that order of yields. The last two significantly less than Parathion. Coppers caused burning.

DOWNY MILDEW

Field plots: Hand sprayers, 11 applications March 3-May 13. California -- C. E. Yarwood and Morris Cohen.

Order of Control: (1) Rosin lime sulfur 2%, (2) Dithane Z-78 at .2%, (3) Check. Overall preference in same order.

DOWNY MILDEW AND BLAST

Field plots: Power-sprayed, 9 weekly applications June 28-August 30. New York -- A. G. Newhall.

Order of Control: (1) Dithane D-14 + $ZnSO_4$ and Parzate + $ZnSO_4$; (2) Manganese ethylene bis dithiocarbamate; (3) Check. Two replicates.

BLAST AND DOWNY MILDEW

Power-sprayed vs. Dusted: 5 applications Dithane D-14 + $ZnSO_4$, vs. Dithane Z-78 7% dust. New York -- A. G. Newhall. Best control and yields from sprays, on three farms receiving 5, 6, and 12 applications respectively, four replications.

BLAST

Field plots: Power-dusted, 6 weekly evening applications. New York -- A. G. Newhall.

Order of Control: Dithane Z-78 7% + sulfur 30% vs. same without sulfur. No significant difference, six replications.

PINK ROOT AND FUSARIUM

Soil treatment: Small plots, Colorado -- W. D. Thomas, Jr., R. L. Skiles, and C. T. Lange.

Order of Disease Control: (1) Dowfume N at 25 gals./acre; (2) Dithane Z-78 at 4 lbs./acre; (3) Shell OS-840 at 30 gals./acre; (4) Ceresan M at 1 1/2 lbs./acre; (5) Phygon 4 lbs./acre; (6) Arasan, 2 lbs./acre.

Plant Safety: (1) Dowfume N, Dithane Z-78, and Shell OS-840, (2) Arasan, (3) Phygon, (4) Ceresan.

Yields: (1) Dithane, (2) Dowfume N, (3) OS-840, (4) Arasan, (5) Phygon, (6) Ceresan M.

Overall Preference: Same order as disease control.

PURPLE BLOTCH

Sprayed: 7 applications 10 days apart, 120 gals. p.a. Colorado -- W. D. Thomas, R. L. Skiles, and C. T. Lange.

Order of Disease Control: (1) Yellow Cuprocide 1 1/2 lbs./acre, (2) Dithane Z-78 1 1/2 lbs., (3) Parzate 1 1/2 lbs.

Yield: (1) Dithane, (2) Parzate, (3) Yellow Cuprocide.

Overall Preference: (1) Yellow Cuprocide, (2) Dithane and Parzate equal.

PEAS

DAMPING-OFF

Seed treatments: Field plots. Michigan -- D. J. DeZeeuw and A. L. Anderson.

Order of Disease Control: (1) Phygon XL at .25% wgt., (2) Panogen at .2% wgt., (3) Ceresan M at .125% wgt., (4) Carbide & Carbon L-224 at .125% wgt., (5) C. & C. L-640 at .125% wgt., (6) Yellow Cuprocide at .25% wgt., (7) Bioquin 1 at .125% wgt., (8) Arasan at .125% wgt., (9) C. & C. 5400 at .125% wgt., (10) Panogen S at .2% wgt., (11) Spergon at .25% wgt., (12) Check.

Order of Overall Preference: (1) Panogen, Ceresan M, Phygon XL, (2) Arasan, Yellow Cuprocide, Bioquin 1, C. & C. L-224, and L-640.

SEED DECAY AND DAMPING-OFF

Seed treatments -- Dust, slurry: Greenhouse 50°, cold room 50°, and field. Wisconsin -- D. J. Hagedorn.

Order of Disease Control: A. Field (1) KF467 (mercurial) at 1 oz./bu., (2) Phygon at .5 oz./bu., (3) Arasan at 1.2 oz./bu., (4) Spergon at 2 oz./bu., (5) Phygon XL slurry at .5 oz./bu., (6) Arasan SF slurry at .8 oz./bu., (7) Dow 9B at 1.8 oz./bu., (8) Check. B. Greenhouse (1) KF467, (2) Phygon, (3) Spergon, (4) Arasan, (5) Arasan SF, (6) Phygon XL, (7) Check, (8) Dow 9B.

Overall Preference: Same as under A. Field except reverse 3 and 4.

CORN

SEED DECAY AND SEEDLING DISEASE

Seed treatments: Madison, Wisconsin -- Paul E. Hoppe.

Order of Disease Control: Vancide 51, seeds moistened with concentrated solution, gave perfect control where checks showed 100% seed decay. Carbon and Carbide 224, C. & C. 640, Arasan, and Phygon also gave good control and are listed in order of preference. Spergon gave inferior control.

POTATOES

EARLY BLIGHT

Cobbler variety, on muckland at Willard, Ohio -- J. D. Wilson ("Most severe attack ever seen".)

Of 15 fungicides applied 6 times between July 9 and August 31, 5 were significantly better than all others. These were Dithane D-14 + $ZnSO_4$ + DDT (4-1-1-100), Dithane Z-78 + DDT (2-1-100), Methasan S + DDT (3-1-100), Methasan B + DDT (3-1-100), and Tribasic + parathion (4-1-100). Of 5 insecticides employed with Tribasic, parathion was outstanding and Dilan very good.

EARLY AND LATE BLIGHT

Cobblers, upland at Marietta, Ohio -- 5 applications May 23 to July 6 -- J. D. Wilson.

Of 15 fungicides used with DDT, Dithane D-14 was outstanding. Tribasic + p.e.p.s., Dithane Z-78, and Fungicide 1189 were all better than 12 others. Cop-O-Zink significantly better than four other treatments. Dilan gave slightly better yields than EPN, parathion, DDT, or Aldrin for the insecticides.

Rank of all fungicides from three experiments like above on yield basis was as follows: Dithane Z-78, Dithane D-14, Dithane Z-78 + p.e.p.s., Tribasic + p.e.p.s., Methasan S, copper cupferron, Methasan B, Zerlate, Fungicide 1189, Crag 658, Cop-O-Zink, COCS, Zac x 6 + p.e.p.s., Robertson Cu, CP2271, Tribasic, and Zac x 6. The ranking of insecticides, all used with Tribasic, was Dilan, parathion, EPN, DDT, Aldrin, and DDT + Aldrin, in this order.

Performance of Tribasic and Zac x 6 was increased by p.e.p.s., but Dithane Z-78 was decreased.

EARLY AND LATE BLIGHTS

Variety Katahdin, on upland at Wooster, Ohio. Sprayed 7 times July 10 to September 5 -- J. D. Wilson. (40 fungicides and formulations).

Ranked on Yield Basis: Dithane D-14 significantly better than all but Cop-O-Zink, Methasan S, Parzate dry, and MnEBD. Again MnEBD, and Cop-O-Zink were better than all but the above 4 and COCS + p.e.p.s. Crag 658 was better than 26 others. Bordeaux better than only 10 others.

EARLY BLIGHT

Variety Cobbler (?): Upland, Wooster, Ohio. Sprayed 5 times June 22 to July 28 -- J. D. Wilson.

In a comparison between 5 formulations of Zac, 6 of Methasan, 4 of Parzate, 3 of Robertsons Copper and 2 of Vancide, all treatments gave yields significantly better than the check, owing probably to DDT used in all. Parzate was above average in disease control and yield. Addition of p.e.p.s. to Vancide 51 improved its performance.

EARLY BLIGHT

Variety Cobbler: Upland, Wooster, Ohio. J. D. Wilson. An experiment to compare 7 fungicides at high gallonage (160 g.p.a.) and low (1X) concentration, vs. low gallonage (40 g.p.a.) and high (4X) concentration, all with DDT. Results gave very little advantage to the low gallonage concentration, yields from which exceeded the regular in five out of seven instances, but not significantly.

Materials Ranked on Yields: (1) Methasan W, Zerlate, (2) Parzate, Zac, Dithane, (3) Tribasic, COCS.

LATE BLIGHT

Minnesota (Crookston; H. D. Thurston and D. S. Olmsted. Variety Pontiac).

Six applications, 7 to 10-day intervals. Disease negligible. Listed in order of yield, but not statistical differences:

Tribasic spray, Cop-O-Zink spray, Mackoblend ZM spray, Cop-O-Zink dust, Z-78 spray, Tribasic dust, Z-78 dust, Mackoblend ZM dust. All sprays were at 100-130 gals./acre; all dusts at 20-40 lbs./acre.

Ohio (Wooster; J. D. Wilson. Variety Cobbler, on upland).

Several fungicides all at 4X concentration applied at 80 and 40 g.p.a. Parzate liquid, and COCS gave best yields but a copper aerosol at only 6 gallons per acre and providing only half as much copper showed up well.

Ranked on Yields: Parzate + $ZnSO_4$ (8-4-100), COCS (16-100), Dithane Z-78 + C 4049 (8-4-100), Copper aerosol, Robertson Cu (8.8-100), Dithane Z-78 + Dilan (8-4-100), Methasan S (12-100), Vancide 51 (12-100), Zac S (12-100). All above had 8 lbs. DDT except where Dilan or C 4049 were employed.

Prince Edward Island (Charlottetown; L. C. Callbeck. Variety Green Mountain).

Eight sprays, July 13 to September 16.

In two experiments, Bordeaux (8-4-100) gave best control of both foliage infection and subsequent tuber rot. In one of these experiments Dithane D-14 + zinc sulfate (2 qts.-1-100) gave highest yield but tuber rot was 12.9%, as compared with 1.3% for bordeaux and 18.1% for the check. In the other experiment Z-78 gave highest yield but 12.5% tuber rot compared to 1.1% for bordeaux and 13.3% for check. Over-all preference in Experiment I: Bordeaux (8-4-100), Basicop (3.5-100), Crag 658 (1.5-100), D-14 + zinc sulfate (2 qts.-1-100), Phygon XL (1-100); in Experiment II: Bordeaux (8-4-100), Fungicide 1124 and Fungicide 1189; SR 406, and Z-78.

Tennessee (Crossville; W. W. Stanley, E. L. Felix, and T. R. Gilmore. Early and late blights and insects on Cobbler).

Six applications, 10-day intervals, 500-600 g./acre.

COCS + 50% DDT (4-2-100), and Tribasic + 25% Aldrin (4-1-100) given over-all preference. Tribasic + DDT (4-2-100) without adhesive, Tribasic + 50% Dilan (4-1-100), Bordeaux + DDT (8-4-2-100), and Tribasic + DDT (4-2-100) were close behind, with Bordeaux + DDT (8-4-1-100) and DDT alone (2-100) following. Copper naphthenate emulsion (3.8% Cu) + DDT (2 gals.-2-100) without adhesive was injurious. Except where indicated otherwise all sprays contained synthetic resin adhesive (National #3605) at 1 pint/100 gals.

TOMATO

ANTHRACNOSE

Illinois (Urbana; hydraulic sprays; 10-day interval applications; variety Ill. 97A)

Control: (1) Mn bis; (2) Zerlate-Tribasic; (3) Dithane D-14 & $ZnSO_4$; (4) Z-78; (5) Zerlate; (6) Tribasic; (7) Cop-O-Zink. All materials equally safe.

Yield: (1) Mn bis; (2) Dithane D-14 & $ZnSO_4$; (3) Zerlate-Tribasic; (4) Z-78; (5) Tribasic; (6) Cop-O-Zink; (7) Zerlate.

Overall Preference: (1) Mn bis; (2) Dithane D-14 & $ZnSO_4$; (3) Z-78; (4) Zerlate-Tribasic.

New Jersey (New Brunswick; hydraulic sprays; 5 applications; variety Rutgers)

Control: (1) M-294, Zerlate, Zerlate-Tribasic, Orthocide 406, Dithane D-14 & $ZnSO_4$, Zerlate + Tribasic, Zerlate + Z-78, Parzate; (2) Z-78-Tribasic, Z-78-bordo, Z-78; (3) Phygon XL, Tribasic, Cop-O-Zink, Crag 658.

All materials equally safe. No significant differences in yield.

Overall Preference: (1) Zerlate; (2) Zerlate-Tribasic, Orthocide 406, Dithane D-14 & $ZnSO_4$, Zerlate + Tribasic, Zerlate + Z-78, Parzate; (3) Z-78-Tribasic, Z-78-bordo, Z-78; (4) Phygon XL, Tribasic, Cop-O-Zink, Crag 658.

Note: M-294 is Cupric N-nitrosophenylhydroxylamine.

New Jersey (Riverton; hydraulic sprays; 5 applications; variety Improved Garden State)

Control: (1) Zerlate + Tribasic, Z-Z-Z-T-T; (2) Zerlate + Tribasic, Z-T-Z-T-Z, Zerlate + Dithane D-14 & $ZnSO_4$; (3) Zerlate + Crag 658, Z-Z-T-Z-T, M-294; (4) Dithane, Orthocide 406*, Orthocide 406**, Zerlate-Tribasic concentrate, Mn bis; (5) Tribasic, Crag 658.

No data available on plant safety. Yield differences not significant. No over-all preference given.

(*Orthocide 406 at 2 lbs. per 100 gallons; **Orthocide 406 at 4 lbs. per 100 gallons.)

New York (Geneva; hydraulic sprays; 5 applications; variety Gem)

Control: (1) Orthocide 406**; (2) Orthocide 406*, Zerlate + bordo, Z-Z-B-Z-B; (3) C & C 5400, Zerlate, Zerlate + Tribasic; (4) Zac, check.

All materials equally safe except Zerlate + bordo which showed some injury.

Yield: (1) Z-Z-B-Z-B, Orthocide 406*, Zerlate + Tribasic, Orthocide 406**, Zerlate; (2) Zac, C & C 5400, Zerlate + bordo.

Overall Preference: (1) Z-Z-B-Z-B.

(*Orthocide 406 at 2 lbs. per 100 gallons; **same material at 4 lbs. per 100 gallons.)

EARLY BLIGHT

Alabama (Clanton; dusts and spray, hand equipment; seven weekly applications; variety Rutgers)

Control: (1) Z-78 (5% dust); Z-78 (7% dust); Tribasic copper (7% dust); liquid Parzate. (3) Phygon XL (2% dust).

Plant Safety: (1) Z-78 (5% dust); liquid Parzate. (2) Z-78 (7% dust); Tribasic copper; Phygon XL.

Yield: (1) Z-78 (5% dust); (2) Z-78 (7% dust); (3) Tribasic copper; (4) Phygon XL; (5) liquid Parzate.

Overall Preference: (1) Z-78 (5% dust); (2) Z-78 (7% dust); Tribasic copper.

California (Riverside; hydraulic sprays-400 lbs. pressure; six applications; variety Pearson)

Control: (1) Phygon; (2) Zineb; (3) Crag 658; (4) cuprous oxide plus sulfur.

All materials equally safe. Yield differences not significant.

Overall Preference: (1) Phygon; (2) Zineb.

Connecticut (Mt. Carmel; hydraulic sprays; 9 applications; variety Chatham)

Control: (1) Phygon XL; (2) Z-78, Orthocide 406.

All materials equally safe. No yield data.

Overall Preference: (1) Phygon XL; (2) Z-78, Orthocide 406.

Georgia (Tifton; hydraulic sprays and power dusts; tomato transplants; 7-day interval applications)

Control: (1) Nabam & $ZnSO_4$, Zerlate; (2) Z-78, Tribasic copper; (3) Copper Cpd A; (4) Parzate; (5) Phygon XL and dusts of Zerlate, Z-78, Tribasic copper, and Phygon XL.

Apparently all materials equally safe. No yield data.

Overall Preference: (1) Nabam & $ZnSO_4$, Zerlate; (2) Z-78, Tribasic copper.

Hawaii (Poamoho; hydraulic sprays; 8 applications; variety Lanai)

Control: (1) Mn bis; (2) Parzate; (3) Tribasic; (4) Yellow Cuprocide; (5) Zerlate. All materials equally safe.

Yield: (1) Tribasic; (2) Mn bis, Yellow Cuprocide; (3) Zerlate; (4) Parzate.

No preference indicated; Mn bis outstanding in control of early blight on both fruit and foliage.

Illinois (Urbana; hydraulic sprays; 10-day interval applications; variety Ill. 97A)

Control: (1) Z-78; (2) Dithane D-14 & $ZnSO_4$; (3) Zerlate-Tribasic; (4) Mn bis; (5) Tribasic copper; (6) Cop-O-Zink; (7) Zerlate. All materials equally safe.

Yield: (1) Mn bis; (2) Dithane D-14 & $ZnSO_4$; (3) Zerlate-Tribasic; (4) Z-78; (5) Tribasic copper; (6) Cop-O-Zink; (7) Zerlate.

Overall Preference: (1) Mn bis; (2) Dithane D-14 & $ZnSO_4$; (3) Z-78; (4) Zerlate-Tribasic.

Illinois (Mt. Prospect; hydraulic sprays; 5 applications; variety Garden State)

Control: (1) Mn bis, Z-78, Tribasic copper, Orthocide 406, Zerlate + Tribasic, Zerlate-Tribasic, Zerlate, Z-78 + Tribasic; (2) Crag 658 + Zerlate; (4) Crag 658.

No indication of any phytotoxicity. Yield differences not significant. No preferences indicated.

Mississippi (Crystal Springs; knapsack dusts; staked greenwraps; 5 applications; variety Rutgers)

Control: (1) Copper Cpd A, Zineb; (2) Tribasic copper.

All materials equally safe. Yield differences not significant. No preferences indicated.

Mississippi (Crystal Springs; knapsack dusts; unstaked greenwraps; 5 applications; variety Rutgers)

Control: (1) Tribasic copper; (2) Copper Cpd A; (3) Zineb. All materials equally safe.

Yield: (1) Tribasic copper; (2) Copper Cpd A; (3) Zineb.

Overall Preference: (1) Tribasic copper; (2) Copper Cpd A; (3) Zineb.

New York (Geneva; hydraulic sprays; 5 applications; variety Gem)

Control: (defoliation) (1) Z-Z-B-Z-B, Zerlate + bordo, Orthocide 406**, Zerlate + Tribasic; (2) Orthocide 406*, Zerlate; (3) C &

C 5400, Zac, check.

Control: (fruit rot) (1) Orthocide 406**; (2) Orthocide 406*, Zerlate + Tribasic, C & C 5400, Zerlate, Z-Z-B-Z-B, Zerlate + bordo, Zac.

Plant Safety: All materials equally safe; combination of Zerlate + bordo showed some injury.

Yield: (1) Z-Z-B-Z-B, Orthocide 406*, Orthocide 406**, Zerlate + Tribasic, Zerlate; (2) Zac, C & C 5400, Zerlate + bordo.

Overall Preference: (1) Z-Z-B-Z-B. Orthocide shows considerable promise. Others not preferred for control of all tomato diseases.

(*Material at 2 lbs. per 100 gallons; **material at 4 lbs. per 100 gallons.)

LATE BLIGHT

Alabama (Etowah County; hydraulic sprays; 8 applications; variety Rutgers)

Control: (1) Dithane D-14 & $ZnSO_4$, Z-78, liquid Parzate & $ZnSO_4$, Parzate, Tribasic copper, Copper Cpd A; (3) Phygon XL.

Plant Safety: (1) Dithanes, Parzates, Phygon; (2) Tribasic copper, Copper Cpd A.

Yield: (1) Dithane D-14; (2) Z-78; (3) Phygon XL; (4) Parzates, Tribasic copper, Copper Cpd A.

Overall Preference: (1) Dithane D-14; (2) Z-78; (3) liquid Parzate; (4) Tribasic copper, Copper Cpd A; (5) Parzate; (6) Phygon.

Florida (Homestead; hydraulic sprays; 20 applications at 3-7 day intervals; variety Mo. S34)

Control: (1) Z-78, Parzate, Phygon XL, Phygon XL-Dithane D-14 & $ZnSO_4$ & lime, liquid Parzate & $ZnSO_4$, Dithane D-14 & $ZnSO_4$ & lime, Dithane D-14 & $ZnSO_4$; (2) Orthocide 406; (3) Tribasic copper, copper thiram, P 111-5.

Plant Safety: (1) Z-78, Parzate, Phygon XL, Phygon XL-Dithane D-14 & $ZnSO_4$ & lime, Orthocide 406, Tribasic copper, copper thiram; (2) liquid Parzate & $ZnSO_4$, Dithane D-14 & $ZnSO_4$ & lime, Dithane D-14 & $ZnSO_4$; (3) P 111-5.

Yield: (1) Z-78; (2) Parzate, Phygon XL, Phygon-Dithane D-14 & $ZnSO_4$ & lime; (3) liquid Parzate & $ZnSO_4$, Dithane D-14 & $ZnSO_4$ & lime, Dithane & $ZnSO_4$; (4) Orthocide 406; (5) Tribasic copper; (6) copper thiram; (7) P 111-5.

Overall Preference: (1) Z-78; (2) Parzate, Phygon XL, Phygon XL-Dithane D-14 & $ZnSO_4$ & lime; (3) liquid Parzate & $ZnSO_4$, Dithane D-14 & $ZnSO_4$ & lime, Dithane D-14 & $ZnSO_4$; (4) Orthocide 406.

Note: Nabam treatments resulted in leaf roll, marginal chlorosis, stunting, and fruit injury; P 111-5 caused rather severe chlorosis and stunting. Tribasic copper sulfate, copper thiram, P 111-5 did not provide sufficient control of late blight to justify further testing.

Maryland (Salisbury; hydraulic sprays; 7 applications at 11-day intervals; variety Rutgers)

Control: (1) Orthocide 406; (2) Z-78; (3) C & H copper, Z-Z-T-T-T-T-T; (4) Z-Z-Z-Z-T-T-T; (5) Z-Z-D-D-T-T-T.

Apparently all materials equally safe.

Yield: (1) C & H copper; (2) Orthocide 406; (3) Z-78; (4) Z-Z-T-T-T-T-T; (5) Z-Z-D-D-T-T-T; (6) Z-Z-Z-Z-T-T-T; (7) Cop-O-Zink.

Overall Preference: (1) Z-Z-T-T-T-T-T; (2) Z-78; (3) Orthocide 406, Z-Z-D-D-T-T-T; (4) C & H copper, Z-Z-Z-Z-T-T-T; (5) Cop-O-Zink.

Mississippi (Crystal Springs. See summary under Early Blight for both staked and unstaked tomatoes.)

Missouri (Columbia; hydraulic sprays; 10-day interval applications; variety Rutgers)

Control: (1) Fixed copper, Z-78; (4) Zerlate.

Plant Safety: (1) Z-78, Zerlate.

Yield: (1) Fixed copper, Z-78.

Overall Preference: (1) Fixed copper, Z-78. Zerlate not effective against late blight, but very effective against Septoria blight and anthracnose. Present recommendations are alternate fixed copper and Zerlate. If only one fungicide were used, Z-78 would be preferred.

North Carolina (Hendersonville; hand dusters; 4 to 7-day interval applications; variety Marglobe)

Control: (1) Tribasic copper; (2) C & H copper; (3) Z-78.

All materials equally safe.

Yield: (1) Tribasic copper; (2) C & H copper; (3) Z-78.

Overall Preference: (1) Tribasic copper.

Note: This is the third year that coppers have proved better than zineb at this location where late blight has been very severe each year.

Nova Scotia (Kentville; wheelbarrow sprayer; 3 applications; variety Stokesdale)

Control: (1) Tricop, COCS, Tribasic copper; (2) Copper Cpd A; (3) Perenox; (4) Zerlate-bordo.

All materials equally safe except Zerlate-bordo.

Yield: (1) Perenox, Tricop, Copper Cpd A, Tribasic copper, COCS; (2) Zerlate-bordo.

Overall Preference: (1) Tricop, Tribasic copper, COCS. Satisfactory control of late blight was obtained with fixed coppers. Zerlate, followed by bordo and then Zerlate, did not hold the disease, 7.5% as against 28.3% in the check. The split program of Zerlate-bordo is recommended to growers with the change to bordo taking place when late blight appears.

Ohio (Wooster, J. D. Wilson. Late blight severe. Seven applications of 39 formulations at 160 gal. per acre at 300 p.s.i. between July 12-September 12 at 10-day intervals, except reduced to 7 days between 3rd, 4th, and 5th applications.)

Results: Twelve of the best 15 treatments contained copper in some form. COCS + p.e.p.s. 4-1/2-100 gave best control of all. Other high ranking were Bordeaux 8-6-100, Robertson Cu 2.2-100, Phelps Dodge Paste 4-100, and Tribasic 4-100. Second in effectiveness were the organics Dithane + $ZnSO_4$ 4-1-100, Parzate 2-100, MnEBD 1.7-100. Close after these came Orthocide 2-100, and Methasan slurry 3-100. Near the bottom of the list came Zerlate, Zac, and the Vancides.

Slurries were better than their dry-mix counterparts.

Zerlate + Tribasic tank mix 1-2-100 was better than alternating with each at full strength (2-100, and 4-100 respectively).

The 10-day intervals probably account for relatively poorer showing of organics against the coppers.

Ohio: Late Blight Fruit Rot. (Six applications of 19 fungicides between July 11 and September 6 -- J. D. Wilson, Wooster)

Again the coppers in general gave best control of late appearing Phytophthora fruit rot, in following order: (1) Bordeaux 8-6-100, Robertson Cu 2.2-100, Tribasic 4-100, MnEBD + Triton 1.7-.1-100, (2) Parzate + $ZnSO_4$ 4-1-100, Cop-O-Zink 4-100, COCS 4-100, (3) Crag 658 2-100, Methasan S 1-100, Parzate 2-100, (4) poor control achieved with Zerlate, Orthocide, Vancide 51, and Zac X6.

However, the coppers gave little control of anthracnose fruit rot which was controlled better by Methasan slurry, and MnEBD, and Liquid Parzate.

South Carolina (Charleston; hand dusters; 4 applications)

(See data under Stemphylium blight.)

Virginia (Blacksburg; knapsack dusters; 13 applications; variety Rutgers)

Control: (1) Parzate (3.9%), Parzate (20%), Robertson copper (7%); (2) Cop-O-Zink (7%), Tribasic copper (7%), Crag 658 (6%), Phygon (1%).

Plant Safety: (1) Parzate, Cop-O-Zink, Tribasic copper, Robertson copper; (2) Crag 658; (3) Phygon.

Yield: (1) Parzate, Cop-O-Zink; (2) Tribasic copper, Robertson copper, Crag 658; (3) Phygon.

Overall Preference: (1) Parzate, Robertson copper; (2) Cop-O-Zink, Tribasic copper; (3) Crag 658; (4) Phygon.

Parzate (20%) would be too expensive at rate used. Phygon was toxic at heavy rate used in test. All materials were used in excessive amounts in this test.

West Virginia (Huttonsville; hydraulic sprays; 14 applications at weekly intervals; variety Marglobe)

Control: (Defoliation) (1) Parzate; (2) Parzate-C & H copper; (3) Parzate-Tribasic copper; (4) bordo; (5) Methasan-Tribasic, Tribasic; (6) Methasan + Tribasic; (7) Methasan + C & H copper; (8) C & H copper; (9) Cop-O-Zink.

Control: (Fruit Rot) (1) bordo; (2) Parzate-Tribasic, Parzate; (3) Methasan-Tribasic, Tribasic; (4) Methasan + Tribasic; (5) Parzate-C & H copper; (6) C & H copper; (7) Cop-O-Zink; (8) Methasan + C & H copper.

Plant Safety: Apparently only bordo 8-4-100 showed any injury.

Yield: (1) Parzate-Tribasic; (2) Parzate; (3) Parzate-C & H copper; (4) bordo; (5) Methasan-Tribasic; (6) Tribasic; (7) Methasan + Tribasic; (8) Cop-O-Zink; (9) C & H copper; (10) Methasan + C & H copper.

Overall Preference: (1) Parzate-Tribasic, Parzate; (2) Parzate-C & H copper, bordo; (3) Methasan-Tribasic, Tribasic; (4) Methasan + Tribasic; (5) Cop-O-Zink; (6) C & H copper (7) Methasan + C & H copper.

STEMPHYLIUM BLIGHT

Maryland (Salisbury; hydraulic sprays; 7 applications; variety Rutgers)

See data under Early Blight.)

Maryland (Salisbury; Campbell Soup Co.; hydraulic sprays; 7 applications; variety Garden State)

Control: (1) Z-78; (2) Zerlate + Z-78; (3) Zerlate, Z-T-Z-T-Z-T-Z, Zerlate + Crag 658; (4) Tribasic, Zerlate + Tribasic; (5) Z-Z-Z-T-T-T-T; (6) Orthocide 406.

No data on plant safety.

Yield: (1) Zerlate + Crag 658, Zerlate, Z-T-Z-T-Z-T-Z, Zerlate + Tribasic, Z-78, Tribasic, Z-Z-Z-T-T-T-T, Zerlate + Z-78; (2) Orthocide 406.

No overall preference indicated.

South Carolina (Charleston; hand dusters; 4 applications; varieties Rutgers and Ontario)

Control: Too little late blight for evaluation of materials. Gray leaf spot caused complete defoliation, but only after harvest was completed; applications stopped too soon to control it.

Plant Safety: (1) Parzate (3.9%), Z-78 (3.9%), Orthocide 406 (5%); (2) Phygon XL (1%); (3) Tribasic (6%).

Yield differences not significant.

Overall Preference: (based on previous years' tests) (1) Tribasic; (2) Parzate, Z-78; (3) Phygon XL.

SEPTORIA BLIGHT

Missouri (Columbia; hydraulic sprays; 10-day interval applications; variety Rutgers)

(See data under Late Blight.)

Illinois (Ridgefarm; hydraulic sprays; 6 applications; variety, Indiana Baltimore)

Control: (1) Mn bis; (2) bordo 8-4-100; Tribasic + Zerlate, Tribasic, Z-78; (3) T-Z-T-Z-T-Z, Crag 658, Orthocide 406.

No data on plant safety.

Yield: Yield differences not significant.

No data on overall preference.

PHOMA LEAFSPOT

Louisiana (Baton Rouge; hydraulic sprays and hand dusts; 8 applications; variety Marglobe)

Control: (1) Tribasic; (2) Z-78; (3) Crag 658; (4) dusts of Tribasic (7%), Z-78 (6%), Crag 658 (6%).

Plant Safety: (1) Z-78; (2) Z-78 dust; (3) Crag 658, Crag 658 dust; (4) Tribasic dust; (5) Tribasic.

Yield; (1) Z-78; (2) Crag 658; (3) Crag 658 dust; (4) Z-78 dust; (5) Tribasic; (6) Tribasic dust.

Overall Preference: (1) Z-78; (2) Crag 658; (3) Crag 658 dust; (4) Z-78 dust.

PEPPER

ANTHRACNOSE

Maryland (Hurlock; hydraulic sprayer; 5 applications; variety California Wonder)

Control: No disease data.

Plant Safety: (1) Orthocide 406, Z-78; (2) Tribasic copper.

Yield: (1) Orthocide 406, Z-78; (3) Tribasic.

Overall Preference: (1) Orthocide 406, Z-78.

CUCURBITS

Cucumber

ANTHRACNOSE, SCAB, DOWNY MILDEW

Louisiana (Hammond; hand duster; 4-6 day applications; variety Marketer; disease -- downy mildew)

Control: (1) Z-78 (8%); (2) Tribasic (7%); (3) Parzate (8%); (4) Fermate (8%); (5) Orthocide 406 (8%); (6) Crag 658 (8%).

Plant Safety: (1) Z-78; (2) Fermate; (3) Parzate; (4) Orthocide 406, Crag 658, Tribasic.

Yield differences not significant.

Overall Preference: (1) Z-78; (2) Fermate; (3) Parzate; (4) Orthocide 406; (5) Tribasic; (6) Crag 658.

South Carolina (Charleston; hand duster; 8 applications; variety Palmetto; diseases -- downy mildew, anthracnose)

Control: -- Downy Mildew -- (1) Tribasic (5.3%); (2) Z-78 (3.9%), Parzate (3.9%), Orthocide 406 (5%), Phygon XL (1%); (3) Fermate (8%).

Control: -- Anthracnose -- (1) Orthocide 406; (2) Z-78, Parzate, Fermate; (3) Phygon XL, Tribasic.

Plant Safety: (1) Z-78, Parzate, Orthocide 406; (2) Fermate, Phygon XL, Tribasic.

Yield: (1) Parzate; (2) Z-78, Orthocide 406; (3) Fermate; (4) Phygon XL; (5) Tribasic.

Overall Preference: (1) Z-78, Parzate, Orthocide 406; (2) Tribasic; (3) Fermate, Phygon XL.

Notes: Palmetto mildew-resistant, but mildew serious in spite of resistant variety. Phygon and Fermate not considered worth further testing. Orthocide looked very good, particularly against anthracnose, but this represents only one year's test. Zineb will be recommended for 1951 as it was in 1949 and 1950.

North Carolina (Faison; dusts and sprays; weekly applications; variety Palmetto; diseases -- severe anthracnose, moderate downy mildew)

Control: (1) Zerlate (8%), Z-78 (8%), Tribasic spray, Zerlate-Tribasic; (2) Fermate (8%); (3) Tribasic (5%).

Plant Safety: (1) All materials equally safe, Fermate and Zerlate the safer.

Yield: (1) Zerlate; (2) Z-78; (3) Tribasic spray; (4) Zerlate-Tribasic; (5) Fermate; (6) Tribasic.

Overall Preference: (for anthracnose control on mildew-resistant varieties in fall crop)

(1) Zerlate, Z-78, Tribasic spray, Zerlate-Tribasic; (2) Fermate; (3) Tribasic.

Note: While there is some interest in fall cucumbers, the main crop is grown in the spring when downy mildew rather than anthracnose is the major disease. Downy mildew-resistant varieties are not adapted for the spring crop and Tribasic is recommended.

Missouri (Columbia; hydraulic sprays; 10-day interval applications; variety Earliest-of-All; diseases -- anthracnose, downy mildew)

Control: (1) Zerlate, Z-78; (2) Fixed copper.

Plant Safety: (1) Zerlate, Z-78; (3) Fixed copper.

Yield: (1) Zerlate, Z-78; (3) Fixed copper.

Overall Preference: (1) Zerlate, Z-78.

Considerable injury occurred with the Fixed copper in combination with Lindane.

Michigan (East Lansing; hydraulic sprayer; 4 applications; variety National Pickling; disease -- scab)

Control: (1) C & C 5400; (2) Actidione*, Actidione**, Crag 658.

Plant Safety: (1) C & C 5400, Crag 658; (2) Actidione*, Actidione**.

Yield: (1) Crag 658; (2) Actidione*; (3) C & C 5400; (4) Actidione**.

Overall Preference: (1) Crag 658, C & C 5400.

Some phytotoxicity with the actidiones. Very poor growing year -- cold and wet. Heavy scab epidemic with only slight control in any treatment.

(*10 P.P.M.; **30 P.P.M.)

Muskmelon

Michigan (East Lansing; hydraulic sprayer; 4 applications; variety Honey Rock; disease -- Macrosporium leaf spot)

Control: Data inconclusive.

Plant Safety: (1) C & C 5400, Crag 658; (2) Actidione*; (3) Actidione**.

Yield data not significant.

No overall preference based on 1951 results.

(*10 P.P.M.; **30 P.P.M.)

Maryland (Hurlock; hydraulic sprayer; 6 applications; variety Hales Best; diseases -- Macrosporium leaf spot and downy mildew)

Control: (1) Orthocide 406, Zerlate; (2) Tribasic; (3) C & H copper; (4) Z-78; (5) Robertson copper, Crag 658; (6) Tribasic (delayed applications); (7) Z-78 (delayed application).

Plant Safety: (1) Z-78, Orthocide 406, Zerlate, Z-78 (delayed applications); (2) Crag 658; (3) Tribasic, Robertson copper, C & H copper.

Yield: (1) Orthocide 406; (2) Zerlate; (3) Z-78, Robertson copper; (4) C & H copper; (5) Crag 658; (6) Tribasic; (7) delayed applications of Z-78 or Tribasic.

Overall Preference: (1) Z-78, Zerlate; (2) Orthocide 406; (3) Robertson copper, C & H copper; (4) Tribasic; (5) Crag 658.

Delayed applications; sprays delayed until downy mildew appeared on July 28 and then applied July 28, August 4, and August 11.

Watermelon

Florida (Leesburg; hydraulic sprays; 7-day interval applications; variety Cannon Ball; disease -- downy mildew)

Control: Control equally good with the following: Z-78 (2 lbs./100 or 1 1/2 lbs./100), Parzate (2 lbs./100 or 1 1/2 lbs./100), Phygon (1/2 lb./100 or 1/2 lb. + 1/2 lb./100 $MgSO_4$).

No phytotoxicity. No yield data.

Overall Preference: Z-78 or Parzate because they will control anthracnose and gummy-stem blight. Phygon XL is untested against these.

Florida (Leesburg; hand dusters; 7-day interval applications; variety Cannon Ball; disease -- downy mildew)

Control: Compared Z-78 dust, containing 3%, 4%, 5%, 6%, and 8% active ingredient; also Parzate dust containing 6.5% active ingredient. Equal control with all percentages except 3%, which was too low for adequate mildew control.

All materials equally safe. No yield data taken.

Overall Preference: Z-78 at 4%, 5%, or 6%, Parzate at 6.5%. Z-78 at 8% too high.

SOIL TREATMENTS FOR CONTROL OF NEMATODES IN 1950

CONTRIBUTORS REPORTING

State	Contributor	Location of tests
Connecticut	Anderson, P. J.	Windsor
Delaware	Crittendon, H. W.	Bethel
Florida	Christie, J. R. Perry, V. G.	Sanford
	Kincaid, R. R.	Quincy
	Clark, Fred, Myers, J. M.	Gainesville
	Conover, R. A. Wolfenbarger, D. O.	Homestead
Georgia	Boyle, L. W.	Experiment
Maryland	Cox, C. E. Scott, L. E. Matthews, W. A.	Salisbury
New York	Lear, Bert	Ithaca
South Carolina	Epps, W. M.	Charleston
	Graham, T. W.	Florence

SOIL TREATMENTS FOR THE CONTROL OF NEMATODES

At Windsor, Connecticut, fumigants were applied 6 inches deep in sandy loam soil by a tractor-drawn shank applicator. Dowfume N was applied at 25 gal./acre, Iscobrome D at 30 gal./acre, and Dowfume W-40 at 15 gal./acre. Treatments were made in May and September 1949, and cigar leaf tobacco plants were set in June 1950. Most effective control of meadow nematodes was achieved with Isobrome D and Dowfume W-40. Some impairment of burn quality was caused by Dowfume N treatments.

At Bethel, Delaware, fall applications of DD mixture were made 6 inches deep in a sandy soil with hand injectors at rates of 13, 21, and 34 gal./acre. A spring application of 21 gal./acre, a combination fall and spring application totaling 42 gal./acre of DD mixture, and a fall application of Iscobrome D at 29 gal./acre completed the treatments. One month following the spring applications, two varieties of cantaloupe were planted on each of the 25 x 100 foot plots. Control of root-knot nematode was best on plots receiving 42 gal./acre of DD mixture in the combination fall and spring application. However, the lowest yields were obtained from these plots. Highest yields were obtained from fall treatments of DD mixture at 13 and 21 gal./acre and Iscobrome D at 29 gal./acre.

At Sanford, Florida, tests were conducted in quart fruit jars of sandy soil containing miscellaneous soil nematodes. The volatile materials were injected in the soil and the non-volatile materials mechanically mixed with the soil. Treatments included dosages of 0.5, 1, 2, 4, and 8 ml. of each of the following:

1-(3, 4-dichlorobenzyl)-1-methyl-2-(3-pyridyl)-pyrrolidinium chloride
1-butyl-2-methyl-2-(3-pyridyl)-2-pyrrolidinium thiocyanate
didocecyl nicotinium dipicrate

1-dodecyl-2-methyl-2-(3-pyridyl)-pyrrolidinium chloride
1-(2,4-dichlorobenzyl)-1-methyl-2-(3-pyridyl)-pyrrolidinium chloride
bis (diethyl nicotinium dibromide)
8-phenyl-mercuridyx-quinoline
maleic acid
diethylene glycol butyl ether ester of acetic acid
anisalacetone
benzoic acid (allyl ester)
azoxybenzene
p-aminodiphenyl
benzoic acid
p-aminobenzoic acid (methyl ester)
ammonium dinitro-o-cresylate
acetic acid (3,4-dichlorobenzyl ester)
anisaldehyde
acrylic acid (beta-phenoxyethyl)
acrylic acid (beta benzyloxyethyl ester)
anthranilic acid (methyl ester)
1-hexadecyl-1-methyl-1-2-(3-pyridyl)-pyrrolidinium thiocanate
acrylic acid (tetrahydrofurfuryl ester)
anisic acid (methyl ester)
1-hexadecyl-1-methyl-2-(pyridyl)-pyrrolidinium bromide
1-hexadecyl-1-methyl-2-(pyridyl)-pyrrolidinium-toluene-sulfonate
bis (3, 4-dichlorobenzyl) nicotinium dichloride
DD mixture
Soilfume 80-20
Fumigant H-9136
Fumigant 406-J
Fumigant 406-J (emulsifiable)
Fungicide 275-E
Metacide
Neo-Vita
Pestox
paradichlorobenzene

One additional test was conducted in fumigating boxes with tight covers and in greenhouse flats. Chemicals used were Atlas Fumigant A, Atlas Fumigant B, cyclohexane, synthetic hexane, ammonium dinitro-o-cresylate, dibromobutene, cyclohexyl bromide, allyl acetone, petrolium hexane, and cyclohexyl chloride. The most effective materials as based on the number of living nematodes recovered from 1/2 pint of soil by a combination of decanting, sieving, and the Baermann technic were benzoic acid (allyl ester) 4 ml., azoxy-benzene 8 ml., ammonium dinitro-o-cresylate 2 ml., acetic acid (3,4-dichlorobenzyl ester) 4 ml., DD mixture 0.5 ml., Soilfume 80-20 1 ml., H-9136 0.5 ml., Fumigant 406-J 2 ml., Fumigant 406-J (emulsifiable) 1 ml., and dibromobutene 1 ml.

At Quincy, Florida, field applications in a fine sandy loam of 16° C. at 6- to 8-inch depth were made with DD mixture at 10 and 20 gal./acre, Dowfume W-40 at 8 and 16 gal./acre, chlorobromopropene at 18 gal./acre, and dichlorobutene at 18 gal./acre. Control of root-knot nematode on cigar-wrapper tobacco plants set one month after treatment was best and the highest yields were obtained with DD mixture and Dowfume W-40 at all rates used. No material gave weed control and slightly retarded growth resulted on the DD mixture treatment at the 20 gal. dosage.

At Gainesville, Florida, field treatments of nematode-infested land were made three weeks before setting tobacco plants. Methyl bromide was applied with a "jiffy applicator" at 1 lb./100 square feet. Ethylene dibromide at 7 to 8 gal./acre and DD mixture at 8 to 10 gal./acre were applied in drill rows 3.5 ft. apart with a gravity flow applicator at 8- to 9-inch depth in a fine sandy soil at 60° F. Excellent root-knot nematode control and weed control were obtained with methyl bromide and the ethylene dibromide gave slightly better nematode control than DD mixture.

At Homestead, Florida, treatments were made in a root-knot nematode infested field by spring applications of calcium cyanamide at 2000 lbs./acre, broadcasted and disced in the soil, DD mixture at 306 lbs./acre, and Dowfume W-40 at 311 lbs./acre applied 4 to 6 inches deep with a tractor-drawn applicator with outlets one foot apart. MC-2 at 910 lbs./acre released beneath Sisalkraft paper was used in the fall, and a summer treatment of two applications of Chipman 2-4 D amine 67% plus 300 lbs./acre of sodium chlorate completed the treatments. The soil involved was a Perrine marl (a finely divided calcareous soil of pH8). Results were obtained from roots of volunteer potatoes and yields obtained from potatoes planted in November and dug the following March. MC-2 was most effective in the control of nematodes, producing 95 percent marketable tubers compared to 16 percent in the check plots. No control was achieved with DD mixture, Dowfume W-40, or calcium cyanamide. Complete weed control was obtained from the MC-2 treated areas. A second test was made with replicated dosages of DD mixture applied at 1608, 494, 335, and 176 lbs./acre applied in the spring with a tractor-drawn applicator having outlets one foot apart. There were no significant differences among treatments as regards nematode control, yield, or effect on weeds.

At Salisbury, Maryland, DD mixture was applied at 60 gal./acre to field soil with a tractor-drawn applicator at a 6-inch depth. Rain after the applications was the only surface seal. Six to eight weeks following treatment sweet-potatoes, tomatoes, snapbeans, and cantaloupes were planted on the plots. Good weed control, especially of crabgrass, was obtained. Control of root-knot nematode and wireworms was also good. There were also indications of an indirect effect on reduction of "growth cracking" in sweetpotatoes.

At Ithaca, New York, replicated glazed gallon crocks of root-knot nematode infested soil were treated with the following chemicals: Dowfume G, 3 ml.; Dowfume W-40, 1.5 ml.; dichlorobutenes, 0.5 and 1 ml.; chlorobromopropene, 0.5 and 1 ml.; DD mixture, 1 ml.; Dow H-9138, 1.5 ml.; Formulation 118, 1 ml.; and DD-chloropicrin, 1 ml.; Parathion (15% wettable powder), 75 mgm.; chlorobutenes, 1 and 2 ml.; and Metacide, 75 and 300 mgm. A surface seal was applied by the application of 100 ml. of water to each crock. Three weeks following treatment three squash seeds were planted in each crock and the number of nematode galls present on the squash roots five weeks later counted as an estimate of treatment efficacy. Most effective treatments were Dowfume G, Dowfume W-40, dichlorobutenes, chlorobromopropene, Dow H-9138, and DD-chloropicrin mixture. In a second experiment, a 10% liquid formulation of dichlorobutenes at 2 and 5 ml., a solid formulation of 10% dichlorobutenes at 2 and 5 grams, and 1,3-dichloro-1-butene at 0.5 ml. per gallon crock were applied to replicated gallon glazed crocks of root-knot nematode infested soil. All gave eradication of root-knot nematode as based on gall counts on roots of squash indicator plants sowed three weeks following treatment.

At Florence, South Carolina, the following materials were applied to root-knot nematode infested soil by surface drench: allyl alcohol (6 qts.) plus sodium azide (6 lbs.) per 100 sq. yd.; uramon (100 lbs.) plus calcium cyanamide (50 lbs.) per 100 sq. yd.; dichlorobutene (40 gm.) per sq. yd.; and allyl alcohol (6 quarts) per 100 sq. yd. Methyl bromide at 1 lbs./100 sq. ft. was released beneath a gas-proof cover, and a second methyl bromide treatment in which tobacco seed was sowed 6 to 24 hours after treatment. Chemical treatments were compared with steam applied beneath an inverted pan, and the untreated check. Treatments were made in October in sandy soil and tobacco seed was sown in February. Root-knot nematode control was best with methyl bromide, allyl alcohol plus ethylene dibromide, and uramon plus calcium cyanamide. The number of plants per square foot was higher in the allyl alcohol plus sodium azide and the uramon plus calcium cyanamide treated plots.

SOIL TREATMENTS TO CONTROL FUNGI

At Experiment, Georgia, chlorobromopropene at 15 and 25 gal./acre was applied to soil in 8 cubic foot containers with packets of Sclerotium rolfsii sclerotia buried throughout the soil. Injections were made 6 inches deep and a water seal applied. Fungicidal properties were too limited and erratic, especially in heavier soils, to be of practical importance.

At Ithaca, New York, replicated glazed gallon crocks of club-root infested soil were treated with dibromobutene at 1, 5, and 10 grams, Vancide 51 (1% water solution) at 100, 200, and 500 ml., dichlorobutenes at 1 and 2 ml., and acrylon nitrile at 1 ml./gallon crock of soil. No surface seal was used. Cabbage indicator plants were set three weeks following treatment. Most effective treatments were acrylon nitrile, dichlorobutenes, dibromobutene at the 10 gram dosage, and Vancide 51 at 500 ml. per crock. A field-scale experiment was conducted with dichlorobutenes at 3 ml. and chlorobromopropene at 2 and 3 ml. per injection, applied 4.5 inches deep on staggered 10-inch centers with hand injectors. Indicator cabbage plants scored three months later showed the following mean root scores on basis of 0 to 5: Check, 4.56; dichlorobutenes (3 ml.), 2.53; chlorobromopropene (3 ml.), 2.35, and (2 ml.), 3.33. Severe injury was evident on the plots receiving the dichlorobutenes.

At Charleston, South Carolina, chlorobromopropene at 20 gal./acre and chloropicrin at 50 gal./acre were applied 5 inches deep with hand injectors to sandy soil containing damping-off organisms, especially Sclerotinia sclerotiorum. Within one hour of treatment the surface was sealed with 1/4 inch of rain. Stand counts of lettuce sowed six weeks after treatment showed both treatments effective as regards stand with chloropicrin giving the best pest control. Excellent control of Stellaria media and Lamium amplexicaule was obtained with chloropicrin.

GLADIOLUS DISEASES

Data reported are results of national cooperative corm treatment tests sponsored by the American Gladiolus Council and the North American Commercial Gladiolus Growers. Cooperators were: Jack Scott, Clarkesville, Georgia; J. L. Forsberg, Urbana, Illinois; A. F. Sherf and C. H. Sherwood, Ames, Iowa; W. D. McClellan, Beltsville, Maryland; J. R. Keller and A. W. Dimock, Ithaca, New York; A. A. Foster, Farmingdale, New York; F. A. Haasis, Wilmington, North Carolina; and H. A. Runnels, Wooster, Ohio.

Materials used were:

(a) for Fusarium brown rot control on variety Corona:

1. New Improved Ceresan, 1 oz., plus Dreft, 2 tblsp./3 gals., 15 min. soak.
2. Dow 9B, 3 oz./3 gals., 15 min. soak.
3. Arasan, full strength dust.
4. Dow 9B, full strength dust.
5. Natriphene, 14.2 grams/3 gals., 1 hr. soak.
6. Dowicide B, 6 oz./3 gals., 15 min. soak.
7. Phygon XL, full strength dust.
8. Spergon Gladiolus Dust, full strength dust.
9. Ceresan M, 1 oz./3 gals., 15 min. soak.
10. Tag 331, 60 ml./3 gals., 15 min. soak.
11. Phenyl Mercury Fixtan, 11.4 grams/ 3 gals., 15 min. soak.

(b) for bacterial scab and Sclerotinia dry rot control:

1. Mercuric chloride, 11.4 grams/3 gals., 2 hr. soak.
2. Mercuric chloride, 11.4 grams/3 gals., 14 hr. soak.
3. Semesan, 113.5 grams/3 gals., 3 hr. soak.
4. Phenyl Mercury Fixtan, 11.4 grams/ 3 gals., 2 hr. soak.
5. Calogreen, 9.6 oz./3 gal., brief dip.
6. Tag 331, 60 ml./3 gals., 2 hr. soak.
7. Mercuric chloride, 11.4 grams plus New Improved Ceresan, 1 oz., plus Dreft, 2 tblsp./3 gals., 30 min. soak.

Records were taken on stand, flower production, date of bloom, corms harvested, rot-free corms in the Fusarium test, and scabby corms and corms with Sclerotinia dry rot in the scab test.

Results, Fusarium test: On the bases of flower production, corm production, and rot-free corms, only Tag 331 and Phenyl Mercury Fixtan consistently failed to show highly significant improvement over the controls. Natriphene was low in corm production and in rot-free corms in most cases, and Spergon Gladiolus Dust was often low. No one material was clearly superior but New Improved Ceresan, Dowicide B, Arasan dust, Dow 9B soak, and Ceresan M were generally most effective. In no case was any material significantly superior to New Improved Ceresan, the most common material in current commercial usage. Ceresan M was consistently inferior to New Improved Ceresan. Dow 9B dust was the only material causing injury, this being reflected in emergence, total bloom, and time from planting to bloom.

Results, scab and Sclerotinia test: Tag 331 was apparently injurious to the variety Snow Princess, reducing emergence and bloom production and delaying bloom. There were no significant differences in scab except in Ohio, where mercuric chloride (14 hrs.), Semesan, and Tag 331 apparently gave best control. Differences in Sclerotinia dry rot were not significant.

Gladiolus corm treatments: Additional data on 1950 gladiolus corm treatments were supplied by J. L. Forsberg, Urbana, Illinois. The tests were conducted in cooperation with the Kankakee County Gladiolus Growers Association.

In tests of corm treatments for the control of Fusarium rot a soak of 2 hours or more in Natriphene (1 to 800) gave good control whereas a 15-minute soak was ineffective. Dow 9B was effective at both 3 ounces and 4 ounces to 3 gallons; Arasan dusted on the corms prior to planting and dusted in the furrow after dropping the corms were both effective, the former method giving the better results; Phenyl Mercury Fixtan was of questionable value; and New Improved Ceresan, as usual, was effective.

In corm treatments for bacterial scab control involving 10 varieties, $HgCl_2$ at 1 to 1000, 2 hr. and 14 hr. soak; $HgCl_2$ at 1 to 1000 plus N. I. Ceresan at 1 oz./3 gals. plus Dreft at 2 tblsp./3 gals., 30 min. soak; $HgCl_2$ at 1 to 1000 plus Ceresan M at 1 oz./3 gals., 30 min. soak; and $HgCl_2$ at 1 to 1000 plus Phenyl Mercury Fixtan at 5 gms./3 gals., all gave very good control. The $HgCl_2$ 2 hr. soak and the $HgCl_2$ plus P. M. F. were usually somewhat less effective than the other three treatments. N. I. Ceresan, Natriphene, and P. M. F. alone were not effective.

Additional scab tests involving three varieties showed excellent control with $HgCl_2$, 2- and 14-hour soaks, $HgCl_2$ plus N. I. Ceresan, 30 min.-soak, and Calogreen (HgCl), 9.6 oz./3 gals., 1 min.-dip. Semesan at 113.5 gms./ 3 gals. and Tag 331, 60 ml./3 gals., 2 hr.-soak gave somewhat less effective control. Phenyl Mercury Fixtan was ineffective.

In tests of pre-storage treatments with and without preplanting treatments for control of Fusarium dry rot, Arasan, Dow F-800, Dow 9B, and Spergon, each mixed with equal parts 5% DDT; Dow 9B, 1 part, Fermate, 1 part, 5% DDT, 4 parts; Natriphene, one 73 grain tablet plus 27 grams wettable DDT in 2 1/2 gals. water; and 5% DDT were used as pre-storage treatments, with N. I. Ceresan at standard dosage as the preplanting treatment in each case.

Although the results lacked statistical significance, nearly all prestorage treatments reduced the amount of storage rot. Dow 9B alone or with Fermate appeared to be slightly superior to the other treatments. With these treatments and with Dow F-800, control of rot during the growing season was excellent, and the use of the pre-planting treatment with N. I. Ceresan improved the control only with one lot of Picardy in which heavy storage losses had also occurred. With Arasan pre-storage treatment, the use of N. I. Ceresan pre-planting treatment in most cases resulted in greatly reduced control, whereas with Spergon and Natriphene pre-storage treatments, the pre-planting treatment in all cases improved control.

Prestorage corm treatments for Fusarium brown rot control reported by Frank A. Haasis indicated good results and plant safety with a 5-minute steep in Dow 9B suspension at 3 lbs./100 gals.

Preplanting corm dips for control of Sclerotinia dry rot were reported by C. J. Gould. Tersan (1 lb./6 gals. -- 1 hr.) was rated best of the materials tested on the basis of disease control and plant safety. Mersolite W (1 lb./241 gal., 1 lb./482 gal., 1 lb./723 gal. -- 1 hr.) gave best disease control but caused delay in emergence and bloom. Disease control improved and plant safety decreased as the concentration of active ingredient increased. Natriphene (1 lb./96 gal., 1 lb./193 gal. -- 1 hr.) failed to give adequate control.

CARNATION DISEASES

Soil treatments: E. F. Guba and R. W. Ames reported results of soil drenches for Rhizoctonia stem rot control. New Improved Ceresan (6 weekly treatments at 0.78 oz./ 100 sq. ft.) gave best control and yield followed by Fermate and Semesan (both at 6 treatments of 3.10 oz./100 sq. ft.). Pfizer's Mercurial Mixture and mercuric chloride both caused injury, and Phygon XL and Semesan Bel failed to give adequate control.

Soil treatments for control of Fusarium wilt and branch rot of carnations were reported by W. D. Thomas, Jr. and J. G. Zoril. Best disease control was given by Dithane Z-78 (4 oz./100 sq. ft.), followed by a *Trichoderma lignorum* extract (7% soln.; 2 oz./100 sq. ft.). Crag 658 and Goodrite Zac were quite injurious. Dithane Z-78 applied during high temperature periods caused excessive apparent stimulation of growth.

H. Murakishi and J. W. Hendrix, in Honolulu, obtained excellent control of Fusarium root rot and wilt of carnations in greenhouse flats by drenching the soil with Dithane Z-78 (1 to 200), using approximately 3 pints per square foot. Treatments were made one week before planting, at planting, and again one month after planting. Bioquin 1 (Technical), Copper A, Puratized 111-5, Puraturf, Natriphene, and Quinate were wholly ineffective.

Foliage sprays: C. A. Davis, Jr. and A. W. Dimock at Ithaca, New York, tested 12 materials for control of *Alternaria dianthi* in replicated small field plots. Applications were made about once a week from June 22 to September 15, final notes being taken September 27.

Best control was obtained with Bioquin 1 (1 lb./100 gal.), Vancide 51 (2 qts./100 gal.) plus zinc sulfate (1 lb./100 gal.), and Orthocide 406 (1 lb./100 gals.). Bioquin 1 and Orthocide 406 ranked 1 and 2 in similar tests last season. Good control was obtained with Dithane Z-78 (1 lb./100 gals.), Phygon XL (1 lb./100 gals.), Vancide 51 (2 qts./100 gals.), and Puratized Agricultural Spray (1 pint/100 gals.). Fair to poor control was obtained with Fermate (1 lb./ 100 gals.), Crag 341C (1 qt./100 gals.) plus lime (0.5 lbs./100 gals.), Crag 341SC (1.5 qts./ 100 gals.) plus lime (0.5 lbs./100 gals.), Zerlate (1 lb./100 gals.), and Tag 331 (0.5 pint/ 100 gals.). Plants sprayed with Crag 341C and with Tag 331 were seriously stunted.

ROSE DISEASES

Blackspot (*Diplocarpon rosae*). At Beltsville, Maryland, tests of 19 materials or combinations in dust form were conducted by W. D. McClellan and F. F. Smith, using small plots of Better Times and Talisman. With both varieties best disease control was obtained with mixtures containing dusting sulfur (usually about 75%) and either copper (10%) or Fermate (10%). All mixtures also contained 5% DDT and usually 1 to 5% of some experimental acaricide. Sulfur without copper or Fermate was not tested. Dusts containing 1% Phygon, without sulfur, failed to give adequate disease control.

An interesting observation was that with both varieties total flower production was with considerable consistency inversely correlated with degree of disease control. No estimate of the quality of the blooms was reported.

At Ithaca, New York, about 30 spray and dust treatments were tested by L. M. Massey and C. A. Davis, Jr. Small plots, each containing 2 plants of each of 6 varieties were employed, with 4 replicates of each treatment. Sprays were applied with a power sprayer and dusts with a hand duster. Applications were made weekly from July 5 until mid-October. Briefly summarized, outstanding results, as in two previous seasons, were obtained with manganese ethylene bis dithiocarbamate spray (1 1/2 lbs./100 gals.). This gave excellent control, with only slight injury during a hot, humid spell. Also outstanding were COCS dust (5% Cu plus 0.75% rotenone) and COCS (2 lbs./100 gals.) plus sulfur (2 lbs./100 gals.) spray. Excellent control was given by these treatments though injury occurred during cool, wet weather.

Very good control was also given by Orthocide 406 (2 lbs./100 gals.), Ortho Rose Dust (containing 6.7% ferbam, 40% sulfur), Farmrite Rose Dust (containing 9.1% zineb), Jackson and Perkins Rose Dust (containing ferbam, sulfur, and Bioquin 1), and Dithane Z-78 (1 lb. per 100 gals.) plus Karathane. Orthocide 406 produced some injury on Crimson Glory and Pinochio. The other materials caused no evident injury.

Fair control was obtained with Triogen Dust, J. & P. Rose Spray, Sears Rose Dust, Urea with sulfur, Bioquin 1 with sulfur, Bioquin alone, Farmrite Spray, Crag 341SC, and sulfur alone.

Poor results were obtained with Rix with sulfur, TMTD, Ortho Rose Spray, Triogen Spray, and Ortho-Rix.

Tag 331 (1/4 pint/100 gals.) gave excellent eradication when applied after rains but caused considerable injury. Lime-sulfur (1/100) after rains also proved effective in control but was quite conspicuous and injurious.

It is of interest that in all cases where materials were tested both as sprays and dusts, the dust treatments gave better results.

Powdery mildew (Sphaerotheca pannosa var. rosae). Greenhouse spray trials conducted by W. D. McClellan showed best control of powdery mildew on var. Starlite with Arathane or Karathane at 1/2 lb./100 gals. plus Santomerse S at 1 to 2000. Good control was also obtained with Arathane at 1/4 lb./100 gals. plus wettable sulfur at 2 lbs./100 gals. and with wettable sulfur at 2 lbs./100 gals., both with Santomerse S at 1 to 2000. Arathane and Karathane under some conditions caused mild injury.

SNAPDRAGON RUST

Replicated small-plot spray tests conducted by C. A. Davis, Jr. and A. W. Dimock at Ithaca, New York, showed excellent control with Crag 341SC (1.5 qt. plus 1/2 lb. lime/100 gal.), Crag 341C (1 qt. plus 1/2 lb. lime/100 gal.), and Dithane Z-78 (1 lb./100 gal.). Crag 341C caused considerable stunting and downward curling of the leaves, whereas Crag 341SC caused very little injury. Dithane Z-78 was not injurious.

Fair control was obtained with Zerlate, Phygon XL, Vancide 51 (2 qts./100 gal.), and Vancide 51 (2 qts./100 gal.) plus zinc sulfate (1 lb./100 gals.). Fermate (1 lb./100 gal.), Puratized Agricultural Spray (1 pint/100 gals.), Bioquin 1 (1 lb./100 gal.), and Orthocide 406 (1 lb./100 gals.) gave poor control. Both Puratized Agricultural Spray and Tag 331 caused serious stunting, the latter being discontinued after a few treatments.

CHRYSANTHEMUM DISEASES

Leafspot (Septoria obesa). In tests by C. A. Davis, Jr. and A. W. Dimock at Ithaca, New York, excellent control was obtained in replicated small plots with Zerlate, Fermate, Dithane Z-78, Bioquin 1, Orthocide 406, Phygon XL (all at 1 lb./100 gals.), Crag 341SC (1 1/2 qts./100 gals.) plus lime (0.5 lb./100 gals.), and Vancide 51 (2 qts./100 gals.) plus zinc sulfate (1 lb./100 gals.). Poor control was obtained with Crag 341C, Tag 331, and Puratized Agricultural Spray.

Foliar nematode (Aphelenchoides sp.). New phosphate insecticides were tested by J. R. Keller and A. W. Dimock at Ithaca, New York for foliar nematode control. Parathion, Pestox III, and Systox were used both as foliage sprays and as soil drenches. There were three ten-plant plots for each treatment. All plots were inoculated with nematode material on June 26 and August 9 and spray or drench treatments made on June 28, and with some plots again on August 11. Parathion 15% w.p. was used as a spray at 1 and 1 1/2 lbs./100 gals., and the soil drench used .2 grams active per 1000 sq. ft. Pestox III and Systox were used at 0.5 lbs./1000 sq. ft. both as foliage sprays and as soil drenches. Very good control was obtained with Systox where both the first and second treatments were made, whereas control was only fair where the second treatment was omitted. There was no observed difference between soil and foliage treatments. Parathion gave good control at both spray dosages and also when used as a soil treatment, there being no differences due to method of treatment. Pestox III gave good control as a spray, only fair control as a soil treatment.

IRIS

Leafspot (Didymellina macrospora). Small plot tests were conducted by C. A. Davis, Jr. and A. W. Dimock at Ithaca, New York. There were 8 plants per plot and 3 replicates of each treatment. Sprays were applied weekly with a power sprayer.

Excellent control was obtained with Puratized Agricultural Spray (1 pint/100 gal.) and very good control with Bioquin 1 (1 lb./ 100 gals.) and Dithane Z-78 (1 lb./100 gals.). Poor results were obtained with Zerlate, Fermate, Crag 341C, Crag 341SC, Tag 331, Orthocide 406, Phygon XL, Vancide 51, and Vancide 51 plus lime. There was no evidence of mercury injury on the Puratized and Tag plots.

NARCISSUS

Basal rot (Fusarium). W. D. McClellan reported tests at Beltsville, Maryland, in which King Alfred narcissus bulbs were treated three days after digging and again just before planting. Liquid materials were used as a 5-minute dip. Best disease control and yield were obtained with Tag HL 331 (10 lbs. soln./800 gal. water), Mersolite P dust (2% phenyl mercury acetate in bentonite), and Mersolite 8 (1 lb./800 gal.). Less satisfactory control and yield were obtained with Dow F-800 dust, Compound "A" (9.25% p.m. a.), Puratized Apple Spray, Arasan SF, Dynacide, and Dow 9B.

In tests at North Carolina, F. A. Haasis reported best control of basal rot and plant safety with Mersolite 8 (1 lb./700 gal.) as a 5-minute steep. Other materials considered less satisfactory, because of poorer disease control or plant injury, included Mersolite W, Mersolite 15, Ceresan 5%, Ceresan M, Ceresan 2%, and Dow 9B plus Fermate.

AZALEA (RHODODENDRON SP.)

Petal blight (Ovulinia azaleae). D. L. Gill, at Spring Hill, Alabama, reported good control with sprays of Dithane D-14 + zinc sulfate + lime, Dithane D-14 + zinc sulfate, and Parzate. Dithane D-14 plus lime and Dithane D-14 plus spreader gave good control but were very injurious. Dithane Z-78 and manganese ethylene bis dithiocarbamate gave only fair control.

WESTERN SYCAMORE (PLATANUS RACEMOSA)

Anthracnose (Gnomonia veneta). Pierre A. Miller and G. A. Zentmyer report significant control with the following sprays in decreasing order of effectiveness: Puratized Agricultural Spray (1 qt./100 gals.); Phygon XL plus Karathane W.P. 25 (both at 2 lbs./100 gals.); Phygon XL (2 lbs./100 gals.); Bordeaux mixture (6-6-100); Bioquin 1 (1.16 lbs./100 gals.); Goodrite Zac (2 lbs./100 gals.); and Dithane D-14 (2 qts./100 gals.). The amount of disease ranged from 10.14 to 23.13 percent in the sprayed plots to 32.92 percent in the untreated checks. Dormant plus foliage sprays were compared with foliage sprays alone, but there were no significant differences.

Spray tests for sycamore anthracnose control were conducted by J. C. Carter at Urbana, Illinois. Disease incidence was too light for reliable comparisons but none of the following materials caused injury when a series of three sprays was applied: Arathane W.P. 25 (1 lb./ 100 gals.); Bioquin 1 (1 lb./100 gals.); Crag 341C (1 qt./100 gals.); Fermate (2 lbs./100 gals.); manganese ethylene bis dithiocarbamate (2 lbs./100 gals.); Orthocide 406 (2 lbs./100 gals.); Puratized Agricultural Spray (1 pint/ 100 gals.); Puratized Apple Spray (1/2 pint/100 gals.); and Tag 331 (1/2 pint/100 gals.).

MISCELLANEOUS FUNGICIDE TESTS 1950

TURF

DOLLAR SPOT
(Sclerotinia homeocarpa) control.

California: (Los Angeles; P. A. Miller. Seven bi-weekly spray treatments, July 13 to September 28.)
Preference, based on disease control and plant safety: Puraturf 177 (1.6 oz.), Cadminate (.5 oz.), Caloclor (2 oz.), Carbide and Carbon 1025 (3 oz.), C. & C. 531 (3 oz.), P.M.A.S, (0.1 pint). Spergon (3 oz.), Tersan (3 oz.).
All concentrations in ounces to 10 gals. spray per 1000 sq. ft. Spergon and Tersan not considered worth further trial.

Pennsylvania: (Philadelphia; R. M. Means and H. W. Thurston, Jr. Four sprays, June 3, June 28, July 26, and August 30.)
Ratings based on spots per 100 sq. ft., season average: Cadminate (1.6 oz.) -- 7; Crag 531 (3 oz.) -- 13; Crag 1025 (3 oz.) -- 15; Puraturf 177 (1.6 oz.) -- 24; GG (1/2 pint) -- 48; Actidione (crude, 32 c.c.) -- 109; 111-5 (2.5 oz.) -- 112; Caloclor -- 124; Actidione (pure, 0.8 gms.) -- 199; Orthocide 406 (5 oz.) -- 466; check -- 1254.

TOBACCO

BLUE MOLD CONTROL

Florida: (Quincy; R. R. Kincaid. Cigar wrapper tobacco, var. Rg. Dust treatments, 3 times a week, 16 applications.)
Overall preference on basis of disease control, safety, and yield: Z-78 (6.5% active), Fermate (15%), Parzate (6.5%), Phygon (1%). Phygon safe at 1%, might be used at higher concentration with better results.

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THE PLANT DISEASE REPORTER

Issued By

THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey

BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

AGRICULTURAL RESEARCH ADMINISTRATION

UNITED STATES DEPARTMENT OF AGRICULTURE

1950 SUMMARY OF RESULTS OF FUNGICIDE TESTS ON FRUIT AND NUT TREES

Supplement 210 continued April 15, 1952

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

PLANT DISEASE REPORTER SUPPLEMENT

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THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station Beltsville, Maryland

1950 SUMMARY OF RESULTS OF FUNGICIDE TESTS ON FRUIT AND NUT TREES[1]

Compiled by
The Fungicide Committee of the American Phytopathological Society:
Sub-Committee on Testing and Results of Newer Fungicides[2]

Plant Disease Reporter
Supplement 210 continued April 15, 1952

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[1]The material contained in this part of the Supplement was not available at the time that the first part of the fungicide summary, "1950 Summary of Results of Fungicide Tests on Crops Other Than Fruit Trees", was published, March 15, 1952. P. R. M.

[2]Members of Sub-committee:

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W. D. Mills, Cornell University, Ithaca, New York .
A. G. Newhall, Cornell University, Ithaca, New York.
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1950 SUMMARY OF RESULTS OF FUNGICIDE TESTS ON FRUIT AND NUT TREES

W. D. Mills

Reports of cooperators in 21 States and in two Provinces of Canada were forwarded to the writer by Dr. J. M. Hamilton for compilation late last summer, and the preliminary results of the tabulation were reported at the 13th Annual New York State Insecticide and Fungicide Conference in Ithaca, New York, November 7, 1951. During that meeting an informal conference of the section on fungicide tests was held at which it was stated that the 1950 report would not be published. When the opportunity for publication presented itself the writer was in the middle of nine consecutive weeks of winter fruit meetings so this late date is the first opportunity to complete the job. All cooperators may be assured that no such delay in the report will occur with the 1951 data.

COOPERATORS

California: L. J. Klotz, Phytophthora brown rot and Botrytis blossom blight of citrus.
G. A. Zentmyer, W. A. Thorn, L. C. Masters, avocado fruit rot.
Connecticut: Saul Rich, apple scab.
Delaware: P. L. Poulos and J. N. Heuberger, apple scab.
Georgia: J. R. Cole, pecan scab.
Illinois: Dwight Powell, apple scab.
Iowa: O. F. Hobart, sour cherry leaf spot (nursery), pear Fabraea spot (nursery).
Kansas: Erwin Abineyer, apple scab.
Maine: M. T. Hilborn, apple scab.
Maryland: M. E. Goldsworthy, J. C. Dunegan, R. A. Wilson, J. M. Gorm, peach bacteriosis.
M. E. Goldsworthy, J. C. Dunegan, R. A. Wilson, J. M. Gorm, eradicant fungicides for apple scab.
Massachusetts: O. C. Boyd, apple scab.
Michigan: Walker Toenjes, apple scab.
Missouri: H. G. Swartwout, grape black rot on Herbert, Catawba, and Concord varieties, apple fire blight and fungicides, sooty blotch-apple scab eradication.
New Hampshire: M. C. Richards, apple scab.
New York: D. H. Palmiter, apple scab.
A. B. Burrell, concentrate sprays.
North Carolina: C. N. Clayton, strawberry leaf spot control, apple black rot and bitter rot control.
Ohio: H. C. Young and H. E. Winter, apple scab on Rome, McIntosh, Cortland.
Oregon: J. R. Kienholz, Sclerotinia brown rot of sweet cherry, pear scab.
Paul W. Miller, walnut bacteriosis.
Pennsylvania: H. W. Thurston, Jr., apple fungicides.
Virginia: A. B. Groves, apple scab.
Washington: J. R. Kienholz, powdery mildew of apple.
R. Sprague, powdery mildew of apple.
Wisconsin: J. D. Moore and G. W. Keitt, apple scab, cherry leafspot.
Canada - Ontario: G. C. Chamberlain, apple scab, sweet cherry blossom blight.
Nova Scotia: J. F. Hockey and R. G. Ross, apple scab.

APPLE SCAB

In the following summary of apple fungicides an attempt was made to bring together all the comparisons of protectant fungicides in which each of the listed materials had been compared with each of the others in scab control. Experiments in which the fungicides were listed in order of disease control and order of plant safety were included. Leaf scab and fruit scab data were both included where percentages were given to obtain a larger number of comparisons. The following seven fungicides or groups of protectant fungicides were used in Table 1.

305 = Cr 305, 2-hydroxy 5-chlorophenyl sulfide (Röhm and Haas)
341 = Crag 341SC and 341C, pure and impure forms of 2 heptadecyl glyoxalidine (Carbon and Carbide)
Pst = Paste sulfur, largely Magnetic 70 wet ground sulfur paste. Stauffer Chemical Company. Thylox flotation sulfur paste from several gas companies was also included.
406 = Orthocide 406, N-trichloro methyl hydrophthalimide. (California Spray Chemical Co.)
D. W. S. = dry wettable sulfur, largely micronized or other air-ground elemental sulfur.
Kol = "Kolo" materials containing Banks colloidal sulfur and elemental sulfur (Niagara

Table 1. Protectants and Apple Scab Control 1950.

	305 +=-	341 +=-	Pst +=-	406 +=-	DWS +=-	Kol +=-	Fer +=-	Total +=-	Rating
305	XXX	615	402	413	110	200	301	600	1
341	516	XXX	140	525	700	202	812	501	2
Pst	204	041	XXX	311	511	600	500	402	3
406	314	525	113	XXX	300	101	411	213	4
DWS	011	007	115	003	XXX	400	301	204	5
KOL	002	202	006	101	004	XXX	101	024	6
FER	103	218	005	114	103	101	XXX	015	7

\+ better control = equal control - poorer control

Table 2. Protectants and Fruit Russeting 1950.

	341 +=-	406 +=-	Fer +=-	Kol +=-	DWS +=-	Pst +=-	305 +=-	Total +=-	Rating
341	XXX	101	201	100	100	100	300	510	1
406	101	XXX	101	100	100	100	200	420	2
Fer	102	101	XXX	100	100	100	200	411	3
Kol	001	001	001	XXX	110	300	100	303	4
DWS	001	001	001	011	XXX	300	100	204	5
Pst	001	001	003	003	003	XXX	101	106	6
305	003	002	002	001	001	101	XXX	006	7

\+ better finish = equal finish - poorer finish

Sprayer & Duster Co.). Kolofog 100 containing Phygon and sulfur was not included.

Fer = ferbam (ferricdimethyldithiocarbamate,) largely Fermate, (DuPont de Nemours)

Protectants in Table 1 are listed in order of their control of leaf and fruit scab: + indicates the material at left in the same line gave better control than the material at the head of the column; = indicates equal or a difference of less than 1 percent in scab or tied in the order of disease control; - indicates the material at the left gave poorer control than the material heading the column. Example: follow "305" line to 2nd column headed "341". "305" gave better scab control in 6 comparisons, equal control in 1 comparison and poorer control in 5 comparisons with "341". Underlined figures under + or - heading indicate that the data in one or more experiments were treated statistically, and significant differences at .05 level or higher were found. In the three-digit column at right, headed Total, the rating of each material against the other six fungicides is shown. Following the "305" line to this column we find 600 under +, =, and - respectively, indicating that "305" was superior in scab control to the other six fungicides, giving it a rating of 1. "341" with 501 indicates that "341" was superior to five other fungicides but inferior to one, giving "341" a rating of 2. Paste sulfur with four wins and three losses was third, "406" with two wins, one tie, and three losses was fourth, dry wettable sulfur with two wins and four losses was fifth, Kolofog was sixth with two ties and four losses, while ferbam was seventh with one tie and five losses. It is recognized that this fungicide usually gives poorer control of leaf scab than fruit scab, and both were included here.

Table 3. Eradicants and Apple Scab Control 1950.

	Hg Ace +=-	Hg Lac +=-	L S +=-	Phy +=-	341 +=-	Hg 806 +=-	406 +=-	Total +=-	Rating
Acet	XXX	562	123	812	403	562	303	501	1
Lact.	265	XXX	101	420	100	343	202	321	2
L. S.	321	101	XXX	101	002	001	200	222)	
Phy	218	024	101	XXX	C10	100	211	222)	3
341	304	001	200	010	XXX	101	525	222	
806	265	343	100	001	101	XXX	202	132	6
406	303	202	002	112	525	202	XXX	015	7

+ better control = equal control - poorer control

Table 4. Eradicants and Fruit Russeting.

	406 +=-	Hg Ace +=-	Hg Lac +=-	341 +=-	Phy +=-	L X +=-	Total +=-	Rating
406	XXX	210	200	311	201	100	500	1
Acet	012	XXX	205	302	201	201	302	2
Lact	002	502	XXX	104	400	010	212	3
341	113	203	401	XXX	001	200	203	4
Phyg	102	102	004	100	XXX	100	203	4
L. S.	001	102	010	002	001	XXX	014	6

+ better finish = equal finish - poorer finish

In Table 2 the same seven protectants are rated for the amount of fruit russeting. Many less comparisons of russeting than of scab control were available. Again the differences known to be significant are underlined. The materials causing least russet are listed first. It will be noted that Crag 341, Orthocide 406, and ferbam were the three safest materials and that no significant differences were reported between them. The CR305, which was first in scab control, caused more russeting than any of the other materials.

In a similar way eradicant fungicides are compared with each other in Table 3. Crag 341 and Orthocide 406 were included because there were some reports of their effectiveness as eradicants.

Hg Ace or Acet. refer to the phenyl mercury acetates Tag (Calif. Spray Co.) and Puratized Apple Spray (Gallowhur Chem. Co.). The powdered form of phenyl mercury acetate was not included.

Hg Lac or Lact. refer to the phenyl mercury lactate, Puratized Agricultural Spray (Gallowhur Chem. Co.).

Hg 806 or 806 refer to the mercury formamide compound known as Puratized 806 (Gallowhur Chem. Co.).

L.S. = liquid lime sulfur solution. The dry lime sulfur powder was not included here.

Phy. = Phygon XL (dichloro naphthoquinone plus magnesium sulfate) (Naugatuck Chem. Co.).

341 = Crag 341C and 341SC (Carbon & Carbide).

406 = Orthocide 406 (Calif. Spray Chem. Co.).

It will be noted that the acetate and lactate salts of phenyl mercury received the first and second ratings followed by liquid lime sulfur, Phygon, and "341" in a tie for third place. The

Table 5. Performance of new fungicides as compared with generally used protectants and eradicants for apple scab control.

		Scab Control			Russet		
Protectants		+	=	-	+	=	-
	Pst	3	1	2	0	0	1
CR	DWS	1	1	0	0	0	2
305	Kol	2	0	0	0	0	1
	Fer	2	0	2	0	0	2
	406	4	1	3	0	0	2
	2351	2	0	0	0	0	1
CR	Pst	1	0	1	-	-	-
2351	406	1	0	4	0	0	2
	341	1	0	3	0	1	1
	Ferm	0	0	2	0	1	0
	Pst	1	0	0	1	0	0
	DWS	3	0	0	1	0	0
TMTD	341	0	0	2	1	0	1
	Fer	0	0	1	1	0	0
	Fer	1	0	0	1	0	0
Stanofide	Pst	1	0	0	0	0	1
	341	0	0	1	0	0	1
DWS x DWS +	Urea	2	0	0	-	-	-
Pst x Pst +	Urea	1	0	4	-	-	-
Fer x Fer +	Lime	1	0	0	-	-	-
Eradicants							
	Phy	1	0	4	0	0	2
	Lac	3	0	1	0	0	2
CR	Ace	6	0	2	0	0	3
305	806	2	0	2	0	1	0
	2351	3	0	2	0	0	1
	406	5	2	1	0	0	3
	M-bis	0	0	4			
	Lac	1	0	1	1	0	0
CR	Ace	2	0	3	1	1	0
2351	806	1	1	2	1	0	0
	406	1	1	4	0	0	2
	341	1	0	3	0	2	0
	2351	1	0	1	1	0	1
M-bis	406	1	0	3	1	0	3
	341	2	0	0	3	4	1
	806	2	0	0	-	-	-
	Kolo 100	1	0	0	1	0	0
Dynacide	Phy	1	1	1	0	1	3
	Lac	0	1	2	0	1	2
	Ace	1	0	2	0	0	1
	806	0	0	1	-	-	-
	341	1	1	0	1	0	0
	406	-	-	-	0	0	1
	2351	-	-	-	0	1	0
	341	0	0	2	-	-	-
Kolofog 100	406	0	0	1			
	Ace	0	1	0	1	0	0
	Ls/60	0	0	1	1	0	0
Stanofide	LS/75	0	0	1	1	0	0
	341	0	0	1	0	0	1

protection afforded the fruit by "341" seems to account for its tie with lime sulfur and Phygon. When leaf scab alone was compared, "341" and "406" were in sixth and seventh places indicating that they are largely protectants rather than eradicants. The formamide salt of mercury, "806", was in sixth place with one win, three ties, and two losses, and Orthocide 406 was poorest in scab control in comparison with the eradicants, with one tie and five losses.

In Table 4 the same eradicants, with the exception of mercury formamide, are compared in regard to fruit russeting. Of the true eradicants, the acetate and lactate salts of mercury led, with "341" and Phygon tied behind them. The older 341C was used in about half the tests and the purified 341SC in the other half. Most of the russeting reported was with the 341C. Lime sulfur caused more russeting in the small numbers of comparisons made.

A number of new or less widely known fungicides were compared in one or more experiments. In Table 5 are listed some of these materials, in comparison first with protectants and then with eradicants. These materials were:

CR305 (bis 2 hydroxy 5 chlorophenol sulfide)
CR2351 (analogue of Cr 305)
TMTD (tetramethyl thiuram disulfide)
M-bis (manganese ethylene bis dithio carbamate)
Stanofide (?)
Kolofog 100 Sulfur 3.5% + Phygon XL 27.8%

The first three columns after the materials refer to scab control and the second three columns to fruit russeting.

SUPPLEMENTAL REPORTS ON APPLE SCAB CONTROL AND SUMMARY OF TESTS WITH OTHER HOSTS

In the following pages an attempt is made to summarize reports on the control of other fruit diseases than apple scab or to quote information and comments on apple scab fungicides not covered by Tables 1 to 4 inclusive.

APPLE SCAB

Delaware, P. L. Poulos and J. W. Heuberger. Apple scab on variety Rome. (Results published as Misc. Paper No. 103 Del. Agric. Expt. Stat. Contribution No. 27 of the Department of Plant Pathology.)

Half-strength with NuGreen or manganese ethylene bis dithiocarbamate appear promising.

Tag 331 and Puratized 806 are not effective in control of fruit scab where the basis of the schedule is protection.

Illinois, D. Powell. Apple scab on Golden Delicious, Rome Beauty, Starking.

No significant difference in fruit scab control with the ten top materials. Cr 2351 and 4.9 RLF1 (?) were significantly inferior to other treatments but superior to check. Cr 305 gave excellent scab control but caused more fruit injury than the other treatments. Puratized Apple Spray and Tag 331 caused a speckling of the fruit which was not present elsewhere. This speckling was not serious enough to eliminate the fruit from a No. 1 grade.

Maine, M. T. Hilborn, apple scab on McIntosh.

The following materials are not worth further trial: Copper dimethyl dithio carbamate (Monsanto), copper mercapto benzo thiazole, 2% tetramethylthiuram disulfide in sulfur (Niagara).

Maryland, M. C. Goldsworthy, J. C. Dunegan and R. A. Wilson. Scab on Rome, Delicious, Summer Rambo, Lowry, Stayman Winesap.

Ground spraying followed by Puratized Agricultural Spray at pink and calyx stages in heavily infected isolated orchards appears to be adequate for very effective control of both leaf and fruit scab. This program is not so effective in an orchard surrounded by non-ground-sprayed orchards. In Puratized-sprayed plots, leaf color and leaf and fruit size were superior to plots sprayed with sulfur compounds. This was especially true of the Delicious and Summer Rambo varieties and somewhat less so of Rome.

Liquid lime sulfur, Puratized B, Puratized 806, and Tag, all caused leaf injuries. It was evident that these materials influenced set, for a reduction in the number of harvested fruits was observed. Puratized B proved to be the best fungicide but to have the most deleterious effect on fruit-set. Puratized Agricultural Spray appeared safe on both leaves and fruit. The introduction of parathion or of urea to the calyx spray of Puratized Agricultural Spray did not influence the results.

Massachusetts, O. C. Boyd, Scab on McIntosh, Baldwin, Wealthy.

Order of Preference: (1) sulfur 4 lb. + ferbam 1/2 lb. with one Tag spray, (2) 341SC 1 1/2 qt., (3) 341C 1 qt.

Without the one spray of Tag, sulfur-ferbam was less effective against scab than 341 SC. No russet or other spray injury to McIntosh fruit. Baldwin fruits showed moderate to heavy russeting. All plots received 341C before bloom owing to late arrival of the 341SC.

No early mite sprays. Four mite sprays applied in sulfur-ferbam May 31, June 9, July 24, and August 14. "Although red mite was present throughout the season in the 341C and 341SC trees, at no time did it become abundant enough to justify an acaricide."

Glyoxalidine-lead-lime sprays left a smooth uniform deposit on both leaves and fruit as compared with the usual blotchy deposit of the sulfur-fermate lead mixture.

Michigan, Walter Toenjes. Scab on Spy, McIntosh, Jonathan, Red Delicious.

On Red Delicious and McIntosh wettable sulfur caused more russet than ferbam and caused foliage burn and fruit scald. Ferbam caused more russet on Jonathan than sulfur and gave dark green foliage. Poor color under spray blotches occurred when ferbam was used without spreader. Fixed copper and lime were used on Spy only. Spy tolerates copper in early and later sprays without serious russeting. In cool seasons fruits are often considerably russeted and foliage is sometimes brittle and harsh. Fixed copper gave highest yield of Spy fruit.

Missouri, H. G. Swartwout. Scab inactivation on Rome Beauty.

No sprays were applied until considerable scab was showing on fruit and foliage. Rainy weather continued. Sprays were applied June 2, 16, and 30.

Counts of Terminal Five Leaves on September 6: Percent free from scab: Tag 1/2 pint, 68; Puratized Agricultural Spray 1 pt., 64; Puratized 1 pt. + 3 lbs. sulfur, 50; Tag 1/2 pint + 3/4 lb. ferbam, 27; Puratized 1 pint + 3/4 lb. ferbam, 23; sulfur 3 lb. + ferbam 3/4 lb., 3.

Percent Scab-Free Fruit September 10: Puratized 1 pint, 81; Tag 1/2 pint, 75; Puratized 1 pint + sulfur, 59; Puratized + ferbam, 44; Tag + ferbam, 39; sulfur + ferbam, 23.

As in 1950 mercuries were more effective as eradicants when used alone. Both sulfur and ferbam reduce their efficiency, with the greatest reduction from the addition of ferbam.

New Hampshire, M. C. Richards, R. Eggert. Scab on McIntosh.

Nugreen with Phygon, Puratized Agricultural Spray, or Dynacide gave good control, but fruit russet is increased with the Phygon-Nugreen combination.

Combination of Nugreen with bentonite sulfur increases difficulty of scab control, and is a dangerous combination for grower (Kolospray 5 lbs., 1.3% Kolo spray 6 lbs + Nugreen 5 lbs., 22 percent fruit scab).

Phygon and Kolocarbamate gave excellent control of cedar rusts on McIntosh leaves and Delicious fruits.

Ohio, H. C. Young and H. F. Winter. Scab on Rome Beauty.

"Very severe test. 341C and 341SC very promising; they controlled red mite also. Control trees were total loss; defoliated in early summer."

Pennsylvania, H. W. Thurston and W. A. Chandler. Scab on Stayman.

All plots receiving sulfur in schedule were significantly lower in yield. Use of lime sulfur before bloom increased russet. The new 341SC is much safer than the old 341C at equivalent dosage and slightly inferior in scab control. It should be possible to use new 341 on most varieties in pre-bloom as well as post-bloom sprays.

Orthocide 406 is a satisfactory fungicide at 2 lb. rate, but 1 lb. is not enough. Stanofide is a promising fungicide.

Canada, British Columbia. Scab on McIntosh and Delicious.

No disease data.

Foliage burn and slight fruit russeting occurred with lime sulfur. No injury occurred with: ferbam-wettable sulfur 1 lb. 3-6-100, Crag 341C 1 qt. per 100 gallons in calyx and 1 pint/100 in covers, Venturicide (organo mercury precipitated on China clay) 3 lb. per 100 gallons.

Canada, Nova Scotia, J. F. Hockey and R. G. Ross. Scab on Gravenstein, McIntosh, Cortland, Golden Delicious.

On Gravenstein, 341C, 341SC, Phygon XL and Mag 70 paste all gave good control of fruit scab; least with 341C 1 qt. and 1 pint and Phygon XL 1 lb.

On McIntosh, 1 lb. Phygon XL gave better fruit scab control than 341C 1 qt. and 1 pint in covers.

On Cortland and Golden Delicious 341C gave better fruit scab control than 341SC, four sprays each between bordeaux in delayed dormant and third cover sprays.

After rain sprays only.

Rating in scab control on McIntosh (1) Phygon 1 lb., (2) lime sulfur 1-40, (3) Tag 1/2 pt., Puratized Apple 1/2 pt.

Rating on Wagener (1) Phygon 1 lb., (2) Tag 1/2 pt., (3) Puratized Apple 1/2 pt., lime sulfur 1-40 (foliage injury).

Canada, Ontario, G. C. Chamberlain. Scab on McIntosh.

Overall preference: (1) Tag 1/2 pint, sulfur covers. (2) Tag 1/2 pint, ferbam cover; Tag 1/4 pt. + sulfur 4 lb. (3) Crag 341C 1 qt. + 1/2 lb. lime; Crag 341SC 1 1/2 qt. + 1/2 lb. lime; Orthocide 406 2 lb.; Orthocide 2 lbs., ferbam covers; Orthocide 2 lbs., sulfur covers. (4) Crag 341SC, ferbam covers. (5) Phygon 1 lb. + Mg SO_4 1/2 lb., ferbam covers; Phygon 1/2 lb. + ferbam 1 lb. (6) Microfine sulfur 8 and 6 lb.; Mag. 70 paste 9 and 7 lb. (7) Kolofog "100" 4 1/2 lb. (Phygon 3.5%, sulfur 27.8%).

Some foliar mottling with Phygon. "On sweet cherries sulfur, Tag, Orthocide, and Phygon as pre-blossom sprays had no value in preventing an outbreak of blossom blight which occurred with several nights of fog in the latter part of the bloom period."

OTHER APPLE DISEASES

(See also note on cedar rust in New Hampshire scab report above)

Missouri, H. G. Swartwout. Fire blight on Jonathan and Golden Delicious.

Two bloom sprays of 1 1/2-4 1/2-100 bordeaux caused considerable russet on Golden Delicious and moderate russet on Jonathan and Winesap. Bioquin 1 at 1/2 lb., Dithane Z-78 at 2 lb. with 1 oz. Triton B1956, and Kolofog 100 at 3 1/2 lb.-100, caused no russet. Bioquin and Kolofog 100 failed to control blight. Only a trace of blight developed where the bordeaux and Dithane were applied, even on checks.

Missouri, H. G. Swartwout. Fruit finish on Golden Delicious and Jonathan.

Jonathan Rated in Order of Best Finish: (1) sulfur-lead arsenate, (2) sulfur-toxaphene, (3) sulfur-DDT, (4) sulfur-methoxychlor, (5) ferbam-toxaphene, (6) ferbam-parathion, (7) sulfur-parathion. Least russet and best finish was with lead arsenate. Nu zinc as a safener for lead arsenate caused appreciable russeting. Little difference appeared between other combinations.

Golden Delicious: Lead arsenate treatments had the least russet. Methoxychlor caused the most russet. It was severe. As in 1948 and 1949, DDT caused more russet than lead arsenate on Delicious. As with Jonathan, Nu zinc is not a safe corrective for lead arsenate. Ferbam-toxaphene and ferbam-parathion caused considerably more russet than in nearby lead-arsenate sprayed plots. Sulfur-parathion caused more and ferbam-parathion less russeting than was expected. Data indicate that activated charcoal may be effective in reducing russet from parathion, but "are far from conclusive." As in previous two years all synthetic organic insecticides caused more fruit injury than sulfur lead arsenate or a lead arsenate-ferbam combination.

Missouri, H. G. Swartwout. Sooty blotch on Golden Delicious.

Order of Sooty Blotch Control: (1) ferbam 1 lb., ferbam 3/4 lb., bordeaux 1-2-100, DN111 1 lb. (2) Karathane 1 lb. (3) Phygon XL 1/4 lb., Bioquin 1 1/4 lb.

Ferbam at 1-100 left undesirable residue on the fruit even with frequent rains during the summer. At 3/4 pound there was less but still noticeable black residue. DN111 and Karathane left little residue, and there was practically none from Bioquin or Phygon. Bordeaux caused heavy defoliation and some increase in russet. Loss of foliage from bordeaux may have been caused by a greater development of sooty blotch. There was more sooty blotch in sprayed trees on fruit in tops of trees and ends of branches than in interior, indicating some control through redistribution.

North Carolina, C. N. Clayton and J. F. Fulkerson. Bitter rot and black rot on Stayman and Golden Delicious.

No scab occurred even on checks. Bordeaux mixture controlled bitter rot and black rot best. Orthocide 406 gave very good control of black rot and fair control of bitter rot. Ferbam was relatively effective against bitter rot but ineffective in control of black rot.

Kolofog 100 (Phygon-sulfur) was totally ineffective against both rots.

Cop-o-Zink and Cr 305 were not very effective. Phygon 3/4 lbs. gave fairly good control of both rots but was ineffective at lower dosages. Cr 305 caused most russet. No Phygon delayed fruit in ripening. Stayman fruit sprayed with 303 or ferbam cracked more than with other treatments. Relatively little cracking resulted when sprayed with bordeaux or Phygon.

Orthocide-sprayed fruits were smoother. Orthocide and 341SC left no visible residue and very good color resulted. Ferbam- and Phygon-sprayed fruits were poorly colored.

"Kolofog 100 and CR305 will not be retested."

Washington, R. Sprague. Powdery mildew on Jonathan.

Karathane looked good as summer spray but has been dropped by the manufacturer.

5379 (Carbon & Carbide) shows promise and was found to be more effective than 5400 (Carbon & Carbide). Our recommendations for mildew control are; lime sulfur 2.5% pink, 2% calyx, 4 lbs. wettable sulfur in about two weeks. Mike sulfur is effective at 2 lbs. None are safe at Wenatchee after late May. Ferbam, Orthocide, and ziram are not effective.

West Virginia, C. F. Taylor. Brooks' Spot.

In the Brooks' spot test "All of the copper formulations caused excessive foliage injury. Omitting the lime gave injury in about one week, adding it delayed injury about three weeks but eventually reached about the same amount of damage. There was no perceptible difference between the bordeaux formulations and the fixed coppers and dosage had no effect."

Wisconsin, J. Duain Moore and C. W. Keitt. Russet on McIntosh.

A russet associated with the calyx end of the apple was found to be of more importance than the usual kind. This russet occurred on all plots that had received any ferbam. The most was found on plots that had been sprayed with only ferbam as the fungicide and on those plots that had received lime sulfur before bloom and ferbam after bloom. The least leaf injuries occurred on trees that had been sprayed with an organic mercury ferbam combination schedule, with ferbam only, or with the paste sulfur in all applications. There is increasing evidence that the use of certain of the milder fungicides is resulting in more annual bearing and higher yields. The general acceptance of the ground spray in the Peninsular area has made the use of milder tree spray fungicides possible.

PEAR SCAB

Oregon, J. R. Kienholz. Scab on Bartlett and Anjou.

No scab developed. Phygon XL was less safe than ferbam, Karathane, 406, or Parzate and zinc.

PEACH BACTERIAL SPOT

New Jersey, M. C. Goldsworthy, J. C. Dunegan, R. A. Wilson, M. Horn. Bacterial spot on Sun High peach.

CR305 and Compound 30* gave beautiful fruit finish and best foliage. Zinc lime caused considerable leaf injury and leaf drop.

Order of Control: (1) CR305; (2) Orthocide 406 at 3 lbs., Compound 30; (3) CR2351 at 2 lbs., 406 at 4 lbs., Zinc lime 8-8-100; (4) wettable sulfur 6 lbs.; (5) clorox 5.5% solution 3 gallons.

*Compound 30 = hydroxychloro phenyl sulfide (Sundar Corp.)

CHERRY DISEASES

Iowa, O. F. Hobart, Jr. Montmorency cherry leaf spot, in nursery. "Started late" (eradication needed).

Order of Preference: (1) 8-8-100 bordeaux, tribasic copper; (2) Phygon, Puratized; (3) 341C, 341SC; (4) 406; (5) Sulfuron, lime sulfur.

Wisconsin, J. D. Moore and G. W. Keitt. Cherry leaf spot.

Standard spray schedule consisted of 6-8-100 bordeaux mixture at petal fall, two additional sprays of 3-4-100 bordeaux mixture before harvest, and one spray after harvest. The other 13 spray programs tested gave larger fruits, in 11 significantly larger. The largest cherries were from trees receiving seasonal schedules of Dithane, Fermate, 341B, 341SC, and Tennessee 34, with either Dowax or Orthex. The group with smallest fruits received complete programs of bordeaux mixture. The intermediate size group received the full schedule of "insoluble" copper, or mixed programs of bordeaux and "insoluble" copper or bordeaux and organic materials. There were no significant differences in weight of pits, but the pulp weights were significantly different.

Studies of can corrosion started in 1949 were continued in 1950. The first examination of 1950 gave results almost identical with 1949. Except for fruit sprayed with a combination of Tennessee 34 and Dowax, the highest drained weights and highest sugars (Brix test) were from cherries that received only copper fungicides. Highest drained weights and sugars correlated well with smallest fruit sizes. In general the lowest drained weights and lowest sugars were obtained from cherries sprayed only with an organic fungicide. In both 1949 and 1950 the lowest drained weights and the lowest sugar tests were with fruit sprayed with Tennessee 34-Dowax throughout the season.

The fourth cutting of the 1949 pack, made in August and September 1950, showed corrosion ranging from very slight to moderately heavy. The type of corrosion could not be correlated too closely with the fungicide used and the results of this work are not conclusive. There was an indication, however, that the least corrosion was present in cans used to process fruits from plots that had been sprayed with a glyoxalidine material.

There was a marked difference in the color of fruit from the fourth cutting. Fruit sprayed with bordeaux in the first spray and 341B in the other two pre-harvest sprays had the poorest color. Fruit sprayed with the standard bordeaux and with the Tennessee 34-Dowax combination also averaged poor in color. There was little difference among the other programs in fruit color.

The various fungicides were continued in the spray after harvest rather than the usual bordeaux post-harvest spray.

Counts September 5, when leaf spot was abundant only on checks, showed least leaf drop on plots receiving three sprays of ferbam and most on plots receiving three sprays of bordeaux mixture. The least defoliation and the most defoliation on October 11 was on the same two plots. In general, greatest defoliation due to spray injury occurred with seasonal spray schedules of bordeaux mixture, and least on plots receiving full schedules of an organic fungicide, with intermediate amounts on the mixed programs. The "insoluble" copper COCS ranked with the organic in defoliation due to spray injury.

Oregon, J. R. Kienholz. Brown rot on sweet cherry.

Equally safe on Bing and Lambert cherries were: Puratized Agricultural spray, Phygon XL 1/2 lb., Ferbam 1 1/2 lbs., Orthocide 406 2 lbs., Karathane 1 lb., and Sulfuron 6 lbs. per 100 gallons. No brown rot data were obtained.

(See also note on sweet cherry blossom blight in Ontario report on apple scab above)

GRAPE BLACK ROT

Missouri, H. G. Swartwout. Black rot on Concord, Herbert, and Catawba grapes.

Bordeaux, ferbam, Bioquin, and Orthocide controlled black rot in Concord grapes. Fair control and light injury was obtained with Dithane D-14 + 1 lb. $ZnSO_4$ (36%). A trace of injury resulted from other materials.

In test with Herbert and Catawba grapes, ferbam 1 1/2 pounds + Tennessee 26 was superior in control to Bioquin at 1 1/2 pound per 100 gallons.

STRAWBERRY LEAF SPOT

Missouri, H. G. Swartwout.

Two sprays: (1) when flower buds could be seen, (2) when first blossoms open. At least three pre-bloom sprays should have been made.

Ratings after harvest: Actidione* 20 p.p.m., good control, best of all treatments. Dithane D-14 + 1 lb. zinc sulfate fair control, second to Actidione. Bioquin 1, 1/2 lb. + 1 oz. Triton B1956, fair control, not quite the equal of Dithane. Bordeaux 4-6-100, slight control, very little better than checks. Ferbam 2-100, no control.

Ratings mid-October: (1) Actidione good control; (2) Bioquin moderate control; (3) Dithane, Bordeaux, slight control; (5) ferbam no control.

*Actidione is the registered trade mark for the antibiotic b3-(2-(3.5-dimethyl-2-oxocyclohexyl)-2-hydroxyethyl)-glutarimide. (UpJohn Co., Kalamazoo, Mich.)

North Carolina, C. E. Lewis and C. N. Clayton.

Most effective control and most injury occurred with higher dosages of bordeaux mixture. Phygon XL + U.S. Rubber Co. fungicide sticker gave good control and no injury. Orthocide 406, CR 305, and 341SC were ineffective against leaf spot.

CITRUS

California, L. J. Klotz, E. C. Calavan, E. L. Wambler, T. A. DeWolfe. Phytophthora brown rot and Botrytis blossom blight on lemon.

Order of Phytophthora Control: (1) Zinc Coposil 3 lbs. (2) 1-1-100 bordeaux, Dithane D-14 + $FeSO_4$ + oil + SS3 8-0.8-8-0.37. (3) Crag 640 2 lbs. (4) 20-4 Fungorex + Citroflo oil + S20 spreader 8-2-0.37. (5) Crag 658. (6) Copper A + SS3 Spreader Sticker 1.5-0.125. (7) Crag 658 + SS3 2-0.06. (8) Alcufe + Citroflo oil + S20 5-2-0.37. (9) Crag 351 + SS3. (10) Crag 531 2 lbs. (11) Crag 169.

Order of Botrytis Control (Insufficient data): (1) ?Dithane. (2) ? 658, (3) ? Alcufe. (4) ? 531.

Order of Plant Safety: (1) 351, 531; (2) 169; (3) Fungorex; (4) 658 + SS3; (5) Alcufe; (6) 658; (7) Zinc Coposil; (8) 640; (9) bordeaux mixture.

NUT TREES

Georgia, J. R. Cole. Scab on pecan, variety Schley.

Materials in Order of Yield in Pounds per Tree: (1) Bordeaux 4-1-100 prepollination, 6-2-100 post pollination 70 lbs., (2) bordeaux 4-1-100 prepollination, ziram (5x concentration) 26 lbs., (3) Dithane Z-78 35 lbs.; (6) Vancide 30 lbs. (7) Check 20 lbs. Dithane Z-78 promising, low yields were due to light crop of nuts set. Ziram concentrate in Bean 17 mist machine does not look encouraging.

Oregon, P. W. Miller. Walnut bacteriosis.

Bordeaux mixture 4-2-100 was safer and more effective than Yellow Cuprocide (yellow cuprous oxide, Röhm & Haas Co.) or Copper A Compound (copper oxychloride, Dupont) which are not worth further trial.

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THE PLANT DISEASE REPORTER

Issued By

THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey

BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

AGRICULTURAL RESEARCH ADMINISTRATION

UNITED STATES DEPARTMENT OF AGRICULTURE

SUPPLEMENT 212

HOST INDEX OF PLANT PATHOGENS OF VENEZUELA

Supplement 212 June 15, 1952

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

PLANT DISEASE REPORTER SUPPLEMENT

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THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station Beltsville, Maryland

HOST INDEX OF PLANT PATHOGENS OF VENEZUELA

J. H. Standen

Plant Disease Reporter
Supplement 212 June 15, 1952

INTRODUCTION

In the past many great mycologists contributed to the knowledge of the fungi of Venezuela, among them H. Sydow, M. C. Cooke, Patouillard, Gaillard, and Heim. All publications prior to 1934, except two papers by H. Sydow, were brought together, with many additions, by Chardon and Toro in that year, and are therefore not included in the bibliography for this index. H. Sydow, in his "Fungi Venezuelani" (1930) also has a good bibliography of earlier papers.

Following the work of Chardon and Toro, each of these authors independently published an additional list of fungi, Kern and Thurston a series of papers on Venezuelan rusts, and Linder a list of Fungi Imperfecti. Muller listed the pathogens damaging economic crops, and Chupp and Muller catalogued the Cercosporas of Venezuela.

Meanwhile a large number of specimens of both parasitic and saprophytic organisms had accumulated in the Mycological Herbarum of the "Ministerio de Agricultura y Cria" in Caracas. In 1949, Clifford Meredith, at that time Chief of the "División de Fitopatologia", had this collection transferred to the División offices in Maracay, where it was catalogued for the first time. I was with the División at the time and Mr. Meredith requested me to prepare a host index based on all material available to that date.

It is scarcely necessary to say that this host index is far from complete. Any casual trip into the field always resulted in several new collections.

The index includes fungi, bacteria, viruses, nematodes, a destructive leaf lichen (Strigula elegans), and mistletoes. The sooty mold group of fungi, although doubtless of some economic importance, is omitted.

During the earlier part of this work I was ably assisted by three of my students at the Universidad Central, namely, Angel Viso Rodrigues, Miquel Laprea Finamore, and M. Delgado Urdaneta. Preliminary typing was done by personnel of the American International Association, and final typing was done by Mary Standen and Loretta Skufca. To these and many other who have so freely given their help I wish to express my sincere gratitude.

HOST INDEX

- ABELMOSCHUS sp. (HIBISCUS sp.)
  - Cercospora hibiscina Ell. & Ev. (2, 14)
- ABUTILON spp.
  - Cercospora sp. (6)
  - C. sphaeralceicola Speg. (6)
  - Irenopsis molleriana (Wint.) F. L. Stevens (6)
  - Puccinia heterospora Berk. & Curt. (6)
- A. INTEGERRIMUM Hook.
  - Puccinia heterospora Berk. & Curt. (2)
- A. UMBELLATUM (L.) Sweet
  - Puccinia heterospora Berk. & Curt. (2)
- ACACIA spp.
  - Ravenelia concinna Syd. (2)
- A. MACRACANTHA Humb. & Bonpl. (according to Pittier, this is not a Venezuelan species; possibly POPONAX or PROSOPIS)
  - Phyllachora acaciae P. Henn. (2)
- ACALYPHA spp.
  - Meliola acalyphidis Toro (2, 6)
  - Phakopsora antiguensis (Cumm.) Kern & Thurston (11)
- A. CHAMAEDRIFOLIA Muell. Arg.
  - Asterina acalyphae Syd. (2)
- A. CUSPIDATA Jacq.
  - Amazonia acalyphae (Rehm) Th. (2)
- A. MACROSTACHYA Jacq.
  - Phyllachora tragiae (Berk. & Curt.) Sacc. (2)
- ACANTHACEAE
  - Whetzelia venezuelensis Chardon & Toro (2)
- ACANTHOSPERMUM AUSTRALE (Loefl.) Kuntze (A. BRASILIUM Schrank)
  - Puccinia acanthospermi P. Henn. (6)
- ACHRAS ZAPOTA L.
  - Scopella sapotae (Arth. & J. R. Johnston) Mains (Uredo sapotae Arth. & J. R. Johnston) (6, 9, 13)
- ACHYRANTHES: see ALTERNANTHERA
- ACNISTUS ARBORESCENS (L.) SCHLECHT.
  - Microthyrium acnisti (Syd.) Toro (20)
- ACNISTUS UMBELLATUS (R. & P.) Miers.
  - Puccinia acnisti Arth. (2)
- ADENARIA FLORIBUNDA H. B. K.
  - Myiocoprum guiscafrei Toro (2)
- ADIANTUM TETRAPHYLLUM Willd.
  - Cercospora adianti Syd. (14)
- AESCHYNOMENE AMERICANA L.
  - Phakopsora aeschynomenis Arth. (10)
- AGAVE SISALANA Perrine
  - Colletotrichum agaves Cav. (6)
  - Diplodia natalensis P. -Evans (7)
  - Septonema agave Stevenson (7)
- AGERATUM CONYZOIDES L.
  - Albugo tragopogonis (DC) S. F. Gray (2, 6)
  - Alternaria sp. (Macrosporium sp.) (6)
  - Puccinia conoclinii Seym. (8)
- ALCHORNEA TRIPLINERVIA (Spreng.) Muell. Arg.
  - Uredo alchorneae P. Henn. (11)
- ALEURITES MONTANA (Lour.) Wilson
  - Cercospora sp. (6)
- ALLIUM CEPA L.
  - Alternaria porri (Ell.) Cif. (Macrosporium porri Ell.) (2, 6, 13)
  - Botrytis sp. (6, 13)
  - Peronospora destructor (Berk.) Casp. (P. schleideni Unger) (2)

ALLIUM PORRUM L.
Alternaria porri (Ell.) Cif. (Macrosporium porri Ell.) (13)
Colletotrichum circinans Vogl. (6)
A. SATIVUM L.
Alternaria porri (Ell.) Cif. (Macrosporium porri Ell.) (13)
ALSTOEMERIA sp.
Oidium sp. (6)
ALTERNANTHERA spp.
Albugo bliti (Biv.) Kuntze (2, 6)
Cercospora sp. (6)
A. FICOIDEA (L.) R. Br.
Albugo bliti (Biv.) Kuntze (2)
A. LANCEOLATA (Benth.) Standl.
Uredo maculans Pat. & Gaill. (10)
ALTHAEA ROSEA (L.) Cav.
Ascochyta sp. (6)
A. althaeina (Sacc.) Bizz. (13)
Cercospora althaeina Sacc. (6, 13, 14)
Puccinia malvacearum Bert. (6)
AMARANTHACEAE
Uredo maculans Pat. & Gaill. (2)
AMARANTHUS sp.
Cercospora sp. (6)
C. brachiata Ell. & Ev. (6, 14)
A. DUBIUS Mart.
Albugo bliti (Biv.) Kuntze (2)
Phyllosticta sp. (6)
A. SPINOSUS L.
Albugo bliti (Biv.) Kuntze (2)
AMBROSIA spp.
Cercospora arctii-ambrosiae Halst. (6, 14)
Oidium sp. (6)
A. PERUVIANA Willd.
Cercospora ambrosiae Chupp (2, 14)
Phyllachora ambrosiae (Berk.& Curt.) Sacc. (2)
AMPHILOPHIUM PANICULATUM (L.) H.B.K.
Prospodium amphilophii (Diet. & Holw.) Arth. (2)
P. depallens (Arth. & Holw.) Cumm. (11)
A. PANICULATUM var. MOLLE (S. & C.) Standl.
Prospodium cumminsii Kern & Thurston (11)
ANISOSORUS HIRSUTUS (L.) Underw. & Maxon
Cercospora pteridii Siem. (6)
AMYGDALUS PERSICA L. (PRUNUS PERSICA (L.) Stokes)
Cladosporium sp. (6)
Monilinia fructicola (Wint.) Honey (Sclerotinia fructicola (Wint.) Rehm) (6)
Taphrina deformans (Berk.) Tul. (6, 13)
Tranzschelia punctata (Pers.) Arth. (2, 6, 13)
A. PERSICA var. NECTARINA Ait.
Tranzschelia punctata (Pers.) Arth. (6)
ANACARDIACEAE
Phyllachora anacardiarum Chardon (2)
P. meridensis Chardon (2)
ANACARDIUM OCCIDENTALE L.
Phyllosticta sp. (6)
A. EXCELSUM (H.B.K.) Skeels
Cercospora rhinocarpi Chupp & Muller (6, 14)
ANANAS COMOSUS (L.) Merr.
Thielaviopsis paradoxa (de Seyn.) Hoehn. (13)
ANDIRA JAMAICENSIS (W. Wright) Urb.
Polystigma pusillum Syd. (20)

ANDROPOGON spp.
    Phyllachora brevifolia Chardon (6)
    P. luteomaculata (Schw.) Orton (6)
    Puccinia kaernbachii (P. Henn.) Arth. (9)
    Sphacelotheca guaranitica (Speg.) Zundel (2)
A. ALTUS Hitch.
    Puccinia meridensis Kern (8)
A. BICORNIS L.
    Uredo rubida Arth. & Holw. (2)
A. CONDENSATUS H.B.K.
    Phyllachora andropogonis (Schw.) Karst. & Har. (1, 6)
    Sphacelotheca guaranitica (Speg.) Zundel (2)
A. SACCHAROIDES Sw.
    Puccinia meridensis Kern (8)
A. SEMIBERBIS (Nees) Kunth
    Dothichloë atramentosa (Burk. & Curt.) Atk. (6)
    Puccinia sp. (6)
    Ustilago sp. (6)
ANEIMIA PHYLLITIDIS (L.) Sw.
    Desmella aneimiae (P. Henn.) Syd. (2)
ANNONA spp.
    Meliola jahnii Toro (2)
    Phakopsora cherimolia (Lagh.) Cumm. (2)
A. CHERIMOLA Mill.
    Phakopsora cherimolia (Lagh.) Cumm. (Physopella cherimolia Arth., Uredo cherimolia Lagh.) (2, 6, 10, 13, 18)
A. MURICATA L.
    Asterinella winteriana (Pascher) Th. (15)
    Colletrotrichum gloeosporioides Penz. (6)
    Meliola sp. (6)
A. PURPUREA Moc. & Sess.
    Cercospora caracasensis Chupp & Muller (6, 14)
A. SQUAMOSA L.
    Cercospora anonaceae P. Henn. (6, 14)
ANODA ACERIFOLIA (Zucc.) DC.
    Puccinia heterospora Berk. & Curt. (2)
A. HASTATA Cav.
    Marmor sp. (virus) (7)
    Puccinia heterospora Berk. & Curt. (2)
ANTHEPHORA HERMAPHRODITA (L.) Kuntze
    Phyllachora sp. (6)
    P. anthephorae Syd. (2, 6)
ANTHURIUM spp.
    Micropeltis clava Toro (2)
    Phyllachora engleri Speg. (6)
A. SCOLOPENDRINUM (Ham.) Kunth.
    Phyllachora engleri Speg. (2)
ANTIGONUM LEPTOPUS Hook. & Arn.
    Cercospora sp. (6)
ANTIRRHINUM sp.
    Phyllosticta sp. (6)
APIUM GRAVEOLENS L.
    Cercospora apii Fres. (6, 13, 14)
    Septoria apii (Briosi & Cav.) Chester (6, 13)
ARACHIS HYPOGAEA L.
    Ascochyta pisi Lib. (6)
    Cercospora personata (Berk. & Curt.) Ell. (2, 6, 14)
    Puccinia arachidis Speg. (6, 8, 13)
    Sclerotium rolfsii Sacc. (3: year 1; no. 10, Oct. 1947)
    Septogloeum sp. (5, April-May 1949)
ARGEMONE MEXICANA L.
    Cladosporium guanicensis F. L. Stevens (2, 6)

ARGEMONE PLATYCERAS Link & Otto
Ovularia sp. (6)
ARISTIDA spp.
Dothichloë aristidae Atk. (6)
Dothidea aristidae (S.) Ell. (6)
A. ADSCENSIONIS L.
Dothichloë sp. (6)
D. aristidae Atk. (6)
Phyllachora sp. (6)
ARRABIDAEAE
Irenopsis bignoniacearum F. L. Stevens (2)
ARRACACIA XANTHORRHIZA Bancroft
Cercospora donnel-smithii Speg. (6)
Septoria apii Fres. (6, 13)
ARTHROSTEMA CAMPANULARE (Naud.) Tr.
Cercospora gracilenta Syd. (14)
ARTHROSTYLIDIUM LONGIFLORUM (L.) Link
Phyllachora arthrostylidi Petr. & Cif. (1, 6)
Sphaerodothis portoricensis Chardon (2)
ARTOCARPUS COMMUNIS Forst.
Capnodium sp. (7)
Uredo artocarpi Berk. & Br. (Physopella artocarpi Arth.) (2, 18)
A. INTEGRA (Thunb.) Merr.
Uredo sp. (6)
U. artocarpi Berk. & Br. (6)
ARUNDO DONAX L.
Meliola marantae F. L. Stevens (6)
ASCHERSONIA sp.
Sirosperma hypocrellae Syd. (2)
ASCLEPIAS spp.
Cercospora sp. (16)
Puccinia sp. (6)
A. CURASSAVICA L.
Cercospora clavata (Gerard) Cke. (6, 14)
Uromyces asclepiadis (Schw.) Cke. (9)
ASPARAGUS OFFICINALIS L.
Cercospora asparagi Sacc. (6, 14) (C. asparagicola Speg., C. caulicola Wint.)
ASTERINA MEGALOSPORA Berk. & Curt. (fungus)
Phaeodimeriella tachirensis Toro (2)
ASTRONIUM GRAVEOLENS Jacq.
Meliola weigeltii Kunze (2)
Uredo rhombica Speg. (11)
AVENA SATIVA L.
Puccinia coronata Cda. (P. rhamni (Pers.) Wett.) (6, 13)
P. graminis Pers. var. avenae Pers. (6, 13)
Ustilago avenae (Pers.) Rostr. (6, 13)
AXONOPUS AUREUS Beauv.
Phyllachora sp. (6)
BACCHARIS CASSINEFOLIA D. C.
Puccinia ancizari Mayor (11)
B. FLORIBUNDA H.B.K.
Puccinia caeomatiformis Lagh. (2)
B. RHEXOIDES H.B.K.
Puccinia exornata Arth. (Eriosporangium exornatum Arth.) (2, 6, 18)
BACCHARIS aff. TRINERVIS (Lam.) Pers.
Puccinia caeomatiformis Lagh. (2)
BAMBOS: see BAMBUSA
BAMBUSA VULGARIS Schrad.
Uredo ignava Arth. (2, 6)
BANARA GUIANENSIS Aubl.
Meliola banarae F. L. Stevens (2)

BANISTERIA CORNIFOLIA (Kunth) Spreng.
Puccinia rubricans Holw. (10)
BAUHINIA spp.
Aschersonia placenta Berk. & Br. (6) (on scale insects?)
Phyllachora sp. (6)
P. panamensis Chardon (6)
Uromyces sp. (6)
U. bauhinicola Arth.? (2)
U. guatamalensis Vest. (2)
U. imperfectus Arth. (2)
B. ACULEATA L.
Uromyces imperfectus Arth. (6)
B. CUMANENSIS H.B.K.
Meliola perexigua Gaill. (2)
Phyllachora panamensis Chardon (2)
B. HETEROPHYLLA Kunth
Xylaria ianthino-velutina Mont. (2)
B. MIRANDINA Pittier
Ravenelia sp. (6)
Uromyces imperfectus Arth. (2)
B. PAULETIA Pers.
Uromyces imperfectus Arth. (U. superfixus Vest.) (2, 18)
U. jamaicensis Vest. (2)
BEGONIA sp.
Oidium sp. (6)
BERBERIS sp.
? Aecidium aridum Diet. & Neger (2)
BETA VULGARIS L.
Cercospora beticola Sacc. (2, 6, 13, 14)
Sclerotium rolfsii Sacc. (13)
B. VULGARIS var. CICLA L.
Cercospora beticola Sacc. (13)
BIDENS spp.
Septoria sp. (6)
Uromyces sp. (6)
U. bidentis Lagh. (2)
B. PILOSA L.
Cercospora bidentis Tharp. (6, 14)
Entyloma sp. (6)
E. incertum Cif. (2)
Oidium sp. (6)
Uromyces bidenticola (P. Henn.) Arth. (2)
U. bidentis Lagh. (2)
BIGNONIACEAE
Prospodium anomalum Jack. & Holw. (2)
BIXA ORELLANA L.
Cercospora bixae Allesch. & Noack (2, 6, 14)
Oidium sp. (6)
BLECHNUM FRAXINEUM Willd.
Milesia australis Arth. (9)
BLECHNUM OCCIDENTALE L.
Desmella superficialis (Speg.) Syd. (2)
Milesia australis Arth. (9)
BLECHUM sp.
Cercospora blechi Chupp & Muller (14)
BLECHUM BROWNEI Juss.
Cercospora blechi Chupp & Muller (14)
Puccinia sp. (6)
P. ruelliae (Berk. & Br.) Lagh. (9)
Uredo sp. (6)
BOCCONIA FRUTESCENS L.
Cercospora bocconiae Chupp (2, 14)

BOEHMERIA NIVEA (L.) Gaud.
Cercospora boehmeriae Chupp (6)
C. krugiana Chupp & Muller (14)
B. RAMIFLORA Jacq.
Asterina raripoda Toro (2)
BOERHAAVIA CARIBAEA Jacq.
Albugo platensis (Speg.) Swing. (6)
B. COCCINEA Mill.
Albugo platensis (Speg.) Swing. (18)
B. ERECTA L.
Albugo platensis (Speg.) Swing. (2, 6)
BOMAREA MULTIFLORA (L.) Mirb.
Aecidium bomareae Mayor (6)
Puccinia bomareae (Lagh.) P. Henn. (9)
BORAGO OFFICINALIS L.
Cercospora agnostoica Speg. (6, 14)
BORRERIA sp.
Meliola psychotriae Earle (2)
B. CAPITATA (R. & P.) DC.
Meliola psychotriae Earle (2)
B. LAEVIS (Lam.) Griseb.
Puccinia lateritia Berk. & Curt. (2, 6)
B. SUAVEOLENS G.F.W. Mey.
Meliola psychotriae Earle (2)
B. TENELLA Cham. & Schlecht.
Uromyces crucheti Mayor (2)
B. VERTICILLATA (L.) G.F.W. Mey.
Uredo borreriae (P. Henn.) Kern & Whet. (6, 9)
BOUCHEA PRISMATICA (Jacq.) Ktze.
Oidium sp. (6)
BRADBURYA sp.: see CENTROSEMA sp; B. VIRGINIANA: see CENTROSEMA VIRGINIANUM
BRASSICA spp.
Alternaria sp(p). (as A. brassicae (Berk.) Sacc.) (2)
Choanephora sp. (3: year 1, no. 10, Oct. 1947)
B. CAMPESTRIS L.
Albugo candida (Pers.) Kuntze (6)
Alternaria brassicae (Berk.) Sacc. (Macrosporium herculeum Ell. & G. Martin) (6)
B. NAPUS L.
Albugo candida (Pers.) Kuntze (6)
Alternaria brassicae (Berk.) Sacc. (Macrosporium herculeum Ell. & G. Martin) (6)
Cercospora armoraciae Sacc. (6)
B. NIGRA (L.) Koch
Albugo candida (Pers.) Kuntze (2)
B. OLERACEA L.
Alternaria sp(p). (as A. brassicae (Berk.) Sacc.) (2, 6)
A. brassicae (Berk.) Sacc. (Macrosporium herculeum Ell. & G. Martin) (6)
A. solani (Ell. & G. Martin) Sor. (6)
Peronospora parasitica Fr. (6)
Xanthomonas campestris (Pam.) Dowson (5: June 1948; 7)
B. OLERACEA var. BOTRYTIS L.
Alternaria brassicae (Berk.) Sacc. (Macrosporium herculeum Ell. & G. Martin) (13)
B. OLERACEA var. CAPITATA L.
Alternaria sp(p). (as A. brassicae (Berk.) Sacc.) (13)
A. brassicae (Berk.) Sacc. (Macrosporium herculeum Ell. & G. Martin) (13)
Meloidogyne sp. (Heterodera radicicola (Greef) Muell.) (13)
Peronospora parasitica Fr. (13)

(Brassica oleracea capitata cont.)
Rhizoctonia solani Kuehn (13)
B. PEKINENSIS (Lour.) Gagnep
Albugo candida (Pers.) Kuntze (6)
Alternaria sp(p). (as A. brassicae (Berk.) Sacc.) (6)
A. brassicae (Berk.) Sacc. (Macrosporium herculeum Ell. & G. Martin) (6, 13)
B. RAPA L.
Albugo candida (Pers.) Kuntze (13)
Alternaria sp(p). (as A. brassicae (Berk.) Sacc. (13)
A. brassicae (Berk.) Sacc. (Macrosporium herculeum Ell. & G. Martin) (13)
BRAVAISIA FLORIBUNDA DC.
Clypeotrabutia deminuta (Syd.) Chardon & Toro (2, 18)
BREDEMEYERA LUCIDA Klotzsch
Asterinella bredemeyerae Orejuela (15)
BRICKELLIA DIFFUSA (Vahl) A. Gray
Puccinia kuhniae Schw. (8)
BROMELIA sp.
Toroa dimerosporioides (Speg.) Syd. (20)
BROMUS CATHARTICUS Vahl
Puccinia sp. (6)
BROMUS PITENSIS H.B.K.
Puccinia sp. (6)
BROWNEA sp.
Uredo sp. (6)
BRUNELLIA COMOCLADIFOLIA Humb. & Bonpl.
Asterina kernii Toro (6)
Hypocrella caulinum (Berk. & Curt.) Pat. (6)
Phyllachora sp. (6)
P. masinii Toro (1, 6)
BUCHENAVIA CAPITATA (Vahl) Eichl.
Phyllachora buchenaviae Petr. & Cif. (2)
BUDDLEIA sp.
Cercospora sp. (6)
B. VERBASCIFOLIA H.B.K.
Cercospora sp. (6)
BUNCHOSIA GLANDULIFERA (Jacq.) H.B.K.
Cercospora sp. (6)
C. bunchosiae Chupp & Muller (14)
Septoria bunchosiae Toro (2)
BYRSONIMA spp.
Aecidium singulare (Diet. & Holw.) Arth. (6)
Cronartium sp. (6)
Meliola sp. (6)
B. CRASSIFOLIA (L.) H.B.K.
Aecidium byrsonimatus P. Henn. (9)
Crossopsora notata Arth. (2)
CAJANUS CAJAN (L.) Millsp.
Cercospora cajanae P. Henn. (6, 13, 14, 16)
Mycovellosiella cajani (P. Henn.) Rangel (2)
Uromyces sp. (6)
U. dolicholi Arth. (13, 16, 19)
CALAMAGROSTIS sp.
Puccinia epiphylla (L.) Wettst. (2)
C. PITTIERI Hack.
Puccinia epiphylla (L.) Wettst. (2)
CALATHEA sp.
Puccinia cannae (Wint.) P. Henn. (8)
CALLIANDRA CARACASANA (Jacq.) Benth.
Ravenelia echinata Lagh. & Diet. (2)

CALOTROPIS HERBACEA Wight.
    Cercospora calotropidis Ell. & Ev. (6, 14)
C. PROCERA (Ait.) R. Br.
    Cercospora calotropidis Ell. & Ev. (2, 14)
    Cladosporium calotropidis F. L. Stevens (2)
    Puccinia sp. (6)
    P. concrescens Ell. & Ev. (2)
    P. obliqua Berk. & Curt. (2)
CANAVALIA sp.
    Mycosphaerella sp. (6)
C. ENSIFORMIS (L.) D.C.
    Cercospora canavaliae Syd. (14)
    Mycosphaerella venezuelensis J. H. Miller & Burton (6)
C. MARITIMA (Aubl.) Thouars
    Ascochyta sp. (6)
CANNA sp.
    Puccinia cannae (Wint.) P. Henn. (2, 6)
C. INDICA L.
    Puccinia cannae (Wint.) P. Henn. (6, 13)
CAPPARIS FLEXUOSA L.
    Polyrhizon capparidis Orejuela (15)
    Septoria sp. (6)
C. ODORATISSIMA Jacq.
    Phyllosticta capparidis Chardon (1, 6)
CAPRIOLA DACTYLON: see CYNODON DACTYLON
CAPSICUM spp.
    Cercospora atromarginalis Atk. (6)
    C. diffusa Ell. & Ev. (2)
C. ANNUUM L.
    Cercospora atromarginalis Atk. (6, 13)
    C. capsici Heald & Wolf (2, 6, 13, 14)
    Colletotrichum atramentarium (Berk. & Br.) Taub. (13)
    C. nigrum Ell. & Hals. (2, 6, 13)
    Erwinia carotovora (L. R. Jones) Holland (13)
    Fusarium sp. (7)
    Phytophthora sp. (4: Vol. 1, No. 6. July 1949)
    Ramularia sp. (7)
    Sclerotium rolfsii Sacc. (13)
    Virus (mosaic) (7)
C. BACCATUM L.
    Cercospora capsici Heald & Wolf (2)
C. FRUTESCENS L.
    Colletotrichum sp. (6)
    C. atramentarium (Berk. & Br.) Taub. (6)
    Oidium sp. (6)
    Phyllosticta carica-papaya Allesch. (6)
CARDIOSPERMUM CORINDUM L.
    Puccinia arechavaletae Speg. (2)
C. HALICACABUM L.
    Puccinia arechavaletae Speg. (2)
C. MICROCARPUM H.B.K.
    Puccinia arechavaletae Speg. (2)
CARICA PAPAYA L.
    Asperisporium caricae (Speg.) Maubl. (Pucciniopsis caricae Earle) (2; 3, 2nd year, no. XIII, Jan. 1948; 6; 13).
    Colletotrichum papayae P. Henn. (13)
    Virus (mosaic) (7, 13)
CARYA ILLINOENSIS (Wang.) K. Koch (HICORIA PECAN Britton)
    Cercospora fusca (Heald & Wolf) Rand (6; 14)
CARYOTA sp.
    Pestalotia sp. (6)

CASEARIA sp.
Meliola caseariae Petr. & Cif. (20)
C. GUIANENSIS (Aubl.) Urban
Meliola paulliniae F. L. Stevens (2)
C. SYLVESTRIS Sw.
Meliola caseariae Petr & Cif. (20)
CASSIA spp. (see also PEIRANISIA)
Cercospora sp. (6)
C. simulata Ell. & Ev. (2, 14)
Diplodia sp. (6)
Phyllachora sp. (6)
C. ABSUS L.
Ravenelia indica Berk. (16)
C. BIFLORA L.
Puccinia sp. (6)
Ravenelia spinulosa Diet. & Holw. (2, 6)
C. EMARGINATA L.
Ravenelia portoricensis Arth. (10)
C. TORA L.
Ravenelia mirandensis Kern & Thurston (10)
Ravenelia sp. (6)
CECROPIA spp.
Anthostomella cecropiae (Rehm) Hoehn. (6)
Aschersonia aleyrodis Webber (6) (on scale insects ?)
Meliola sp. (6)
CEDRELA sp.
Phyllachora balansae Speg. (6)
C. MEXICANA Roem.
Phyllachora balansae Speg. (2)
CEIBA PENTANDRA Gaertn.
Camillea bomba (Mont.) Lloyd (6)
Phyllachora sp. (6)
CELOSIA sp.
Cercospora celosiae Syd. (14)
C. CRISTATA L.
Cercospora celosiae Syd. (6)
CENCHRUS sp.
Puccinia sp. (6)
C. ECHINATUS L.
Puccinia cenchri Diet. & Holw. (2)
Ustilago sp. (6)
C. VIRIDIS Spreng.
Phyllachora sphaerosperma Wint. (2, 6) (Phyllachora sphaerospora Pat.)
CENTAUREA sp.
Cercospora centaureae Diet. (6, 14)
CENTROSEMA sp. (BRADBURYA sp.)
Phyllachora galactiae Earle (6)
C. VIRGINIANUM (L.) Benth. (BRADBURYA VIRGINIANA (Benth.) Kuntze)
Cercospora centrosemae Chupp & Muller (14)
Phyllachora galactiae Earle (2)
Puccinia sp. (6)
CEPHAELIS AXILLARIS Sw.
Pediascus cephaelidis Chardon (2)
CEROPTERIS: see PITYROGRAMMA
CESTRUM sp.
Phyllachora sp.
C. LATIFOLIUM Lam.
Cercospora cestri Chupp. & Muller (14)
Uromyces cestri (Mont.) Lév. (9)
C. MIERSIANUM Wedd.
Chrysocyclus cestri (Diet. & P. Henn.) Syd. (Chrysopsora cestri Arth.) (8)

(Cestrum miersianum cont.)
Phyllachora toroi Chardon (2)
CHAETIUM FESTUCOIDES Nees
Puccinia chaetii Kern & Thurston (11)
CHAMAESYCE: see Euphorbia
CHAPTALIA NUTANS (L.) Polak.
Phyllachora microtheles (Speg.) Chardon (2, 6)
CHENOPODIUM AMBROSIOIDES L.
Cercospora anthelmintica Atk. (6, 14)
CHLORIS POLYDACTYLA (L.) Sw.
Dothichloë nigricans (Speg.) Chardon (6)
C. RADIATA (L.) Sw. (C. VIRGATA P. Durand)
Phyllachora chloridicola Speg. (2)
CHLOROPHORA TINCTORIA (L.) Gaud.
Cercospora sp. (7)
Physopella maclurae Arth. (Uredo maclurae Speg.) (2, 18)
CHOMELIA TENUIFLORA Benth.
Meliola psychotriae Earle (2)
CHRYSANTHEMUM spp.
Cercospora sp. (6)
C. chrysanthemi Heald & Wolf (6, 14)
CHRYSOPHYLLUM spp.
Aschersonia basicystis Berk. & Curt (on scale insects) (6)
A. brunnea Petch (on scale insects) (6)
Phyllachora sp. (6)
C. CAINITO L.
Aschersonia turbinata Berk. (on scale insects) (6)
Phyllachora sp. (6)
CHUSQUEA sp.
Meliola panici Earle (6)
C. SCANDENS Kunth
Ascopolyporus polychrous Moller (2)
CICER ARIETINUM L.
Rhizoctonia solani Kuehn (13)
CISSUS spp.
Endophyllum sp. (6)
E. guttatum (Kunze) Syd. (E. circumscriptum (Schw.) Whet. & Olive) (6)
Mycosyrinx cissi (DC.) G. Beck (2)
C. EROSA L. C. Rich.
Mycosyrinx sp. (6)
C. RHOMBIFOLIA Vahl
Crossopsora caucensis (Mayor) Kern, Thurston & Whet. (C. wilsoniana Arth.) (2, 18)
CISSUS SICYOIDES L.
Aecidium mexicanum Diet. & Holw. (2)
Endophyllum guttatum (Kunze) Syd. (E. circumscriptum (Schw.) Whet. & Olive) (2, 6, 18)
Mycosyrinx sp. (6)
CITHAREXYLUM SUBTHYRSOIDEUM Pittier
Meliola glabroides F. L. Stevens (6)
CITRULLUS VULGARIS Schrad.
Cercospora citrullina Cke. (2, 6, 14)
Colletotrichum lagenarium (Pass.) Ell. & Halst. (6, 13)
Pseudoperonospora cubensis (Berk. & Curt.) Rostow. (6)
CITRUS spp.
Alternaria citri Pierce (13)
Ascochyta citri Penz. (6)
Apsergillus niger v. Tiegh. (13)
Cephaleuros sp. (6)
Colletotrichum gloeosporioides Penz. (6, 13)
Diplodia natalensis P. Evans (13)

(Citrus spp. cont.)
Penicillium sp. (13)
Phytophthora parasitica Dast. (13)
Rhizopus nigricans Ehr. (13)
Septoria sp. (6)
S. citri Pass. (13)
Sphaceloma fawcettii Jenkins (6, 7, 13)
Sphaeropsis tumefaciens Hedges (3, 1st year, No. 7, July 1947)
C. AURANTIFOLIA (Christm.) Swing.
Septoria sp. (6)
Sphaceloma fawcetii Jenkins (Sporotrichum citri (Mass.) Butl.) (2)
C. AURANTIUM L.
Alternaria sp. (6)
A. citri Pierce (6, 13)
Ascochyta citri Penz. (13)
Sphaceloma fawcettii Jenkins (Sporotrichum citri (Mass.) Butl.) (2, 6)
C. GRANDIS (L.) Osbeck
Colletotrichum gloeosporioides Penz. (7)
Sphaceloma fawcettii Jenkins (Sporotrichum citri (Mass.) Butl.) (2)
C. LIMON (L.) Burm. f.
Colletotrichum limetticola Clausen (7)
Septoria sp. (6)
Sphaceloma fawcettii Jenkins (7)
C. MAXIMA (Burm.) Merr.
Phomopsis citri Fawc. (6)
C. SINENSIS (L.) Osbeck
Alternaria citri Pierce (6)
Colletotrichum sp. (6)
C. gloeosporioides (Penz.) Sacc. (2, 7)
Penicillium italicum Wehmer (7)
Septoria citri Pass. (7)
CLEOME spp.
Cercospora conspicua Earle (6, 14)
C. uramensis Chupp & Muller (6, 14)
Plasmopara venezuelanae Chardon (1, 6)
C. PSORALEAEFOLIA DC.
Cercospora cleomes Ell. & Halst. (2, 14)
CLIBADIUM sp.
Uredo sp. (6)
CLIDEMIA ELATA Pittier
Dothidina sphaerospora Chardon (2)
C. FENDLERI Cogn.
Bagnisiopsis toledoi Chardon (2)
C. GRANDIFLORA Cogn.
Bagnisiopsis peribebuyensis (Speg.) Th. & Syd. (1)
Botryosphaeria multipunctata (Wint.) Syd. (6)
CLITORIA GUIANENSIS (Aubl.) Benth.
Puccinia sp. (6)
Uromyces neurocarpi Diet. (9)
C. RUBIGINOSA Juss.
Uromyces neurocarpi Diet. (9)
C. TERNATEA L.
Ascochyta pisi Lib. (6)
Cercospora clitoriae Atk. (2, 14)
C. clitoridis Gonz. Frag. & Cif. (6, 14)
CLUSIA sp.
Meliola sp. (6)
COCCOLOBA sp.
Clypeotrabutia portoricensis (F. L. Stevens) Chardon (2)
C. CARACASANA H.B.K.
Meliola coccolobis F. L. Stevens & Tehon (20)

COCCOLOBA UVIFERA L.
Somatexis coccolobis Toro (2)
Uredo sp. (6)
U. uviferae Syd. (10; erroneously referred to U. coccolobae P. Henn. (2))

COFFEA ARABICA L.
Cephalosporium lecanii Zimm. (on scale insects) (7)
Cercospora coffeicola Burk. & Curt. (6, 13)
Colletotrichum sp. (6)
C. coffeanum Noack (6)
Fusarium sp. (fruit decay) (7)
Mycena citricolor (Berk. & Curt.) Sacc. Reported as Omphalia flavida Rangel & Maubl. (6, 13)
Nematodes undet. (5, March 1948)
Pellicularia koleroga Cke. (Corticium koleroga (Cke.) Hoehn.) (2, 6, 13)
Rosellinia spp. (6, 13)
Septoria sp. (6)
Stilbella flavida (Cke.) P. Henn. (2, 6). See Mycena citricolor.

COMBRETUM FRUTICOSUM (Loefl.) Stuntz.
Uredo combreti Kern & Thurston (10)

COMMELINA spp.
Mycena citricolor (Berk. & Curt.) Sacc. Reported as Omphalia flavida Rangel & Maubl. (6)
Puccinia sp. (6)

C. ELEGANS H.B.K.
Phakopsora tecta Jacks. & Holw. (2)

C. QUITENSIS Benth.
Phakopsora tecta Jacks. & Holw. (2)

CONOCARPUS ERECTUS L.
Cercospora conocarpi Chupp & Muller (6, 14)

CONVOLVULACEAE
Cercospora ipomoeae Wint. (14)

CONVOLVULUS NODIFLORUS Desr., see JACQUEMONTIA NODIFLORA

CORCHORUS PILOBOLUS Link
Cercospora macutensis Syd. (14)

CORDIA spp.
Chaetostigme cordiae (P. Henn.) F. L. Stevens (2)
Diatractium cordiae (F. L. Stevens) Syd. (6)
Dimeriella cordiae (P. Henn.) Th. (20)
Phyllachora sp. (6)

C. ALBA (Jacq.) Roem. & Schult.
Metasphaeria abortiva F. L. Stevens (2)

C. CURASSAVICA (Jacq.) R. & S.
Aecidium cordiae P. Henn. (8)

C. CYLINDROSTACHYA R. & S.
Cercospora cordiae Chupp (2, 14)
Chaetostigme cordiae (P. Henn.) F. L. Stevens (2)

C. GLABRA L. (C. CALLOCOCCA L.)
Diatractium cordiae (F. L. Stevens) Syd. (1, 6)

C. GLOBOSA (Jacq.) H.B.K. (VARRONIA GLOBOSA Jacq.)
Aecidium cordiae P. Henn. (2)

COREOPSIS spp.
Cercospora bidentis Tharp (6, 14)
Oidium sp. (6)

CORIANDRUM SATIVUM L.
Alternaria sp. (as Macrosporium sp.) (6)

COUMAROUNA ODORATA Aubl. (DIPTERYX ODORATA (Aubl.) Willd.)
Phyllosticta sp. (6)

COUSSAPOA VILLOSA Poepp. & Endl.
Phyllachora mirandina Chardon (2)

COUTAREA HEXANDRA (Jacq.) Schum.
Aecidium coutareae Kern & Thurston (11)

(Coutarea hexandra cont.)
Phyllachora coutareae Chardon (1, 6)
CRACCA: see TEPHROSIA
CRESCENTIA CUJETE L.
Irenina arachnoides (Speg.) F. L. Stevens (2)
Meliola crescentiae F. L. Stevens (6)
Phyllactinia sp. (6)
Phyllosticta sp. (6)
CRINUM sp.
Aecidium sp. (6)
CROTALARIA spp.
Cercospora crotalariae Syd. (2, 6, 14)
Oidium spp. (6, 13)
C. ANAGYROIDES H.B.K.
Cercospora crotalariae Syd. (14)
Phakopsora crotalariae (Diet.) Arth. (10)
Uromyces decoratus Syd. (6)
C. INTERMEDIA Kotschy
Cercospora sp. (6)
C. JUNCEA L.
Cercospora sp. (6)
C. MUCRONATA Desv. (C. striata D.C.)
Ascochyta sp. (6)
C. NITENS H.B.K.
Uromyces decoratus Syd. (2)
C. SPECTABILIS Roth
Ascochyta pisi Lib. (6)
Cercospora demetrioniana Wint. (6, 14)
Mycosphaerella sp. (6)
CROTON spp.
Arthuria columbiana (Kern & Whet.) Cumm. (10)
Bubakia venezuelana Kern & Thurston (11)
Cercospora sp. (6)
C. manoensis P. Henn. (6, 14)
C. maritima Tracy & Earle (2)
Meliola sp. (6)
M. longispora (Gaill.) F. L. Stevens (6)
Phakoposora crotonis (Cke.) Arth. (2)
Phyllachora sp. (6)
P. lunulata Chardon (2)
P. tragiae (Berk. & Curt.) Sacc. (2)
Puccinia sp. (6)
Stemphyliomma crotonis Toro (2)
Uredo sp. (6)
C. CURRANII Blake
Phakopsora crotonis (Cke.) Arth. (Schroeteriaster crotonis (Burr.) Diet.) (2, 18)
C. GLANDULOSUS L.
Cercospora maritima Tracy & Earle (2, 14)
C. HIRTUS L'Hérit.
Phakopsora crotonicola (P. Henn.) Kern, Thurston & Whetzel (2)
C. NIVEUS Jacq.
Gomezina araguata Chardon & Toro (2)
CUCUMIS MELO L.
Erysiphe cichoracearum DC. (13) (Oidium stage only)
Pseudoperonosphora cubensis (Berk. & Curt.) Rostow. (6, 13)
CUCUMIS SATIVUS L.
Erysiphe cichoracearum DC. (13) (Oidium stage only)
Pseudoperonospora cubensis (Berk. & Curt.) Rostow. (6, 13)
Pseudomonas lachrymans (E.F.Sm. & Bryan) Carsner (4, Vol. 2, #1, Sept. 1949)

CUCURBITA MAXIMA Duch.
Erysiphe cichoracearum D.C. (13) (Oidium stage only)
Rhagadolobium curcurbitacearum (Rehm) Th. & Syd. (6)
CUCURBITA MOSCHATA Duch.
Pseudoperonospora cubensis (Berk. & Curt.) Rostow. (2, 6)
Rhagadolobium cucurbitacearum (Rehm) Th. & Syd. (2)
CUCURBITA PEPO L.
Erysiphe cichoracearum DC. (6, 13) (Oidium stage only)
CUPANIA AMERICANA L.
Irenopsis cupaniae (F. L. Stevens) F. L. Stevens (20)
Meliola praetervisa Gaill. (2)
CURATELLA AMERICANA L.
Cercospora chirguensis Chupp & Muller (6, 14)
C. curatellae Syd. (14)
CYATHULA ACHYRANTHOIDES (H.B.K.) Moq.
Albugo bliti (Biv.) Kuntze (2)
Uredo cyathulae Mayor (10)
CYBIANTHUS BROWNII Gleason
Meliola cybianthis Toro (2)
CYCLANTHERA PEDATA (L.) Schrad.
Cercospora cyclantherae Chupp & Muller (6, 14)
CYDONIA OBLONGA Mill.
Cercospora mali Ell. & Ev. (6, 13)
Colletotrichum gloeosporioides Penz. (13)
CYNARA CARDUNCULUS L.
Cercospora obscura Heald & Wolf (6, 14)
CYNODON DACTYLON (L.) Pers. (CAPRIOLA DACTYLON (L.) Kuntze)
Helminthosporium sp. (6)
Puccinia cynodontis (Lacroix) Desm. (2, 6)
CYPERUS spp.
Puccinia abrepta Kern (2)
P. cyperi Arth. (2)
P. cyperi-tagetiformis (P. Henn.) Kern (2)
CYPERUS aff. ALTERNIFOLIUS L.
Puccinia subcoronata P. Henn. (9)
C. CARACASANUS Kunth
Puccinia abrepta Kern (2)
C. CAYENNENSIS (Lam.) Britton
Puccinia sp. (6)
P. abrepta Kern (2)
CYPERUS GLOBULOSUS Aubl.
Puccinia canaliculata (Schw.) Lagh. (2)
CYPERUS INCOMPLETUS (Jacq.) Link
Puccinia abrepta Kern (2)
CYPERUS LIGULARIS L.
Cintractia limitata Clint. (2, 6)
CYPERUS TENUIFOLIUS (Steud.) Dandy (KYLLINGIA PUMILA Michx.)
Uredo kyllingiae P. Henn. (2, 6)
DAHLIA spp.
Entyloma dahliae Syd. (6, 13)
Meloidogyne sp., as Heterodera marioni (Cornu) Goodey (13)
Oidium sp. (6, 13)
DALEA CARTHAGINENSIS (Jacq.) Macbr. (DALEA VULNERARIA var. BARBATA Oerst., PAROSELA BARBATA (Oerst.) Rydb.)
Puccinia sp. (6)
Uropyxis daleae (Diet. & Holw.) Magn. (2)
DALECHAMPIA sp.
Aecidium dalechampiicola P. Henn. (2)
DATURA METELOIDES Dunal.
Alternaria solani (Ell. & G. Martin) Sor. (2)
DATURA STRAMONIUM L.
Aecidium daturae Kern, Thurston & Whet. (2)

(Datura stramonium cont.)
Alternaria sp. (also Macrosporium sp.) (6)
DAUCUS CAROTA L.
Alternaria dauci (Kuehn) Groves & Skolko (Macrosporium carotae Ell. & Langl.) (6)
Septoria apii Fres. (7)
DESMODIUM spp. (MEIBOMIA spp.)
Cercospora desmodiicola Ell. & Kell. var. leiocarpa Gonz. Frag. & Cif. (14)
C. meibomiae Chupp (6, 14)
Meliola bicornis Wint. (2)
Oidium sp. (6)
Parodiella paraguayensis Speg. (2)
Parodiella perisporioides (Berk. & Curt.) Speg. (2)
Uromyces hedysari-paniculati (Schw.) Farl. (2)
D. ADSCENDENS (Sw.) DC.
Parodiella perisporioides (Berk. & Curt.) Speg. (2)
D. AFFINE Schlecht. (D. ALBIFLORUM Salzm.)
Uromyces hedysari-paniculati (Schw.) Farl. (2)
D. AXILLARE (Sw.) DC.
Uromyces hedysari-paniculati (Schw.) Farl. (2)
D. BARBATUM (L.) Benth. & Oerst.
Parodiella perisporioides (Berk. & Curt.) Speg. (2)
D. CAJANIFOLIUM (H.B.K.) DC.
Cercospora sp. (6)
Puccinia sp. (6)
D. CANUM (Gmel.) Schinz & Thellung (MEIBOMIA FRUTESCENS Jacq.)
Uromyces hedysari-paniculati (Schw.) Farl. (8)
D. INTORTUM (Mill.) Urb.
Synchytrium citrinum (Syd.) Gäum. (2)
D. SCORPIURUS (Sw.) Desv.
Puccinia sp. (6)
D. SUPINUM (Sw.) DC
Cercospora meibomiae Chupp (2, 14)
Meliola bicornis Wint. (2)
Meliola denticulata Wint. (2)
Meliola desmodii Karst. & Roum. (2)
D. TORTUOSUM (Sw.) DC. (MEIBOMIA PURPUREA (Mill.) Vail)
Cercospora desmodiicola Ell. & Kell. var. leiocarpa Gonz. Frag. & Cif. (6)
Uromyces hedysari-paniculati (Schw.) Farl. (2)
DIANTHUS spp.
Alternaria dianthi F. L. Stevens & Hall (6)
Meloidogyne sp., as Heterodera marioni (Cornu) Goodey (13)
Septoria dianthi Desm. (6, 13)
Uromyces caryophyllinus (Schrank) Wint. (6, 13)
D. CARYOPHYLLUS L.
Uromyces caryophyllinus (Schrank) Wint. (9)
DICHRONEMA sp.
Ustilaginoidea dichronemae P. Henn. (2, 6)
D. CILIATA Vahl
Puccinia dichronemae (Arth.) Jacks. (8)
"DIDYMOPANAX GUILFOGLEI": see POLYSCIAS GUILFOYLEI
DIGITARIA HORIZONTALIS Willd.
Uromyces panici-sanguinalis Rangel (2)
D. SANGUINALIS (L.) Scop.
Piricularia grisea (Cke.) Sacc. (6)
DIOSCOREA spp.
Cercospora dioscoreae Ell. & G. Martin (6, 14)
Phyllachora sp. (6)
P. ulei Wint. (2, 6)

DIOSCOREA ALATA L.
Cercospora brasiliensis Averna-Saccá (6, 14)
D. aff. GRANDIFLORA Mart.
Sphenospora pallida (Wint.) Diet. (2)
D. TRIPHYLLA L.
Alternaria sp. (6)
Colletotrichum sp. (6)
DIPLAZIUM EXPANSUM Willd.
Nipholepis filicina Syd. (19)
DIPTERYX, see COUMAROUNA
DITAXIS FENDLERI (Muell. Arg.) Pax & K.Hoffm.
Cercospora argythamniae Dearn. & House (6, 14)
DOLICHOS LABLAB L.
Erysiphe polygoni DC. (7)
Phakopsora vignae (Bres.) Arth. (7)
Puccinia sp. (6)
D. MINIMUS, D. RETICULATUS: see RHYNCHOSIA
DORSTENIA CONTRAJERVA L.
Uredo rubescens Arth. (2)
DRYOPTERIS POITEAUANA (Bory) Urban
Desmella superficialis (Speg.) Syd. (2)
D. TETRAGONA (Sw.) Urban
Desmella superficialis (Speg.) Syd. (2)
DUGGENA SPICATA: see GONZALAGUNIA SPICATA
DURANTA MUTISII L. f.
Cercospora durantae Chupp & Müller (6, 14)
Meliola sp. (6)
DURANTA REPENS L.
Irenina pittieri (Toro) Orejuela (Irenopsis pittieri Toro) (2, 15)
Meliola sp. (6)
Phyllachora sp. (6)
P. fusicarpa Seaver (2, 6)
ECHINOCHLOA COLONUM (L.) Link
Cercospora echinochloae J. J. Davis. (6, 14)
Piricularia grisea (Cke.) Sacc. (6)
ECHITES TRIFIDA Jacq.
Hemileia jahnii Syd. (2)
Mycosphaerella discophora Syd. (9)
ELEOCHARIS sp.
Puccinia liberta Kern (2)
ELEPHANTOPUS spp.
Cercospora elephantopodis Ell. & Ev. (6, 14)
Coleosporium sp. (6)
Mycena citricolor (Berk. & Curt.) Sacc. as Omphalia flavida (Cke.) Rangel & Maub. (6)
E. ANGUSTIFOLIUS: see ORTHOPAPPUS ANGUSTIFOLIUS
E. MOLLIS H.B.K.
Coleosporium elephantopodis (Schw.) Thuem. (2)
ELEUSINE INDICA (L.) Gaertn.
Helminthosporium sp. (6)
ELEUTHERANTHERA RUDERALIS (Sw.) Sch. & Bip.
Puccinia melampodii Diet. & Holw. (2)
ELYONURUS TRIPSACOIDES H. & B.
Phyllachora dolgei Chardon (2)
ELYTRARIA TRIDENTATA Vahl
Puccinia elytrariae P. Henn. (2)
EMMEORHIZA UMBELLATA (Spreng.) K. Schum.
Cercospora emmeorhizae Syd. (14)
Uromyces emmeorrhizae Syd. (2)
ERAGROSTIS CILIARIS (L.) Link
Uromyces eragrostidis Tracy (2)

ERAGROSTIS CURTIPEDICELLATA Buckl.
    Puccinia sp. (6)
E. NEOMEXICANA Vasey
    Uromyces eragrostidis Tracy (2)
E. POLYTRICHA Nees
    Phyllachora eragrostidis Chardon (1)
ERIGERON PUSILLUS Nutt. (LEPTILON PUSILLUM (Nutt.) Britton)
    Dimeriella erigeronicola F. L. Stevens (20)
ERIOBOTRYA JAPONICA (Thunb.) Lindl.
    Mycena citricolor (Berk. & Curt.) Sacc. as Omphalia flavida (Cke.) Rangel & Maub. (6, 13)
    Pestalotia sp. (6)
    Phyllosticta sp. (6)
    P. eriobotryae Thuem. (6, 13)
ERIOCHLOA POLYSTACHYA H.B.K.
    Puccinia substriata Ell. & Barth. (8)
ERODIUM sp.
    Cercospora sp. (6)
ERYTHRINA spp.
    Dicheirinia sp. (6)
    Phyllosticta lasadjuntas Toro (2)
ERYTHRINA GLAUCA Willd.
    Calostilbe striispora (Ell. & Ev.) Seaver (6)
    Cercospora erythrinae Syd. (6, 14)
    C. pittieri Syd. (14)
    Dicheirinia binata (Berk. & Curt.) Arth. (2)
    Phyllosticta erythrinicola Young (2)
    Puccinia sp. (6)
ERYTHROXYLON spp.
    Uredo erythroxylonis Graz. (2)
    Uredo sp. (6)
ESPELETIA NERIIFOLIA (H.B.K.) Sch. Bip.
    Leptosphaeria jahnii Chardon (1)
ESPELETIA SCHULTZII Wedd.
    Cercospora espeletiae Chupp (14)
EUCHLAENA MEXICANA Schrad.
    Helminthosporium turcicum Pass. (6)
EUGENIA spp.
    Asterina mandaquiensis P. Henn. (2)
    Catacauma eugeniicola Chardon (2)
    Dictothyriella lourdes Toro (2)
    Parasterina mirabilis Toro (2)
    Phyllachora tachirensis Chardon (2)
    Sphaerodothis consociata Chardon (2)
EUGENIA PUNICAEFOLIA (H.B.K.) DC
    Parasterina mirabilis Toro (2)
    Rehmiodothis eugeniae Chardon (2)
    Stomiopeltis eugeniae Toro (2)
EUPATORIUM spp.
    Cercospora sp. (6)
    Cionothrix praelonga (Wint.) Arth. (Cronartium praelongum Winter) (2, 6).
    Cronartium sp. (6)
    Irene sororcula (Speg.) Stev. (2)
    Septoria sp. (6)
    Phyllachora sp. (6)
    Puccinia eupatorii-columbiani Mayor (11)
    Typhodium eupatorii Seaver (2)
E. BALLOTAEFOLIUM H.B.K.
    Septoria sp. (6). Host reported as "Vernonia ballotaefolia."
    Uredo eupatoriorum Mayor (2)

EUPATORIUM IRESINOIDES H.B.K.
Puccinia aegopogonis Arth. & Holw. (11)
E. JAHNII Robinson
Cionothrix praelonga (Wint.) Arth. (Cronartium praelongum Wint.) (2)
E. MACROPHYLLUM L.
Coleosporium eupatorii Arth. (2)
E. ODORATUM L.
Cercospora sp. (6)
Cionothrix praelonga (Wint.) Arth. (18) (Cronartium praelongum Wint.) (2)
E. SCANDENS: see MIKANIA SCANDENS
EUPHORBIA spp. (including CHAMAESYCE)
Botrytis sp. (6)
Oidium sp. (6)
Puccinia sp. (6)
Sphaceloma sp. (6)
Uromyces proeminens (DC.) Pass. (6)
E. CARACASANA Boiss.
Cercospora euphorbiae Kell. & Swing. (6, 14)
E. COTINIFOLIA L.
Puccinia venezuelana Kern, Thurston & Whet. (Uredo venezuelana Kern, Thurston & Whet.) (2, 10)
E. GENICULATA Ortega
Melampsora euphorbiae-geniculatae Kern & Thurston (11)
E. GRAMINEA Jacq.
Albugo sp. (6)
E. HETEROPHYLLA L.
Oidium sp. (7)
E. HIRTA L. (CHAMAESYCE HIRTA Millsp.)
Uromyces proeminens (DC.) Pass. (Uromyces euphorbiicola Tranz.) (2, 18)
E. HYPERICIFOLIA L. (CHAMAESYCE HYPERICIFOLIA (L.) Millsp.)
Microsphaera euphorbiae Pk. (2)
Uromyces proeminens (DC.) Pass. (6)
E. HYSSOPIFOLIA L. (CHAMAESYCE HYSSOPIFOLIA (L.) Small)
Uromyces proeminens (DC.) Pass. (2)
EVOLVULUS ALSINOIDES L.
Uredo evolvuli Speg. (2) (Probably stage of Puccinia tuyutensis Speg.)
E. TENUIS Mart.
Meliola malacotricha Speg. (6)
Puccinia sp. (6)
FAGOPYRUM ESCULENTUM Moench
Cercospora fagopyri Chupp & Muller (6, 14)
FAGARA PTEROTA L.
Meliola fagaricola (Speg.) F. L. Stevens (8)
FAGARA aff. RHOIFOLIA Engl.
Aecidium xanthoxylinum Speg. (9)
FESTUCA MYUROS L.
Puccinia epiphylla (L.) Wettst. (2)
FICUS spp.
Catacauma portoricensis Chardon (6)
Cercospora elasticae Zimm. (2)
C. urostigmatis P. Henn. (6, 14)
Cerotelium fici (Cast.) Arth. (13)
Oidium sp. (6)
Puccinia sp. (6)
Uredo ficina Juel (10)
FICUS CARICA L.
Cercospora elasticae Zimm. (6, 14)
Cerotelium fici (Cast.) Arth. (2, 6, 13)
FICUS FLORESINA Pittier
Phyllachora trujillensis Chardon (2)

FICUS GUANARENSIS Pittier
Phyllachora portoricensis Chardon (6)
FICUS TURBINATA Pittier
Cerotelium fici (Cast.) Arth. (Physopella ficina Arth.) (2, 18)
FIMBRISTYLIS sp.
Phyllachora gracillima Speg. (6)
F. DICHOTOMA (L.) Vahl (F. DIPHYLLA (Retz.) Vahl)
Cintractia axicola (Berk.) Cornu (2)
Phyllachora gracillima Speg. (2)
FOURCROYA HUMBOLDTIANA Trel.
Mirandia fourcroyae Toro (2)
Sphaerodothis fourcroyae Chardon (2)
FRAGARIA CHILOENSIS Duch.
Mycosphaerella fragariae (Tul.) Lindau (7)
Ramularia tulasnei Sacc. (13). Imperfect stage of Mycosphaerella fragariae.
F. VESCA L.
Cercospora vexans Massal. (6, 14)
Ramularia tulasnei Sacc. (6)
FUCHSIA sp.
Cercospora fuchsiae Chupp & Muller (6, 14)
FUNASTRUM CLAUSUM (Jacq.) Schltr.
Puccinia concrescens Ell. & Ev. (2)
F. GLAUCUM (H.B.K.) Schltr.
Puccinia obliqua Berk. & Curt. (Puccinia kunzeana P. Henn.) (2, 18)
GALACTIA spp.
Phyllachora sp. (6)
P. galactiae Earle (6)
G. STRIATA (Jacq.) Urb.
Phyllachora galactiae Earle (2)
GALINSOGA CARACASANA (DC.) Sch. Bip.
Albugo tragopogonis (DC.) S. F. Gray (2)
Entyloma galinsogae Syd. (2, 6)
GARDENIA sp.
Corticium sp. (6)
GERANIUM VELUTINUM Turcz.
Puccinia unilateralis (Arth.) Cumm. (15)
GLIRICIDIA SEPIUM (Jacq.) H.B.K.
Cercospora atropurpurascens Chupp (2, 14)
Cercospora gliricidasis Gonz. Frag. & Cif. (6, 14)
Cercospora gliricidiae Syd. (14)
Cercospora sp. (6)
GLYCINE MAX (L.) Merr.
Ascochyta pisi Lib. (6, 13)
Cercospora glycines Cke. (13)
Cercospora sojina Hara (6, 14)
Meloidogyne sp. (Heterodera marioni (Cornu) Goodey) (7)
Pseudomonas glycinea Coerper (Bacterium sojae Wolf) (13)
Rhizoctonia microsclerotia Matz (6)
Sclerotium rolfsii Sacc. (13)
Virus (Mosaic) (7)
GNAPHALIUM sp.
Puccinia gnaphaliata (Schw.) Arth. & Bisby (2)
G. SPICATUM Lam.
Cercospora gnaphaliacea Cke. (14)
GOMPHRENA IRESINOIDES (H.B.K.) Moq.
Uromyces bonariensis Speg. (2, 8)
GONZALAGUNIA SPICATA (Lam.) Maza (DUGGENA SPICATA (Lam.) Standley)
Meliola psychotriae Earle (2)
GOSSYPIUM spp.
Alternaria sp. (6)
Ascochyta gossypii Syd. (6)

(Gossypium spp. cont.)
Cercospora gossypii Cke. (6, 14)
Cerotelium desmium (Berk. & Br.) Arth. (2, 6, 13)
Colletotrichum gossypii Southworth (6, 13)
Macrophomina phaseoli (Maub.) Ashby (6)
Mosaic (Virus) (7)
Mycosphaerella sp. (6)
Ramularia areola Atk. (6, 13) The perfect stage, Mycosphaeiella areola Ehrlich & Wolf, has not been found in Venezuela.
Sclerotium rolfsii Sacc. (6)
Verticillium albo-atrum Reinke & Berth. (7, 13)
Xanthomonas malvacearum (E.F.Sm.) Dowson (13)
G. HIRSUTUM L.
Alternaria macrospora Zimm. (3, year 1, No. 11, Nov. 1947)
Cercospora gossypii Cke. (3, year 1, No. 11, Nov. 1947)
Choanephora sp. (3, year 1, No. 10, Oct. 1947)
Colletotrichum gossypii Southworth (3, year 1, No. 10, Oct. 1947)
Fusarium vasinfectum Atk. (7)
Ramularia areola Atk. (3, year 1, No. 11, Nov. 1947)
Sclerotium rolfsii Sacc. (4, Vol. 1, No. 6, July 1949)
GOUANIA LUPULOIDES (L.) Urb.
Puccinia gouaniae Holw. (2)
G. POLYGAMA (Jacq.) Urb.
Catacauma contractum Syd. (2)
Puccinia invaginata Arth. & J. R. Johnston (10)
GRAMINEAE
Dothichloë granulosa Chardon (2)
GRISLEA sp.
Cercospora grisleae Syd. (6, 14)
G. SECUNDA L.
Aecidium adenariae Mayor (8)
Cercospora grisleae Syd. (14)
Mollisia grisleae (Syd.) J. H. Miller & Burton (6)
GUADUA LATIFOLIA Kunth
Meliola sp. (6)
Phyllachora guaduae Chardon (2)
GUAREA sp.
Uredo guareae Kern, Thurston & Whet. (2)
GUAZUMA sp.
Cercospora guazumae Syd. (2, 14)
G. ULMIFOLIA Lam.
Alternaria sp. (6)
Cercospora flocculosa Syd. (14)
Cercospora guazumae Syd. (6, 14)
Periconia guazumae Linder (12)
GURANIA sp.
Meliola sp. (6)
GURANIA SPINULOSA Cogn.
Phyllachora cucurbitacearum Chardon (2)
GURANIA WAGENERIANA (Schlecht.) Cogn.
Cercospora cayaponiae F. L. Stevens & Solh. (14)
Peltaster guraniae Toro (2)
GUTTIFERAE
Irenina mangostana (Sacc.) F. L. Stevens (20)
GYMNOLONIA PATENS MACROPHYLLA: see HYMENOSTEPHIUM MICROCEPHALUM
HAMELIA ERECTA Jacq.
Aegerita webberi Faw. (19) An entomogenous species.
Uredo hameliae Arth. (2)
HEBECLINIUM: see EUPATORIUM
HELIANTHUS ANNUUS L.
Cercospora helianthi Ell. & Ev. (6, 14)

(Helianthus annuus cont.)
Cercospora sp. (6)
Erysiphe cichoracearum DC. (6) In the Oidium stage only
HELICONIA spp.
Leptosphaeria sp. (6)
Metasphaeria sp. (6)
HELIOCARPUS AMERICANUS L.
Puccinia heliocarpi Syd. (2)
H. TRICHOPODUS Turcz.
Puccinia sp. (6)
HELIOPSIS BUPHTHALMOIDES (Jacq.) Dunal
Puccinia bimbergi Mayor (2)
HELIOTROPIUM spp.
Cercospora heliotropii Ell. & Ev. (6)
Puccinia heliotropii Kern & Kell. (8)
H. INDICUM L.
Aecidium guatemalense Kern & Kell. (9)
HETEROTRICHUM MACRODON Planch.
Dimeriellopsis heterotrichi Toro (2)
HEVEA BENTHAMIANA Muell. Arg.
Catacauma huberi (P. Henn.) Th. & Syd. (6)
H. BRASILIENSIS (A. Juss.) Muell. Arg.
Dothidella ulei P. Henn. (6)
Fusicladium sp. (6)
HIBISCUS: see also ABELMOSCHUS
HIBISCUS sp.
Phyllosticta sp. (6)
H. ESCULENTUS L.
Ascochyta abelmoschi Harter (13)
Ascochyta sp. (6)
Cercospora hibisci Tracy & Earle (2, 6, 13, 14)
Cercospora hibiscina Ell. & Ev. (6, 13)
Cercospora malayensis F. L. Stevens & Solh. (14)
HICORIA PECAN: see CARYA ILLINOENSIS
HIERACIUM spp.
Oidium sp. (6)
Puccinia hieracii (Schum.) H. Mart. (2)
HILLERIA SECUNDA (R. & P.) H. Walt.
Puccinia hilleriae Kern & Thurston (11)
HOLCUS HALEPENSIS: see SORGHUM HALEPENSE
H. SORGHUM: see SORGHUM VULGARE
H. SORGHUM SUDANENSIS: see SORGHUM SUDANENSE
HORDEUM VULGARE L.
Helminthosporium sativum Pam., King & Bakke (13)
Helminthosporium sp. (6)
Puccinia graminis Pers. (6, 13)
Ustilago hordei (Pers.) Lagh. (6, 13)
Ustilago nuda (Jens.) Rostr. (6, 13)
"HORTENSIA" sp.: see HYDRANGEA
HURA CREPITANS L.
Cercospora hurae F. L. Stevens (6, 14)
Cercosporella hurae Linder & Whet. (12)
HYDRANGEA sp. (host reported as "HORTENSIA sp." but must be HYDRANGEA)
Cercospora sp. (6)
HYDROCOTYLE spp.
Cercospora hydrocotyles Ell. & Ev. (6, 14)
Puccinia sp. (6)
P. hydrocotyles (Ck.) Cke. (6)
HYDROCOTYLE UMBELLATA L.
Cercospora hydrocotyles Ell. & Ev. (6, 14)
Puccinia hydrocotyles (Lk.) Cke. (2)

HYMENACHNE DONACIFOLIA (Raddi) Chase
Physalospora hymenachnei Chardon (1)
HYMENAEA COURBARIL L.
Uredo hymenaeae Mayor (2)
HYMENOCALLIS aff. CARIBAEA Herb.
Aecidium hymenocallis Kern & Thurston (11)
HYMENOSTEPHIUM MICROCEPHALUM (Less.) Blake (GYMNOLONIA PATENS MACROPHYLLA Rob. & Green)
Meliola gymnoloniae (2)
HYPARRHENIA RUFA (Nees) Stapf
Helminthosporium sp. (6)
HYPERICUM sp.
Aecidium monticolae Kern, Thurston & Whet. (2, 6)
H. ULIGINOSUM H.B.K.
Uromyces hyperici-frondosi (Schw.) Arth. (2, 6)
HYPTIS spp.
Cercospora hypticola Chupp & Muller (6, 14)
Irenopsis anastomosans (Wint.) Toro (2)
Puccinia sp. (6)
Rosencheldia paraguaya Speg. (6)
H. CANESCENS H.B.K.
Puccinia medellinensis Mayor (8)
H. CAPITATA Jacq.
Irenina hyptidicola (F. L. Stevens) F. L. Stevens (15)
Puccinia hyptidis (Curt.) Tracy & Earle (11)
H. LAPPULACEA Mart.
Irenina hyptidicola (F. L. Stevens) F. L. Stevens (2)
H. MUTABILIS (Rich.) Briq. (8)
Puccinia hyptidis var. mutabilis Mayor (8)
H. MUTABILIS var. SPICATA (Poit.) Briq.
Irenina hyptidicola (F. L. Stevens) F. L. Stevens (2)
H. PECTINATA Poit.
Puccinia medellinensis Mayor (2)
IBATIA MARITIMA (L.) Dcne.
Cercospora ibatiae Chupp & Muller (6, 14)
IMPATIENS BALSAMINA L.
Cercospora fukushiana (Matsuura) Yamamoto (14)
C. impatientis Berk. (13)
Oidium sp. (6, 14)
IMPERATA CONTRACTA (H.B.K.) Hitchc.
Dictyochlorella sp. (6)
Phyllachora antioquensis Chardon (2, 6)
INDIGOFERA ANIL L.
Parodiella perisporioides (Berk. & Curt.) Speg. (6)
Uredo sp. (6)
I. MUCRONATA Spreng.
Uromyces indigoferae Diet. & Holw. (9)
I. SUFFRUTICOSA Mill.
Parodiella perisporioides (Berk. & Curt.) Speg. (2)
Ravenelia indigoferae Tranz. (2)
INGA spp.
Diatractium ingae (Allesch.) Syd. (19)
Meliola hariotula Speg. (15)
Parodiopsis stevensii Arn. (2)
Ravenelia ingae (P. Henn.) Arth. (Maravalia ingae Syd.) (2, 8)
I. FASTUOSA (Jacq.) Willd.
Uredo ingae P. Henn. (6, 9)
I. SPECTABILIS Willd.
Actinopeltis scitula Syd. (19)
IONOXALIS spp.
Cercospora sp. (6)
Puccinia sp. (6)

IPOMOEA spp.
Albugo ipomoeae-panduranae (Farl.) Swing. (2, 6)
Cercospora bataticola Cif. & Brun. (14)
C. ipomoeae Winter (14)
Coleosporium ipomoeae (Schw.) Burr. (6)
Endophyllum sp. (6)
Meliola clavulata Wint. (2)
Phyllosticta sp. (6)
P. batatas Thuem. (6)
Puccinia crassipes Berk. & Curt. (2)
P. opulenta Speg. (2)
P. puta Jacks. & Holw. (2)
IPOMOEA BATATAS (L.) Lam.
Albugo ipomoeae-panduranae (Farl.) Swing. (13)
Albugo minor (Speg.) Cif. (2)
Phyllosticta batatas (Thuem.) Cke. (2, 13)
IPOMOEA CARNEA Jacq.
Cercospora bataticola Cif. & Brun. (6, 14)
Puccinia puta Jacks. & Holw. (P. distinguenda (Syd.) Jacks. & Holw.) (2, 8)
Puccinia sp. (6)
IPOMOEA CATHARTICA Poir.
Coleosporium ipomoeae (Schw.) Burr. (2)
IPOMOEA GLABRA (Aubl.) Choisy
Coleosporium ipomoeae (Schw.) Burr. (2)
IPOMOEA MEYERI (Spreng.) G. Don.
Albugo ipomoeae-panduranae (Farl.) Swing. (2)
IPOMOEA PES-CAPRAE (L.) Roth
Albugo ipomoeae-panduranae (Farl.) Swing. (7)
IPOMOEA PURPUREA (L.) Lam.
Albugo ipomoeae-panduranae (Farl.) Swing. (2)
Meliola clavulata Wint. (2)
IRENINA HYPTIDICOLA (F. L. Stevens) F. L. Stevens
Ectosticta costaricana Syd. (2)
Stigme costaricana Syd. (2)
Trichothyrium dubiosum (Bom. & R.) Th. (15)
IRENINA TRILOBA (Wint.) F. L. Stevens
Stigme costaricana Syd. (2)
IRENOPSIS GUIANENSIS (F. L. Stevens & Dow.) F. L. Stevens
Helminthosporium guianensis F. L. Stevens & Dowell (2)
IRESINA CELOSIA L.
Uromyces clarus Jacks. & Holw. (2)
IRIS spp.
Asterina libertiae Syd. (15)
Meliola sp. (6)
ISCHAEMUM LATIFOLIUM (Spreng.) Kunth
Phyllachora ischaemicola Chardon (1)
JACOBINA sp.
Cercospora diantherae Ell. & Kell. (6, 14)
JACQUEMONIA LACTESCENS Seem.
Aecidium jacquemontiae Ell. & Ev. (10)
JACQUEMONTIA NODIFLORA (Desv.) G. Don.
Uromyces gemmatus Berk. & Curt. (2)
JASMINUM sp.
Cercospora jasminicola Chupp & Muller (13, 14)
JASMINUM GRANDIFLORUM L.
Cercospora jasminicola Chupp & Muller (14)
JATROPHA CURCAS L.
Phakopsora jatrophicola (Arth.) Cumm. (Uredo jatrophicola Arth.) (2, 8)
JUSSIAEA spp.
Cercospora jussiaeae Atk. (6, 14)
C. ludwigiae Atk. (2)

KYLLINGIA PUMILA: see CYPERUS TENUIFOLIUS
LACTUCA spp.
Cercospora lactucae P. Henn. (2)
C. longissima (Trav.) Sacc. (2)
L. INTYBACEA Jacq.
Puccinia arthurella Trott. (9)
L. SATIVA L.
Alternaria sp. as Macrosporium sp. (6)
Bremia lactucae Regel (2)
Cercospora lactucae P. Henn. (14)
C. longissima (Trav.) Sacc. (6, 13, 14)
Rhizoctonia solani Kuehn (13)
Septoria lactucae Pass. (6, 13)
LAGERSTROEMIA INDICA L.
Septoria sp. (6)
Oidium sp. (6)
LANTANA spp.
Cercospora guianensis F. L. Stevens (14)
C. lantanae Chupp (2)
Puccinia lantanae Farl. (2)
L. ACHYRANTHIFOLIA Desf.
Meliola ambigua Pat. & Gaill. (19)
M. lantanae Syd. (6)
Prospodium tuberculatum (Speg.) Arth. (9)
Puccinia sp. (6)
P. lantanae Farl. (2, 6)
L. ACULEATA L.
Puccinia lantanae Farl. (2)
L. CAMARA L.
Cercospora guianensis F. L. Stevens & Solh. (6, 14)
C. lantanae Chupp (2, 6, 14)
Epiphyma nervisequens (Chardon) J. H. Miller & Burton (1, 6)
Meliola lantanae Syd. (2)
Puccinia lantanae Farl. (2)
Rosencheldia paraguaya Speg. (6)
L. "SCHNIFFNERII"
Puccinia sp. (6)
L. TRIFOLIA L.
Meliola lantanae Syd. (20)
LASIACIS sp.
Meliola lasiacidis Toro (2)
LASIACIS DIVARICATA (L.) Hitchc.
Puccinia lasiacidis Kern (8)
LASIACIS PROCERRIMA (Hack.) Hitchc.
Angiopsora lenticularis Mains (11)
LASIACIS RUSCIFOLIA (H. B. K.) Hitchc.
Phyllachora lasiacis Syd. (2)
Uromyces costaricensis Syd. (U. leptodermus Syd.) (2, 18)
LASIACIS SORGHOIDEA (Desv.) Hitchc. & Chase
Uromyces costaricensis Syd. (U. leptodermus Syd.) (2, 18)
LAURACEAE
Clypeotrabutia meridensis Chardon (2)
Rehmiodothis lamulera Chardon (2)
LEONOTIS NEPETAEFOLIA (L.) R. Br.
Puccinia sp. (6)
P. leonotidis (P. Henn.) Arth. (2)
LEPTILON PUSILLUM: see ERIGERON PUSILLUS
LEPTOCHLOA DOMINGENSIS (Jacq.) Trin.
Phyllachora leptochloae Chardon (6)
L. VIRGATA (L.) Beauv.
Phyllachora sp. (6)
Puccinia leptochloae Arth. & Fromme (9)

LINUM USITATISSIMUM L.
Cercospora sp. (6)
LIPPIA sp.
Puccinia sp. (6)
L. NODIFLORA (L.) Greene.
Meliola lantanae Syd. (2)
LOLIUM TEMULENTUM L.
Gibberella saubinetii (Mont.) Sacc. (6)
LONCHOCARPUS spp.
Meliola lonchocarpicola F. L. Stevens (2)
Pucciniopsis lonchocarpi Linder (12)
Trabutia amphigena Chardon (2)
L. FENDLERI Benth.
Puccinia nephroidea Syd. (2)
L. PUNCTATUS H.B.K.
Trabutia conica Chardon (2)
LORANTHUS: see PHTHIRUSA
LUEHEA CANDIDA (DC.) Mart.
Phyllosticta sp. (6)
LUPINUS spp.
Cercospora lupinicola Lien. (6, 14)
Chrysocelis lupini Lagh. & Diet. (2)
LYCOSERIS OBLONGIFOLIA Rusby
Uredo lycoseridis Kern & Thurston (9)
LYCOPERSICON ESCULENTUM Mill.
Alternaria solani (Ell. & G. Martin) Sor. (6, 13)
Cladosporium fulvum Cke. (2, 6, 13)
Colletotrichum phomoides (Sacc.) Chester (6)
Erwinia carotovora (L. R. Jones) Holland (13)
Fusarium sp. (6)
Marmor tabaci Holmes var. vulgare Holmes (7)
Meloidogyne sp. (Heterodera marioni (Cornu) Goodey) (13)
Phytophthora infestans (Mont.) D By. (2, 6, 13)
Sclerotium rolfsii Sacc. (4, Vol. 1, No. 6, July 1949)
Septoria lycopersici Speg. (6, 13)
LYGODIUM VENUSTUM Sw.
Puccinia lygodii (Hariot) Arth. (9)
MABEA sp.
Hyalasterina kerni Toro (20)
MACHAERIUM spp.
Phyllachora sp. (6)
P. machaeriicola (P. Henn.) Th. & Syd. (2, 6)
Uredo sp. (6)
M. HUMBOLDTIANUM Vogel
Catacauma venezuelansis (Syd.) Chardon (2)
Phyllachora machaeriicola (P. Henn.) Th. & Syd. (2)
Uredo pusilla Kern, Thurston & Whet. (2)
M. MORITZIANUM Benth. .
Catacauma venezuelansis (Syd.) Chardon (2, 6)
Periconia toroi Linder (12)
Phyllachora machaeriicola (P. Henn.) Th. & Syd. (2)
M. ROBINAEFOLIUM Vogel
Catacauma venezuelansis (Syd.) Chardon (2, 6)
Phyllachora machaeriicola (P. Henn.) Th. & Syd. (2)
MALACHRA ALCEIFOLIA Jacq.
Cercospora malachrae Heald & Wolf (2, 14)
MALPIGHIA GLABRA L.
Colletotrichum sp. (6)
MALUS SYLVESTRIS Mill. (PYRUS MALUS L.)
Cercospora mali Ell. & Ev. (6, 13, 14)
Gloeosporium fructigenum Berk. (13)

MALVA sp.
Ascochyta sp. (6)
M. SYLVESTRIS L.
Puccinia heterospora Berk. & Curt. (2)
MALVASTRUM sp.
Ramularia malvastri Linder (9)
M. CORCHORIFOLIUM (Desv.) Britton
Puccinia malvacearum Bert. (2)
M. COROMANDELIANUM (L.) Garcke
Puccinia malvacearum Bert. (2, 6)
MAMMEA AMERICANA L.
Pestalotia sp. (6)
MANGIFERA INDICA L.
Cercospora mangiferae Koord. (6, 14)
Colletotrichum gloeosporioides: see Glomerella cingulata
Gloeosporium mangiferae: see Glomerella cingulata
Glomerella cingulata (Ston.) Spauld. & Schrenk (6) Also in imperfect stage as Colletotrichum gloeosporioides Penz. (2, 6), and Gloeosporium mangiferae P. Henn. (7)
Meliola mangiferae Earle. (2, 6)
Strigula elegans (Fee) Muell. Arg. (7)
MANIHOT UTILISSIMA Pohl
Cercospora caribaea Cif. (6, 14)
C. henningsii Allesch. (13, 14)
Phyllosticta sp. (6)
Uromyces janiphae (Wint.) Arth. (2, 6, 13)
MEDICAGO SATIVA L.
Alternaria sp. (as Macrosporium sp.) (6)
Cercospora medicaginis Ell. & Ev. (6, 13, 14)
Cuscuta sp. (7)
[Macrosporium medicaginis Cugini] (5, March 1948). A doubtful record, possibly Stemphylium sarcinaeforme (Cav.) Wilts.
Pseudopeziza medicaginis (Lib.) Sacc. (6, 13)
Sclerotium rolfsii Sacc. (5, April, May 1949)
Stemphylium sarcinaeforme: see Macrosporium medicaginis
Uromyces striatus Schroet. (6, 8, 13)
MELANTHERA ASPERA (Jacq.) Steud.
Uromyces columbianus Mayor (2)
MELANTHERA HASTATA (Walt.) Michx.
Uromyces columbianus Mayor (2)
MELASTOMACEAE Indet.
Septoria melastomatum (Lév.) Berl. & Vogl. (2)
MELIA AZEDARACH L.
Cercospora sp. (6)
Phyllosticta ibarrae Toro (2)
Septoria sp. (6)
MELICOCCA BIJUGA L.
Colletotrichum sp. (6)
Meliola sapindacearum Speg. (2, 6)
Strigula elegans (Fee) Muell. Arg. (7)
MELINIS MINUTIFLORA Beauv.
Helminthosporium sp. (6)
Uredo melinidis Kern (8)
MELIOLA sp.
Calonectria erubescens (Rob.) Sacc. (2)
MELOCHIA CARACASANA Jacq.
Cercospora melanotes Syd. (6, 14)
M. TOMENTOSA L.
Cercospora melanotes Syd. (6, 14)
MERREMIA QUINQUEFOLIA (Griseb.) E. Hall.
Meliola clavulata Wint. (6)

METASTELMA sp.
    Sphaceloma sp. (6)
M. CAMPANULATUM Dcne.
    Phyllachora sp. (6)
MICONIA spp.
    Bagnisiopsis sp. (6)
    B. peribebuyensis (Speg.) Th. & Syd. (6)
    B. spinulosa Chardon (6)
    B. tijucensis The. & Syd. (6)
    Botryosphaeria multipunctata (Wint.) Syd. (6)
    Dothidina sp. (6)
    Lembosia sp. (6)
    Meliola sp. (6)
    Parasterina miconiae (Th.) Toro (2)
    P. venezuelana (Syd.) Toro (2)
    Phyllachora sp. (6)
    Placoasterina antioquensis Toro (2)
    Xenostomella meridensis Toro (2)
M. AERUGINOSA Naud.
    Cercospora sp. (6)
    Parasterina miconiae (Th.) Toro (2)
    P. montagnei Toro (2)
M. CILIATA DC.
    Asterina uribei Toro (2)
M. DODECANDRA (Desr.) Cogn.
    Pittierodothis miconiae Chardon (1, 6)
    Pittieromyces miconiae Chardon (6)
M. MACROPHYLLA (D. Don) Triana
    Bagnisiopsis peribebuyensis (Speg.) Th. & Syd. (6)
    B. toledoi Chardon (2)
M. MINUTIFLORA DC.
    Bagnisiopsis sp. (6)
    B. tijucensis Th. & Syd. (6)
    Dothidina parisi Chardon (2, 6)
M. PRASINA DC.
    Bagnisiopsis peribebuyensis (Speg.) Th. & Syd. (1, 6)
M. ROSTRATA (Naud.) Cogn.
    Meliola sp. (6)
M. RUBIGINOSA DC.
    Catacaumella miconiae (P. Henn.) Th. & Syd. (2)
M. STENOSTACHYA DC.
    Lembosia miconiicola Arn. (2)
MIKANIA spp.
    Achorella sp. (6)
    A. andina Chardon (6)
    Chrysocyclus mikaniae (Arth.) Syd. (10)
    Endophylloides portoricensis Whet. & Olive (6, 11)
MIKANIA MICRANTHA H.B.K.
    Puccinia spegazzini De T. (2)
MIKANIA SCANDENS (L.) Willd. (EUPATORIUM SCANDENS L.)
    Cionothrix praelonga (Wint.) Arth. (Cronartium praelongum Wint.) (6)
MIMOSACEAE
    Irenopsis trompilliana Toro (2)
    Ravenelia igualiaca Arth. (2)
MIMOSA spp.
    Cercospora sp. (6)
    Meliola sp. (6)
    Oidium sp. (6)
    Phyllachora sp. (6)
    Ravenelia sp. (6)
    Uredo sp. (6)

MIMOSA ALBA var. FLORIBUNDA (Willd.) Robinson
    Ravenelia mimosae-albidae Diet. (2)
M. ARENOSA Poir.
    Cercospora hypsophila Syd. (6, 14)
    Ravenelia indissimilis Kern, Thurston & Whet. (2)
M. PUDICA L.
    Ravenelia mimosae-sensitivae P. Henn. (2)
MOMORDICA CHARANTIA L.
    Cercospora chardoniana Chupp (2, 6, 14)
    Mosaic (Virus, probably Marmor astrictum Holmes var. aucuba Holmes) (7)
MONNINA sp.
    Cercospora monninae Chupp & Muller (14)
M. MERIDENSIS Pl. & Lind.
    Phyllachora aequatoriensis Th. & Syd. (18)
M. PHYTOLACCAEFOLIA H.B.K.
    Phyllachora aequatoriensis Th. & Syd. (1, 6)
M. PUBESCENS H.B.K.
    Cercospora monninae Chupp & Muller (6)
    Meliola sp. (6)
    Phyllachora aequatoriensis Th. & Syd. (6)
    Phyllachora sp. (6)
MONOCHAETIUM sp.
    Cercospora monochaeti Chupp & Muller (6, 14)
M. HIRTUM (Karst.) Triana
    Uredo monochaeti Kern & Thurston (10)
M. POLYNEURON Triana
    Cercospora amadelpha Syd. (2)
MONSTERA sp.
    Uredo monstericola Kern, Thurston & Whet. (2)
M. ACUMINATA C. Koch
    Uredo monsterae Syd. (2)
MORUS ALBA L.
    Septogloeum mori Berk. & Br. (6, 13)
MUSA spp.
    Cercospora musae Zimm. (6, 13)
    Cordana musae Zimm. (13)
    Fusarium oxysporum Schlecht. var. cubense (E. F. Sm.) Wr. (13)
    Gloeosporium musarum Cke. & Mass. (13)
    Pseudomonas solanacearum E. F. Sm. (7)
    Septonema sp. (7)
    Stachylidium theobromae Turc. (13)
MUSA CAVENDISHII Lamb.
    Cercospora musae Zimm. (6, 14)
    Pestalotia sp. (6)
    Stachylidium theobromae Turc. (6)
MUSA PARADISIACA L.
    Cercospora musae Zimm. (6, 14)
MUSA PARADISIACA var. SAPIENTUM L.
    Cercospora musae Zimm. (6, 14)
    Cordana musae Zimm. (6)
    Gloeosporium musarum Cke. & Mass. (6)
    Pestalotia sp. (6)
    Xanthomonas solanacearum (E.F.Sm.) Dowson (7) & Hall
MUSA TEXTILIS Née
    Pestalotia sp. (6)
MYOSOTIS sp.
    Cercospora sp. (6)
MYRCIA spp.
    Catacauma myrciae (Lév.) Th. & Syd. (2)
    Phyllachora sp. (6)

MYRCIA CARACASANA Klotzsch
Puccinia psidii Wint. (2)
MYRSINACEAE
Valsonectria orbiculata Syd. (17)
NICOTIANA TABACUM L.
Alternaria sp. (6)
Bacillus sp. (16)
Cercospora nicotianae Ell. & Ev. (6, 7, 13, 14)
Diplodia sp. (6)
Fusarium sp. (16)
Macrophomina phaseoli Maubl. (6, 16)
Marmor tabaci Holmes var. vulgare Holmes (tobacco mosaic virus) (7)
Meloidogyne sp. (Heterodera marioni (Cornu) Goodey) (7, 13)
Phytophthora sp. (6)
P. parasitica Dast. var. nicotianae (Breda de Haan) Tucker (P. nicotianae (Speg.) Breda de Haan) (7)
Pratylenchus pratensis (de Man) Filipjev (16)
Pythium ultimum Drechs. (16)
Rhizoctonia solani Kuehn (13)
Ruga tabaci Holmes ("Kroepoek" virus) (7)
Sclerotinia sclerotiorum (Lib.) D By. (16)
Sclerotium rolfsii Sacc. (6)
OCOTEA spp.
Clinoconidium farinosum (P. Henn.) Pat. (2, 6)
Phyllachora sp. (6)
O. LEUCOXYLON (Sw.) Mez.
Clinoconidium farinosum (P. Henn.) Pat. (18)
OLEACEAE
Phyllachora mayepeae F. L. Stevens & Dalbey (2)
OLIGANTHES HYPOCHLORA Blake (?)
Uredo paraphysata Kern & Thurston (11)
OLYRA CORDIFOLIA H.B.K.
Meliola sp. (6)
O. LATIFOLIA L.
Puccinia deformata Berk. & Curt. (10)
P. phakopsoroides Arth. & Mains (2)
OPERCULINA AEGYPTIA (L.) House
Albugo ipomoeae-panduranae (Farl.) Swing. (2)
OPLISMENUS sp.
Phyllachora puncta (Schw.) C. R. Orton (2)
O. BURMANNI (Retz.) Beauv.
Phyllachora puncta (Schw.) C. R. Orton (2, 6)
O. SETARIUS (Lam.) R. & S.
Puccinia inclita Arth. (2)
OPUNTIA FICUS-INDICA L.
Colletotrichum sp. (6)
ORTHOPAPPUS ANGUSTIFOLIUS (Sw.) Gleason (ELEPHANTOPUS ANGUSTIFOLIUS Sw.)
Coleosporium elephantopodis (Schw.) Thuem. (2)
ORYZA SATIVA L.
Aposphaeria sp. (3, 1st year, No. 10, Oct. 1947)
Cercospora oryzae Miy. (6, 13)
Curvularia sp. (Acrothecium sp.) (6)
Entyloma oryzae Syd. (3, 1st year, No. 11, Nov. 1947; 13)
Fusarium sp. (7)
Helminthosporium oryzae Breda de Haan (3, 1st year, No. 11, Nov. 1947)
Helminthosporium sp. (3, 1st year, No. 11, Nov. 1947)
Hendersonia sp. (3, 1st year, No. 10, Oct. 1947; 6)
Leptosphaeria sp. (6)
Ophiobolus sp. (6)
Piricularia oryzae Cav. (6, 13)
Ustilaginoidea oryzae Bref. (6, 13)

OXALIS spp.
Cercospora oxalidiphila Chupp & Muller (6, 14)
Colletotrichum sp. (6)
Phyllosticta sp. (6)
Puccinia oxalidis (Lév.) Diet. & Ell. (2, 6)
O. LATIFOLIA H.B.K.
Phomopsis oxalina (Ell. & Ev.) Syd. (2)
Puccinia oxalidis (Lév.) Diet. & Ell. (2, 6)
OXYBAPHUS VIOLACEUS (L.) Choisy
Albugo platensis (Speg.) Swing. (2, 6)
OYEDAEA sp.
Phyllachora oyedaeae Chardon (2)
O. VERBESINOIDES DC.
Phomatospora oyedaeae Chardon (1, 6)
Puccinia sp. (6)
P. holwayula Jacks. (P. oyedaeae Mayor, Eriosporangium oyedaeae (Mayor) Syd.) (2, 6, 11, 13, 18)
PACHIRA INSIGNIS Sav.
Cercospora sp. (6)
C. pachirae Chupp & Muller (6, 14)
Phyllosticta sp. (6)
PALICOUREA OBSCURATA (Muell. Arg.) Standl.
Meliola mitragybes Syd. (2)
P. PETIOLARIS H.B.K.
Puccinia fallax Arth. (11)
PANICUM sp.
Phyllachora panici-olivacei Chardon (6)
P. BARBINODE Trin.
Uromyces leptodermus Syd. (2)
P. LAXUM Sw.
Dothichloë sp. (6)
P. MAXIMUM Jacq.
Balansia claviceps Speg. (7)
Cercospora fusimaculans Atk. (6, 14)
Cerebella andropogonis Ces. (6)
Cerebella panici Tracy & Earle (3, 1st year, No. 10, Oct. 1947)
Cladosporium sp. (6)
Claviceps purpurea (Fr.) Tul. (6)
Coniothyrium panici Syd. (2)
Fusarium sp. (6)
Sphacelia sp. (4)
P. OLIVACEUM Hitchc. & Chase
Phyllachora panici-olivacei Chardon (1)
P. PALMIFOLIUM Lam.
Balansia claviceps Speg. (B. trinitensis Cke. & Mass.) (6)
P. PETROSUM Trin.
Ustilago panici-petrosi Syd. (2)
P. PILOSUM Siv.
Claviceps sp. (6)
P. PURPURASCENS Raddi
Puccinia sp. (6)
P. TRICHOIDES Sw.
Puccinia huberi P. Henn. (2, 6)
P. VISCIDELLUM Scribn.
Phyllachora puncta (Schw.) C. R. Orton (6)
PAPAVER sp.
Cercospora sp. (6)
PAPPOPHORUM ALOPECUROIDEUM Vahl
Phyllachora pappophori Chardon (1, 6)
PARITIUM TILIACEUM (L.) St. Hil.
Phyllachora paritii-tiliacei Chardon (1, 6)

PARODIOPSIS STEVENSII Arn.
Ramularia tenuis (Syd.) Toro (2)
PAROSELA BARBATA: See DALEA CARTHAGINENSIS
PARTHENIUM sp.
Cercospora parthenii Chupp (6)
P. HYSTEROPHORUS L.
Cercospora parthenii Chupp (2, 6, 14)
Oidium sp. (6)
Puccinia sp. (6)
P. parthenii (Speg.) Arth. (2)
PASPALUM spp.
Claviceps paspali F. L. Stevens & Hall (Spermoedia stevensii Seaver) (2)
Puccinia sp. (6)
Tilletia rugispora Ell. (2)
Ustilago venezuelana Syd. (2)
P. ACUMINATUM Raddi
Phyllachora leonardi Chardon (2)
P. BOSCIANUM Flügge
Claviceps paspali F. L. Stevens & Hall (6)
P. CANDIDUM (Humb. & Bonpl.) Kunth
Puccinia macra Arth. & Holw. (9)
P. CONJUGATUM L.
Angiopsora compressa Mains (9); reported (2) in error as Puccinia tubulosa (Pat. & Gaill.) Arth.
Myriogenospora bresadoleana P. Henn. (2, 6)
M. paspali Atk. (6)
Phyllachora paspalicola P. Henn. (2, 6)
P. CONVEXUM Humb. & Bonpl.
Helminthosporium sp. (6)
P. DECUMBENS Sw.
Angiopsora compressa Mains (9); reported (8) as in error as Puccinia tubulosa (Pat. & Gaill.) Arth.
Phyllachora paspalicola P. Henn. (6)
Telimena sp. (6)
P. HUMBOLDTIANUM Flügge
Angiopsora compressa Mains (9); reported (2) in error as Puccinia tubulosa (Pat. & Gaill.) Arth.
Phyllachora sp. (6)
Puccinia substriata Ell. & Barth. (8)
Uredo sp. (6)
P. LANGEI (Fourn.) Nash
Puccinia substriata Ell. & Barth. Reported in error as Puccinia levis (Sacc. & Bizz.) Magn. (2) and P. paspali Tracy & Earle (18)
P. MICROSTACHYUM Presl
Puccinia araguata Kern (8); reported (2, 8) as P. paspalicola Kern, Thurston & Whet.
P. MOLLE Poir.
Puccinia sp. (6)
P. substriata Ell. & Barth. (2)
P. PANICULATUM L.
Angiopsora compressa Mains. (9) Reported (2) in error as Puccinia tubulosa (Pat. & Gaill.) Arth.
Phyllachora microspora Chardon (2)
Phyllachora molinae Chardon (2)
Puccinia dolosa Arth. & Fromme (9)
Puccinia sp.
P. PILOSUM Lam.
Phyllachora microspora Chardon (2)
Puccinia levis (Sacc. & Bizz.) Magn. (8) Doubtless in error for Puccinia substriata Ell. & Barth.

PASPALUM PLICATULUM Michx.
Angiopsora compressa Mains (9)
P. UNISPICATUM (Scribn. & Merr.) NASH
Fusarium sp. (6)
Helminthosporium sp. (6)
P. VIRGATUM L.
Phyllachora guianensis F. L. Stevens (2)
PASSIFLORA spp.
Asterina megalospora Berk. & Curt. (6)
Cercospora truncatella Atk. (6)
Colletotrichum sp. (7)
Glomerella sp. (6)
P. EDULIS Sims
Puccinia scleriae (Paz.) Arth. (2)
P. PALLIDA L.
Asterina megalospora Berk. & Curt. (2)
Puccinia scleriae (Paz.) Arth. (2)
P. QUADRANGULARIS L.
Alternaria sp. (6)
P. RUBRA L.
Asterina passiflorae (P. Henn.) Sacc. (2)
PAULLINIA aff. PINNATA L.
Puccinia arechavaletae Speg. (2)
PAVONIA sp.
Cercospora pavoniae Petr. & Cif. (14)
P. PANICULATA Cav.
Cercospora pavoniae Petr. & Cif. (6, 14)
Puccinia heterospora Berk. & Curt. (2)
PEHRIA COMPACTA (Rusby) Sprague (GRISLEA COMPACTA Rusby)
Aecidium adenariae Mayor (8)
Uredo pehriae Kern & Thurston (11)
PEIRANISIA MIRANDINA Britton & Rose.
Ravenelia sp. (6)
P. SAERI Britton & Rose
Ravenelia cubensis Arth. (10)
PELARGONIUM ZONALE Willd.
Botrytis vulgaris Fr. (6, 13)
Cercospora brunkii Ell. & Gall. (6, 13, 14)
PENNISETUM BAMBUSIFORME (Fourn.) Hemsl.
Sphaerodothis columbiensis Chardon (2)
P. PERUVIANUM Trin.
Puccinia atra Diet. & Holw. (8)
PEPEROMIA sp.
Phyllosticta sp. (6)
PEPO MOSCHATA: see CUCURBITA MOSCHATA
PERESKIA GUAMACHO Weber
Cercospora sp. (6)
PERSEA sp.
Phyllachora maculicola Chardon (2)
P. AMERICANA Mill. (P. GRATISSIMA GAERTN.)
Cercospora sp. (13)
C. purpurea Cke. (6, 14)
Colletotrichum sp. (6)
C. gloeosporioides Penz. (6, 13)
Diplodia sp. (7)
Meliola sp. (6)
Oidium sp. (6, 13)
Phyllachora gratissima Rehm (2, 6, 13)
P. CAERULEA (R. & P.) Mez.
Phyllachora maculicola Chardon (6)
PERSICARIA: see POLYGONUM

PETROSELINUM CRISPUM (Mill.) Nym.
Septoria petroselini Desm. (6)
PETUNIA sp.
Cercospora petuniae Chupp & Muller (6, 13, 14)
PFAFFIA IRESINOIDES (H.B.K.) Kuntze
Cercospora gomphrenicola Speg. (2, 6, 13, 14)
Puccinia sp. (6)
PHARUS LATIFOLIUS L.
Phyllachora phari-latifolii Chardon (1)
PHASEOLUS sp.
Mycosphaerella sp. (6)
P. COCCINEUS L. (P. MULTIFLORUS Willd.)
Ascochyta sp. (6)
Phyllachora phaseoli (P. Henn.) Th. & Syd. (6)
P. LUNATUS L.
Alternaria sp. (2, 6)
Ascochyta pisi Lib. (6)
Cercospora canescens Ell. & G. Martin (14)
Isariopsis griseola Sacc. (Cercospora columnaris Ell. & Ev.) (13, 14)
Marmor cucumeris Holmes var. phaseoli Holmes (7) (virus, mosaic)
Phakopsora vignae (Bres.) Arth. (9)
Rhizoctonia microsclerotia Matz (6, 13)
Uromyces sp. (6)
P. MUNGO L.
Ascochyta pisi Lib. (6)
Cercospora canescens Ell. & G. Martin (6, 14)
P. VULGARIS L.
Alternaria sp. (6)
Ascochyta pisi Lib. (6, 13)
Cercospora canescens Ell. & G. Martin (13, 14)
C. cruenta Sacc. (13, 14)
C. phaseolina Speg. (6)
Cladosporium sp. (6)
Colletotrichum lindemuthianum (Sacc. & Magn.) Briosi & Cav. (6, 13)
Erysiphe polygoni DC. (13) Oidium stage only
Isariopsis griseola Sacc. (Cercospora columnaris Ell. & Ev.) (2, 6, 13, 14)
Macrophomina phaseoli (Maub.) Ashby (6, 8)
Mosaic (virus) (7)
Mycosphaerella sp. (6)
Phyllachora phaseoli (P. Henn.) Th. & Syd. (6)
Rhizoctonia microsclerotia Matz (6, 13)
R. solani Kuehn (13)
Sclerotium rolfsii Sacc. (13)
Uromyces phaseoli typica Arth. (2, 6, 13)
Xanthomonas phaseoli (E.F.Sm.) Dowson (4, Vol. 2, No. 1, Sept. 1949)
PHLEUM PRATENSE L.
Helminthosporium sp. (6)
PHOENIX DACTYLIFERA L.
Graphiola phoenicis (Moug.) Poit. (2, 6, 13)
PHORADENDRON CRASSIFOLIUM (Phol) Eichl.
Cercospora sp. (7)
PHTHIRUSA PYRIFOLIA (H.B.K.) Eichl.
Meliola visci F. L. Stevens (2)
PHTHIRUSA THEOBROMAE (Willd.) Eichl.
Asterina loranthicola Syd. (2)
PHYLLACHORA CHAETOCHLOAE F. L. Stevens
Pleospora doidgeae Petr. (2)
PHYLLANTHUS spp.
Aecidium albicans Arth. & Holw. (2)
Ravenelia appendiculata Lagh. & Diet. (2)

PHYLLANTHUS BOTRYANTHUS Muell. Arg.
Aecidium detritum Thuem. (2)
PHYLLANTHUS MICRANDRUS Muell. Arg.
Ravenelia appendiculata Lagh. & Diet. (2)
PHYSALIS sp.
Chlorogenus sp. (virus) (7)
PHYTOLACCA RIVINOIDES Kunth & Bouché (?)
Aecidium calotheum Syd. (2)
PILEA sp.
Irenina triloba (Wint.) F. L. Stevens (2)
PIPER spp.
Amazonia asterinoides (Wint.) Th. (20)
Cercospora piperis Pat. (6, 14)
C. portoricensis Earle (2)
Phyllachora pipericola Chardon (2)
P. ADUNCUM L.
Cercospora piperis Pat. (6, 14)
C. portoricensis Earle (2, 14)
P. PELTATUM L. (POTOMORPHE PELTATA (L.) Miq.)
Cercospora portoricensis Earle (2)
Irenopsis tortuosa (Wint.) F. L. Stevens (2)
PISUM SATIVUM L.
Ascochyta pisi Lib. (6, 13)
PITHECELLOBIUM spp.
Phyllosticta sp. (6)
P. pithecolobii Young (2)
P. DULCE (Willd.) Benth.
Ravenelia sp. (6)
R. pithecolobii Arth. (9)
P. LANCEOLATUM (H.B.K.) Benth.
Cercospora spilosticta Syd. (14)
P. LIGUSTRINUM Klotzsch
Cercospora bauhiniae Syd. (6)
C. spilosticta Syd. (6, 14)
Meliola pithecolobii F. L. Stevens & Tehon (20)
M. venezuelana Orejuela (15)
Phyllosticta sp. (6)
P. pithecolobii Young (2)
PITYROGRAMMA CALOMELANOS (L.) Link
Desmella gymnogrammes (P. Henn.) Syd. (2)
PLANTAGO spp.
Cercospora plantaginis Sacc. (6)
Phyllosticta plantaginella Sacc. (6)
P. BUCHTIENII Pilger
Septoria tovarensis Syd. (2)
P. MAJOR L.
Cercospora plantaginis Sacc. (6, 14)
Phyllosticta plantaginella Sacc. (6)
PLUCHEA ODORATA (L.) Cass.
Cercospora plucheae Petr. & Cif. (6)
PLUMIERIA sp.
Coleosporium domingensis (Berk.) Arth. (2)
P. ALBA L.
Coleosporium domingensis (Berk.) Arth. (6)
P. RUBRA L.
Coleosporium domingensis (Berk.) Arth. (2)
Puccinia sp. (6)
POA ANNUA L.
Puccinia epiphylla (L.) Wettst. (2)
POA aff. BRACHYPHYLLA Schult.
Puccinia epiphylla (L.) Wettst. (2)

POINCIANA sp.
    Cercospora poincianae Chupp & Muller (6, 14)
POIRETIA SCANDENS Vent.
    Ravenelia sp. (6)
    Uromyces sp. (6)
    U. poiretiae Syd. (8)
POLYGALA sp.
    Cladosporium sp. (6)
P. COLUMBICA Chodat
    Cercospora grisea Cke. & Ell. (6, 14)
POLYGONUM spp. (including PERSICARIA)
    Cercospora sp. (6)
    C. avicularis Wint. (14)
    C. polygonorum Cke. (2, 14)
POLYGONUM PUNCTATUM Ell. (PERSICARIA PUNCTATA (Ell.) Small)
    Puccinia polygoni-amphibii Pers. (2)
    Ustilago utriculosa (Nees) Tul. (2)
POLYLEPIS SERICEA Wedd.
    Hypoxylon serpens Fr. (2)
    Podoplaconema jahnii Chardon (2)
    Uredo polylepidis (Arth.) Sacc. & Trotter (2)
POLYPODIUM BRASILIENSE Poir.
    Calidion lidsaeae (P. Henn.) Syd. (2)
P. ELONGATUS H.B.K.
    Puccinia graminis Pers. (8)
POLYSCIAS GUILFOYLEI (Bull.) Bailey (host reported as "DIDYMOPANAX GUILFOGLEI", presumably this)
    Alternaria sp. (6)
POROPHYLLUM RUDERALE (Jacq.) Cass.
    Puccinia porophylli P. Henn. (2)
PORTULACA OLERACEA L.
    Albugo portulacae (DC.) Kuntze (2, 6)
POTOMORPHE PELTATA: see PIPER PELTATUM
POUZOLSIA OCCIDENTALIS Wedd.
    Aecidium yuquillae Pat. (2)
PRIVA LAPPULACEA (L.) Pers.
    Puccinia lantanae Farl. (2)
PRUNUS CAPULI Cav.
    Sphaceloma sp. (6)
P. PERSICA: see AMYGDALUS
P. SEROTINA Ehrh.
    Elsinoë sp. (6)
PSEUDO-ELEPHANTOPUS SPICATUS (B. Juss.) Gleason
    Coleosporium elephantopodis (Schw.) Thuem. (2)
PSIDIOPSIS MORITZIANA Berg.
    Puccinia psidii Wint. (2)
PSIDIUM spp.
    Caudella psidii Ryan (2)
    Meliola psidii Fr. (2)
    Phyllachora tropicalis Speg. (1, 6)
P. GUAJAVA L.
    Caudella psidii Ryan (2, 6)
    Meliola psidii Fr. (6)
    Phyllosticta sp. (6)
P. GUINEENSE Sw.
    Phyllachora tropicalis Speg. (1, 6)
PSYCHOTRIA sp.
    Meliola sp. (6)
P. HORIZONTALIS Sw.
    Aecidium psychotriae P. Henn. (2)
PTERIDIUM AQUILINUM (L.) Kuhn.
    Uredinopsis macrosperma (Cke.) Magn. (2)

PUCCINIA sp.
Tuberculina costaricana Syd. (2)
P. LANTANAE Farl.
Olpidium uredinis (Lagh.) Fischer (2)
P. PURPUREA Cke.
Darluca sp. (3, 1st year, No. 10, Oct. 1947)
D. filum (Biv.) Cast. (2)
Eudarluca sp. (3, 1st year, No. 10, Oct. 1947)
PUERARIA sp.
Mosaic (virus) (7)
PUNICA GRANATUM L.
Cercospora punicae P. Henn. (6, 13)
Coniothyrium sp. (6)
PYRUS COMMUNIS L.
Cercospora mali Ell. & Ev. (13)
P. MALUS: see MALUS SYLVESTRIS
QUARARIBEA sp.
Scolecopeltis larae Toro (20)
RAJANIA sp.
Phyllachora sp. (6)
RANDIA sp.
Fusicladium sp. (6)
R. ARMATA (Sw.) DC.
Phakopsora randiae Kern & Thurston (11)
R. CARACASANA Standl.
Phakopsora randiae Kern & Thurston (11)
RAPANEA spp.
Echidnodella cedralensis Toro (2)
Meliola sp. (6)
RAPHANUS SATIVUS L.
Albugo candida (Pers.) Kuntze (6, 13)
Alternaria brassicae (Berk.) Sacc. (6, 13 as Macrosporium herculeum Ell. & G. Martin)
Cercospora cruciferarum Ell. & Ev. (14)
RAUWOLFIA HIRSUTA Jacq.
Cercospora liebenbergii Syd. (14)
Cercospora rauwolfiae Chupp & Muller (14)
RHEUM RHAPONTICUM L.
Cercospora rhapontici Tehon & Daniels (6, 14)
RHIZOPHORA MANGLE L.
Anthostomella rhizophorae Vizioli (2) (correction of A. rhizomorphae ?)
RHYNCHOSIA MINIMA (L.) DC. (DOLICHOS MINIMUS (L.) Medic.)
Synchytrium dolichi (Cke.) Gäum. (2)
R. RETICULATA (Sw.) DC. (D. RETICULATUS (Sw.) Mill.)
Synchytrium dolichi (Cke.) Gäum. (2)
RICHINUS sp.
Cercospora ricinella Sacc. (2)
R. COMMUNIS L.
Cercospora sp. (6)
C. ricinella Sacc. (2, 6, 14)
Sclerotinia ricini Godfrey (6)
ROBINIA PSEUDOACACIA L.
Ascochyta sp. (6)
RONDELETIA PUBESCENS H.B.K.
Meliola psychotriae Earle (6)
RONDELETIA sp.
Meliola mitchellae Cke. (2)
ROSA spp.
Actinonema rosae (Lib.) Fr. (2, 6, 13)
Botrytis vulgaris Fr. (13)
Cercospora rosaecola Pass. (2, 6, 13, 14)
Diplodia sp. (6)

(Rosa spp. cont.)
Gloeosporium sp. (6)
Mycosphaerella rosaecola (Pass.) B. H. Davis (13)
M. rosigena (Ell. & Ev.) Lindau (2, 6)
Oidium sp. (6)
Phragmidium sp. (6)
P. disciflorum (Tode) James (2)
P. subcorticinum (Schrank.) Wint. (6, 13)
Sphaceloma rosarum Jenkins (6, 13)
Sphaerotheca pannosa (Wallr.) Lév. (2), also (13) as Oidium leucoconium Desm. and (6) as O. "coniconium Desm.", prob. error for O. leucoconium as no such name exists.

ROUPALA spp.
Catacauma sp. (6)
C. rhopalinum (Mont.) Th. & Syd. (2, 6)
Phyllachora sp. (6)

R. COMPLICATA H.B.K.
Dothidea sp. (7)

ROUREA sp.
Phyllachora sp. (6)

RUBIACEAE indet.
Meliola mitchellae (Cke.) Grev. (2)

RUBUS spp.
Mainsia cundinamarcensis (Mayor) Jacks. (2)
M. mayorii Jacks. (2)
M. variabilis (Mayor) Jacks. & Hol. (2)
Meliola calostroma (Desm.) Hoehn. (6)
Puccinia sp. (6)

R. IDAEUS L.
Septoria rubi West. (7)

R. GUYANENSIS Focke
Mainsia mayorii Jacks. (2) (Uromyces quitensis (18))

R. ROBUSTUS Presl
Mainsia lagerheimii (Magn.) Jacks. & Holw. (9)

RUDGEA sp.
Puccinia sp. (6)

RUELLIA TUBEROSA L.
Puccinia ruelliae (Berk. & Br.) Lagh. (9)

RUMEX sp.
Cercospora sp. (6)

RYNCHOSPORA spp.
Cintractia leucoderma (Berk.) P. Henn. (2)
C. utriculicola (P. Henn.) Clint. (2)

R. CORYMBOSA (L.) Britton
Cintractia utriculicola (P. Henn.) Clint. (2)

R. GLOBOSA R. & S.
Uromyces rynchosporae Ell. (2)

SABICEA COLUMBIANA Wernham
Uredo sabiceicola Arth. (2)

SACCHARUM OFFICINARUM L.
Cercospora koepkei Kruger (6, 14)
C. longipes Butl. (13)
Coniothyrium melanosporum (Berk.) Sacc. (2)
Fusarium moniliforme Sheldon (2, 13)
Helminthosporium sp. (6)
H. ocellum Faris (2)
H. stenospilum Drechs. (6, 13)
Leptosphaeria sacchari Breda de Haan (2, 6, 13)
Ligniera vascularum (Matz) Cook (2)
Melanconium sacchari Mass. (6, 13)
Mosaic (virus) (13)
Mycosphaerella sacchari (Speg.) Seaver & Chardon (2)

(Saccharum officinarum L. cont.)
Sclerotium rolfsii Sacc. (6)
SALPIANTHUS PURPURASCENS (Cav.) H. & A.
Cercospora boldoae Chupp & Muller (6, 14)
C. salpianthi Chupp & Muller (6, 14)
SALVIA spp.
Meliola sp. (6)
Puccinia albicera Jacks. & Holw. (2)
P. conturbata Jacks. & Holw. (2)
SALVIA aff. COCCINEA Juss.
Puccinia impedita Mains & Holw. (11)
SAMANEA SAMAN (Jacq.) Merrill
Cercospora samaneae Chupp & Muller (6, 14)
Microstroma pithecolobii Lamkey (2)
Mycosphaerella samaneae Chardon (1, 6)
Phoradendron crassifolium Nutt. (7)
SAPINDACEAE, aff. PAULLINIA
Dexteria pulchella F. L. Stevens (19)
SAPINDUS SAPONARIA L.
Oidium sp. (6)
SAPIUM sp.
Uromyces cisneroanus Speg. (11)
SAURAUJA HUMBOLDTIANA Busc.
Phyllachora sauranicola Chardon (1, 6)
Trabutia sauraniae Chardon (1, 6)
SCABIOSA sp.
Cercospora sp. (6)
SCLERIA sp.
Ustilago subnitens Schroet. & P. Henn. (2)
S. BRACTEATA Cav.
Phyllachora scleriae Rehm (2)
S. MACROPHYLLA Presl
Uromyces scleriae P. Henn. (9)
S. SECANS (L.) Urban
Puccinia mirandensis Kern & Thurston (11)
SCLEROCARPUS COFFEAECOLA Klatt
Oidium sp. (6)
SECALE CEREALE L.
Gibberella saubinetii (Mont.) Sacc. (6) [Probably G. zeae (Schw.) Petch]
Helminthosporium sativum Pass. (6)
SECHIUM EDULE Sw.
Cercospora sechii F. L. Stevens (6, 13)
SECURIDACA spp.
Cercospora securidacae Chupp & Muller (6, 14)
Phyllachora sp. (6)
P. securidacae P. Henn. (6)
S. SCANDENS Jacq.
Phyllachora securidacae P. Henn. (2)
SENECIO GREENMANIANUS Hieron.
Chrysocylus senecionis Davidson (2)
SERJANIA spp.
Meliola sapindacearum Speg. (2)
M. trujillensis Toro (2)
Nectria sp. (6)
Phyllachora sp. (6)
P. galavisi Chardon (2, 6)
P. insueta Syd. (2, 6)
P. serjanicola Chardon (2, 6)
Puccinia sp. (6)
Septoria sp. (6)
S. ATROLINEATA C. Wright
Meliola sapindacearum Speg. (2)

(Serjania atrolineata cont.)
Phyllachora alamoi Chardon (2)
P. insueta Syd. (2)
S. CARACASANA Willd.
Phyllachora serjanicola Chardon (2)
S. COMMUNIS Cambess
Meliola serjaniae F. L. Stevens (2)
S. MEXICANA (L.) Willd.
Aecidium serjaniae P. Henn. (6, 8)
S. PANICULATA H.B.K.
Phyllachora serjanicola Chardon (2)
SESAMUM INDICUM L. (S. ORIENTALE L.)
Alternaria sp. (6)
Cercospora sesami Zimm. (2, 6, 13, 14)
(Macrosporium sp.) (6)
Mosaic (virus) (13)
Phytophthora sp. (4, Vol. 1, No. 6, July 1949)
Rhizoctonia solani Kuehn (13)
SETARIA sp.
Claviceps sp. (6)
S. GENICULATA (Lam.) Beauv.
Puccinia chaetochloae Arth. (9)
P. setariae Diet. & Holw. (2)
P. substriata Ell. & Barth. (2)
S. PANICULIFERA (Steud.) Fourn.
Phyllachora sp. (6)
S. SCANDENS Schrad.
Puccinia cameliae (Mayor) Arth. (2)
S. SCABRIFOLIA (Nees) Kunth
Phyllachora chaetochloae F. L. Stevens (2)
SETARIA aff. TENAX (L. Rich.) Desv.
Puccinia cameliae (Mayor) Arth. (2)
S. VERTICILLATA (L.) Beauv.
Puccinia substriata Ell. & Barth. (2)
SICKINGIA ERYTHROXYLON Willd.
Phakopsora venezuelana Syd. (2, 19)
SIDA spp.
Asterina diplocarpa Cke. (2)
Cercospora hyalospora Muller & Chupp (6, 14)
Meliola sp. (6)
Puccinia sp. (6)
P. heterospora Berk. & Curt. (2)
P. malvacearum Bert. (6)
P. sherardiana Koern. (7)
S. ACUTA Burm. f.
Puccinia sherardiana Koern. (2)
S. SPINOSA L.
Puccinia heterospora Berk. & Curt. (2)
S. URENS L.
Asterina diplocarpa Cke. (2)
SIPANEA GLOMERATA H.B.K.
Meliola makilingiana Syd. (15)
SMILAX spp.
Sphenospora yurimaguasensis (P. Henn.) Jacks. (2)
Puccinia sp. (6)
SOLANUM spp.
Asterina vagans Speg. (2)
Bagnisiopsis maculans Chardon (2)
Cercospora brachycarpa Syd. (2, 14)
C. brachyclada Syd. (2, 14)
C. costeriana Petr. & Cif. (6)

(Solanum spp. cont.)

C. jaguarensis Chupp & Muller (on SOLANUM JAGUARA ?) (6, 14)
C. lanugiflori Chupp & Muller (6, 14) (Host listed as S. "lanugiflorum Pittier" apparently unpublished name)
C. modesta Syd. (2, 6, 14)
C. venezuelae Chupp (2, 14)
Meliola sp. (6)
Phyllachora fluminensis Th. 2, 6)
Puccinia claviformis Lagh. (11)
P. pittieriana P. Henn. (2)
P. solani-tristis P. Henn. (11)
Septoria alamoi Toro (2)
Sphaceloma sp. (6)

S. HETEROPHYLLUM Lam.

Asterina henningsii Th. (2)

S. MELONGENA L.

Alternaria sp. (6)
A. solani (Ell. & G. Martin) Sor.
Ascochyta sp. (6)
A. lycopersici Lib. (5)
Botrytis vulgaris Fr. (5)
Colletotrichum atramentarium (Berk. & Br.) Taub. (5)
Gloeosporium melongenae Ell. & Halst. (5)
(Macrosporium sp.) (6)
Phomopsis citri Fawc. (6)
P. vexans (Sacc. & Syd.) Harter (2, 6)
Phytophthora parasitica Dast. (2)
Rhizoctonia solani Kuehn (2)
Sclerotium rolfsii Sacc. (4, Vol. 1, No. 6, July 1949)
Xanthomonas solanacearum (E. F. Sm.) Dowson (7)

S. NIGRUM L.

Cercospora atromarginalis Atk. (2, 6, 14)

S. OBTUSIFOLIUM Humb. & Bonpl.

Cercospora brachycarpa Syd. (14)

S. TUBEROSUM L.

Acrogenus solani Holmes var. vulgaris Holmes, spindle-tiber virus (7, 13)
Actinomyces scabies (Thaxt.) Güssow (7)
Alternaria solani (Ell. & G. Martin) Sor. (2, 6, 13)
Cercospora solanicola Atk. (6, 13, 14)
Colletotrichum sp. (6)
Corium solani Holmes, leaf-roll virus (7, 13)
Corynebacterium sepedonicum (Spieck. & Kotth.) Burk. & Skapt. (7)
Erwinia carotovora (L.R. Jones) Holland (7)
Fusarium sp. (7)
Marmor solani Holmes (virus) (7, 13)
Meloidogyne sp. (Heterodera marioni (Greef) Muell.) (13)
Oidium sp. (6)
Phytophthora infestans (Mont.) D By. (2, 6, 13)
Pringsheimia sp. (6)
Rhizoctonia solani Kuehn. (13)
Sclerotium rolfsii Sacc. (13)
Septoria sp. (6)
Spondylocladium atrovirens Harz. (7)
Spongospora subterranea (Wallr.) Lagh. (13)
Streak (virus) (13)
Vermicularia sp. (6)
Xanthomonas solanacearum (E.F.Sm.) Dowson (5, Feb. 1948)

S. VERBASCIFOLIUM L.

Cercospora costeriana Petr. & Cif. (14)
C. trichophila F. L. Stevens (2, 14)

SOLANUM VERBASCIFOLIUM var. ADULTERINUM (Ham.) G. Don.
Cercospora costeriana Petr. & Cif. (6)
C. solanacea Sacc. & Berl. (6, 14)
SONCHUS sp.
Alternaria sp. (6, as Macrosporium sp.)
SORGHUM HALEPENSE (L.) Pers. (HOLCUS HALEPENSIS L.)
Helminthosporium sp. (6)
Puccinia purpurea Cke. (2, 6)
S. SUDANENSE (Piper) Stapf (H. SORGHUM var. SUDANENSIS (Piper) Hitch.)
Puccinia purpurea Cke. (2)
S. VULGARE (L.) Pers. (H. SORGHUM L.)
Cercospora sorghi Ell. & Ev. (6, 14)
Colletotrichum sp. (6)
C. lineola Cda. (6, 13)
Gibberella sp. (6)
Gloeocercospora sorghi D. Bain & Edg. (6)
Helminthosporium turcicum Pass. (6, 13)
Phoma insidiosa Tassi (6)
Puccinia purpurea Cke. (6, 13)
Raya blanca (virus) (13)
Sphacelotheca holci Jacks. (2)
S. sorghi (Lk.) Clint. (6, 13)
SPANANTHE PANICULATA Jacq.
Alternaria sp. (6)
SPATHODEA CAMPANULATA Beauv.
Oidium sp. (6)
SPERMACOCE TENUIOR L.
Meliola psychotriae Earle (2)
SPHAERODOTHIS COLUMBIENSIS Chardon
Pleospora doidgeae Petr. (2)
SPIGELIA ANTHELMIA L.
Septoria sp. (6)
SPILANTHES AMERICANA (Mutis.) Hieron
Puccinia spilanthicola Mayor (2)
S. URENS Jacq.
Puccinia barranquillae Mayor (2)
SPINACIA OLERACEA L.
Cercospora beticola Sacc. (6)
SPONDIAS MOMBIN L. (S. LUTEA L.)
Cercospora mombin Petr. & Cif. (14)
Irenopsis comocladiae (F. L. Stevens) F. L. Stevens (2)
SPOROBOLUS INDICUS (L.) R. Br.
Helminthosporium sp. (6)
H. ravenelli Curt. (2)
Uromyces ignobilis (Syd.) Arth. (2)
STACHYS MICHELIANA Briq.
Puccinia pallidissima Speg. (2)
STACHYTARPHETA sp.
Cercospora stachytarphetae P. Henn. (6)
S. BRACTEOSA Turcz.
Endophyllum stachytarphetae (P. Henn.) Whet. & Olive (2)
S. CAYENNENSIS (L. C. Rich.) Vahl (VALERIANODES CAYENNENSE (L. C. Rich) Kuntze)
Irenina glabroides (F. L. Stevens) F. L. Stevens (20)
STANHOPEA WARDII Lodd.
Gloeosporium sp. (6)
STIZOLOBIUM spp. (MUCUNA spp.)
Cercospora stizolobii Syd. (6, 14)
Sclerotium rolfsii Sacc. (6)
STRUTHANTHUS spp.
Cercospora struthanthi Chupp & Muller (6, 14)
Polystomella costaricensis F. L. Stevens (15)

STRUTHANTHUS DICHOTRIANTHUS Eichl.
Aecidium goyazense P. Henn. (8)
SWIETENIA MACROPHYLLA King
Cercospora sp. (6)
SYNEDRELLA NODIFLORA (L.) Gaertn.
Puccinia melampodii Diet. & Holw. (2, 6)
TABEBUIA sp.
Chaetospermella tecomis Chardon & Toro (2)
Prospodium araguatum Kern & Thurston (11)
T. CHRYSANTHA (Jacq.) DC.
Prospodium concinnum Syd. (2, 8)
T. PENTAPHYLIA (L.) Hemsl.
Cercospora jahnii Syd. (6)
Oidium sp. (7)
Prospodium venezuelanum Kern (8)
Septoria sp. (6)
T. ROSEA DC.
Cercospora jahnii Syd. (14)
T. SERRATIFOLIA (Vahl) Nicholson
Cercospora stenolobiicola Speg. (2, 14)
Trichocicinnus tecomae Chardon (2)
TABERNAEMONTANA AMYGDALIFOLIA Jacq.
Meliola tabernaemontanae Speg. (6)
Ovularia sp. (7)
TABERNAEMONTANA CORONARIA Willd.
Meliola wardii F. L. Stevens (20)
TAGETES spp.
Meliola sp. (6)
Puccinia tageticola Diet. & Holw. (2)
T. ERECTUS L.
Meliola sp. (6)
Puccinia tageticola Diet. & Holw. (2)
TALISIA OLIVAEFORMIS Radlk.
Meliola sp. (6)
TECOMA SPECTABILIS Planch. & Lind.
Hypospilina ospinae (Chardon) Chardon & Toro (2)
Septoria cucutana Kern & Toro (6)
T. STANS (L.) H.B.K.
Prospodium appendiculatum (Wint.) Arth. (2)
TEPHROSIA sp. (CRACCA sp.)
Ravenelia caulicola Arth. (10)
TERMINALIA CATAPPA L.
Cercospora sp. (6)
TESSARIA INTEGRIFOLIA Ruiz & Pav.
Uromyces megalospermus Speg. (9)
THEOBROMA CACAO L.
Cercospora sp. (6)
Colletotrichum sp. (13)
Crinipellis perniciosa (Stahel) Sing. (Marasmius perniciosus Stahel) (6, 13)
Helminthosporium guianensis F. L. Stevens & Dowell (2)
Irenopsis guianensis (F. L. Stevens & Dowell) F. L. Stevens (Meliola guaianensis F. L. Stevens & Dowell) (2, 6)
Marasmius sp. (6)
(M. perniciosus): see Crinipellis
Monilia roreri Cif. (13)
Nectria sp. (6)
Ophionectria sp. (6)
Phthirusa theobromae Eich. (7)
Phytophthora palmivora Butl. (P. faberi Maub.) (7, 13)
THUJA sp.
Cladosporium sp. (6)

THUJA OCCIDENTALIS L.
    Colletotrichum sp. (6)
TITHONIA ROTUNDIFOLIA (Mill.) Blake
    Ophiodothella tithoniae Chardon (2)
TORENIA FOURNIERI Linden
    Cercospora torenicola Chupp & Muller (6, 14)
TOURNEFORTIA CUSPIDATA H.B.K.
    Aecidium tournefortiae P. Henn. (8)
TOVARIA PENDULA R. & P.
    Cercospora tovariae Chupp & Muller (6, 14)
TRACHYPOGON PLUMOSUS (Humb. & Bonpl.) Nees
    Phyllachora sp. (6)
TRADESCANTIA CUMANENSIS Kunth
    Uromyces commelinae (Speg.) Cke. (2)
TRAGOPOGON PORRIFOLIUS L.
    Albugo tragopogonis (DC.) S. F. Gray (6, 13)
TREMA MICRANTHA (L.) Blume
    Cercospora tremae F. L. Stevens & Solh. (2, 14)
TRICHACHNE INSULARIS (L.) Nees (VALOTA INSULARIS (L.) Chase)
    Helminthosporium sp. (6)
    Phyllachora insularis Chardon (2, 6)
    Puccinia atra Diet. & Holw. (8)
    Sphacelotheca cordobensis (Speg.) Jacks. (2)
T. SACCHARIFLORA (Raddi) Nees
    Mycosphaerella maydis (Pass.) Lindau (2)
TRICHOLAENA ROSEA Nees
    Cerebella andropogonis Ces. (6)
    Puccinia sp. (6)
    Stigmella graminicola Syd. (12)
TRIFOLIUM spp.
    Curvularia trifolii (Kauff.) F. L. Stevens (6)
    (Macrosporium sp.) (6)
    Uromyces medicaginis Pass. (6)
    U. trifolii (DC.) Lév. (6)
T. REPENS L.
    Uromyces flectens Lagh. (9)
    U. trifolii (DC.) Lév. (2)
TRINIOCHLOA STIPOIDES (H.B.K.) Hitchc.
    Phyllachora paramo-nigra Chardon (2)
TRIPLARIS spp.
    Oidium sp. (6)
    Uredo coccolobae P. Henn. (10)
TRIPSACUM DACTYLOIDES L.
    Uromyces tripsaci Kern & Thurston (9)
T. LAXUM Nash
    Fusarium moniliforme Sheldon (2)
    Puccinia sp. (6)
    P. polysora Underw. (8)
TRITICUM AESTIVUM L.
    Alternaria sp. (6)
    Gibberella saubinetti (Mont.) Sacc. (1, 6) [Probably G. zeae (Schw.) Petch]
    Helminthosporium sp. (6)
    H. sativum Pass. (6)
    Puccinia glumarum (Schmidt) Eriks. & E. Henn. (6, 11, 13)
    P. graminis Pers. var. tritici Eriks. & E. Henn. (P. poculiformis (Jacq.) Wettst.) (2, 6, 13)
    P. rubigo-vera (DC.) Wint. var. tritici Eriks. & E. Henn. (6, 8)
    Septoria nodorum Berk. (6, 13)
    Tilletia caries (DC.) Tul. (T. tritici (Bjerk.) Wint.) (2, 6, 13)
    T. foetida (Wallr.) Liro (T. levis Kuehn) (6, 13)
    Urocystis tritici Koern. (6)

(Triticum aestivum L. cont.)
Ustilago tritici (Pers.) Rostr. (2, 6, 13)
TRIUMFETTA sp.
Cercospora triumfettae Syd. (6, 14)
T. SEMITRILOBA Jacq.
Cercospora triumfettae Syd. (2, 14)
TURNERA MOLLIS H.B.K.
Cercospora turnerae Ell. & Ev. (14)
URENA sp.
Puccinia sp. (6)
URVILLEA sp.
Puccinia arechavaletae Speg.
U. ULMACEA H.B.K.
Puccinia arechavaletae Speg.
VACCINIUM FLORIBUNDUM H.B.K.
Catacauma paramoense Chardon (2)
VALERIANA PARVIFLORA (Trev.) Höck
Uredo meridae Kern, Thurston & Whet. (2)
VALERIANODES CAYENNENSE: see STACHYTARPHETA
VALOTA INSULARIS: see TRICHACHNE
VARRONIA ALBA, V. GLOBOSA: see CORDIA
VERBENA spp.
Alternaria sp. (6)
Cercospora sp. (6)
C. verbeniphila Speg. (6, 14)
V. LITTORALIS H.B.K.
Septoria verbenae Rob. & Desm. (2)
VERBESINA spp.
Meliola sp. (6)
Phyllachora verbesinae (Pat.) Petr. (2, 6)
Puccinia cognata Syd. (2)
P. ferox Diet. & Holw. (2)
VERNONIA spp.
Cercospora sp. (6)
Hypocrella caulinum (Berk. & Curt.) Pat. (6)
Septoria sp. (6)
V. BRASILIANA (L.) Druce (V. SCABRA Pers.)
Puccinia sp. (6)
P. rotundata Diet. (2, 6)
V. CANESCENS H.B.K.
Pseudoparodiella vernoniae F. L. Stevens (15)
Puccinia arthuriana Jacks. (Argomyces vernoniae Arth.) (2, 18)
V. MORITZIANA Sch. Bip.
Puccinia fraterna Jacks. (2)
Uredo sp. (6)
VICIA FABA L.
Cercospora viciae Ell. & Holw. (6, 14)
C. zonata Wint. (6, 14)
Uromyces fabae Pers. (8)
VIGNA spp.
Cercospora sp. (6)
C. cruenta Sacc. (6)
Macrophomina phaseoli (Maub.) Ashby (6)
V. LUTEOLA (Jacq.) Benth.
Uromyces vignae Barclay (11)
V. SINENSIS (Torner) Savi
Ascochyta sp. (6)
A. pisi Lib. (6, 13)
Cercospora sp. (6)
C. canescens Ell. & G. Martin (6)
C. cruenta Sacc. (6, 13, 14)

(Vigna sinensis cont.)

Cercospora vignicola Kawamura
Cladosporium vignae Gardner (?) (5, April-May, 1949)
Mosaic (virus) (13)
Mycosphaerella sp. (6)
Sclerotium rolfsii Sacc. (4, Vol. 1, No. 6, July 1949)

V. UNGUICULATA (L.) Walp.
Cercospora canescens Ell. & G. Martin (14)

VIOLA sp.
Cercospora violae Sacc. (2, 14)

V. ODORATA L.
Cercospora violae Sacc. (2, 6, 14)

VISMIA spp.
Cercospora bixae Allesch. & Noack (2)
C. vismiae Syd. (6, 14)
Phyllachora sp. (6)
P. vismiae F. L. Stevens (6)

V. DEALBATA H.B.K.
Phyllachora vismiae F. L. Stevens (2)

V. FERRUGINEA H. B. K.
Phyllachora sp. (6)

VITEX sp.
Phyllachora sp. (6)

VITIS spp.
Cercospora viticola (Ces.) Sacc. (13)
Elsinoe ampelina Shear (Gloeosporium ampelophagum (Pass.) Sacc., Sphaceloma ampelinum D By.) (7, 13)
Guignardia bidwellii (Ell. & Ev.) Viala & Ravaz (13)
Physopella vitis (Thuem.) Arth. (Phakopsora vitis (Thuem.) Syd.) (13)
Plasmopara viticola (Berk. & Curt.) Berl. & De T. (2, 6)
Uncinula necator (Schw.) Burr. (Oidium tuckeri Berk.) (7, 13)

V. CARIBAEA DC.
Physopella vitis (Thuem.) Arth. (Phakopsora vitis (Thuem.) Syd.) (2)

V. LABRUSCA L.
Cercospora viticola (Ces.) Sacc. (6, 14)

V. VINIFERA L.
Elsinoë ampelina Shear (Gloeosporium ampelophagum (Pass.) Sacc.) (6)
Guignardia bidwellii (Ell. & Ev.) Viala & Ravaz (6)
Physopella vitis (Thuem.) Arth. (Phakopsora vitis (Thuem.) Syd. (2, 6)
Plasmopara viticola (Berk. & Curt.) Berl. & De T. (2, 6)
Uncinula necator (Schw.) Burr. (Oidium tuckeri Berk.) (6)

WALTHERIA AMERICANA L.
Puccinia waltheriae Kern & Thurston (10)

WEDELIA sp.
Meliola sp. (6)

W. JACQUINI L.C.Rich var. CARACASANA (DC.) O.E.Schulz
Endophyllum decoloratum (Schw.) Whet. & Olive (2)
Puccinia caracasana Syd. (2)
? P. holwayula Jacks. (2)

WISSADULA spp.
Puccinia heterospora Berk. & Curt. (2)
Puccinia sp. (2)

WULFFIA sp.
Cercospora sp. (6)

W. BACCATA (L. f.) Kuntze
Uromyces wulffiae-stenoglossae Diet. (2)

XANTHIUM CHINENSE Mill.
Oidium sp. (6)

XANTHOSOMA SAGITTIFOLIUM (L.) Schott
Scleroconium venezuelanum Syd. (19)
XANTHOSOMA spp.
Cercospora verruculosa F. L. Stevens & Solh. (14)
Cercospora chevalieri Sacc. (2)
Punctillina solteroi Toro (2)
Stilbum flavidum Cke. (6)
XANTHOXALIS sp.: see OXALIS sp.
XANOSTOMELLA MERIDENSIS Toro
Chaetostigmella parasitica Toro (2)
XYLOPIA sp.
Dasyspora gregaria (Kuntze) P. Henn. (10)
ZANTHOXYLUM spp.
Aecidium xanthoxylinum Speg. (6)
Phyllachora applanata Wint. (2)
P. winteri Sacc. & Syd. (2, 6)
Z. MICROCARPUM Griseb.
Phyllachora winteri Sacc. & Syd. (2)
ZEA MAYS L.
Angiopsora zeae Mains (10)
Camarosporium sp. (6)
Cercospora zeae-maydis Tehon & Daniels (6, 14)
Diplodia frumenti Ell. & Ev. (6)
Helminthosporium turcicum Pass. (6)
Marmor cucumeris Holmes (virus) (7, 13)
Nigrospora oryzae (Berk. & Br.) Petch (3, 1st year, No. 12, Dec. 1947; 6; 7)
Phoma sp. (6)
Physoderma zeae-maydis Shaw (6)
Puccinia sorghi Schw. (2, 6)
Rhopographus zeae Pat. (6)
Ustilago maydis (DC.) Cda. (U. zeae (Beckm.) Unger) (2, 6)
ZINNIA spp.
Cercospora zinniae Ell. & G. Martin (6, 14)
Oidium sp. (6)
Z. ELEGANS Jacq.
Cercospora zinniae Ell. & G. Martin (6)
Erysiphe cichoracearum DC. (6)
ZORNIA DIPHYLLA (L.) Pers.
Puccinia offuscata Arth. (11)
HOST UNKNOWN
Asterina ampullifera Toro (20)
Irene plegerae Doidge (20)
Parapeltella portoricensis (Speg.) Orejuela (15)
Saccardinula usteriana Speg. (15)

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THE PLANT DISEASE REPORTER

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THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey

BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

AGRICULTURAL RESEARCH ADMINISTRATION

UNITED STATES DEPARTMENT OF AGRICULTURE

1951 SUMMARY OF RESULTS OF FUNGICIDE TESTS IN THE UNITED STATES AND CANADA

Supplement 213 August 15, 1952

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

PLANT DISEASE REPORTER SUPPLEMENT

Issued by

THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station — Beltsville, Maryland

1951 SUMMARY OF RESULTS OF FUNGICIDE TESTS IN THE UNITED STATES AND CANADA

Compiled by
The Fungicide Committee of the American Phytopathological Society:
Sub-Committee on Testing and Results of Newer Fungicides

Plant Disease Reporter
Supplement 213 — August 15, 1952

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1951 SUMMARY OF RESULTS OF FUNGICIDE TESTS IN THE UNITED STATES AND CANADA

The sub-committee on testing newer fungicides, of the fungicide committee of the American Phytopathological Society, after being dissolved in December, 1950, was later revived by fiat, reconstituted somewhat and instructed to prepare another report on 1951 results. Dr. Paul Miller again generously offered the Plant Disease Reporter as a publications medium. The committee is grateful to him and to the many contributors who have sent in their 1951 data from Canada and the States.

So many new materials have been tested since the last lists were published in Plant Disease Reporter Supplement 192, 1950, and 210, 1952, that a new one has been made up which we hope may be helpful.

Members of the sub-committee compiling this report were:

A. W. Dimock, Cornell University, Ithaca, New York
J. M. Hamilton, New York State Agricultural Experiment Station, Geneva, New York
Bert Lear, Cornell University, Ithaca, New York
W. D. Mills, Cornell University, Ithaca, New York
R. E. Wilkinson, Cornell University, Ithaca, New York
A. G. Newhall, Cornell University, Ithaca, New York

VEGETABLES -- SMALL FRUITS -- FIELD AND FORAGE CROPS AND ORNAMENTALS

State	Cooperators	Location of tests
Canada	H. N. Racicot	Ottawa
	K. M. Graham	Ottawa
	J. B. Julien	Ottawa
	J. K. Richardson	St. Catharines
	K. A. Harrison	Kentville, N. S.
	C. A. Gamley	Kentville, N. S.
	L. C. Callbeck	Charlottetown, P.E.I.
Alabama	J. A. Lyle	Auburn
		Ashford
California	J. T. Middleton	Riverside
	J. B. Kendrick, Jr.	Riverside
	P. A. Miller	Los Angeles
Colorado	G. E. Lane	(Eaton
	C. A. Schaal	(Yumpa
	W. D. Thomas, Jr.	(Rocky Ford
		(Ft. Lupton
Connecticut	P. J. Anderson	Windsor
Delaware	J. W. Heuberger	Selbyville
Florida	R. R. Kincaid	Quincy
	R. A. Conover	(Belle Glade
	J. M. Walter	(Bradenton
		(Ft. Pierce
		(Homestead
		(Sanford
Illinois	Benjamin Koehler	Urbana
	J. W. Gerdemann	Urbana
Louisiana	E. C. Tims	Baton Rouge
	E. H. Floyd	Baton Rouge

State	Cooperators	Location of tests
Ohio	J. D. Wilson	Willard Wooster
South Carolina	O. L. Holdeman C. H. Arndt	Florence Clemson
South Dakota	L. T. Richardson A. A. Cook	Brookings
West Virginia	M. E. Gallegly	Huttonsville

FUNGICIDES USED ON VEGETABLES AND ORNAMENTALS -- 1951

Aagrano -- ethyl mercury bromide 3.5%, Mathieson Chem. Corp.
Agrox -- phenyl mercury urea 6.7%, Chipman Chem. Co.
C & C 1217 -- copper chromate complex, Carbide & Carbon
C & H copper oxide -- mixture of cuprous and cupric oxide, 75% metallic copper, Calumet & Hecla Consol. Copper Co.
Cadminate -- cadmium succinate, Mallinckrodt
Calo-clor -- mercuric chloride-mercurous chloride, Mallinckrodt
Calo-cure -- (?), Mallinckrodt
Compound 1189 - a chlorinated hydrocarbon (50%), General Chemical Co.
CHCO -- a cuprous-cupric oxide complex (75-25%) containing 75% copper
Cop-O-Zinc -- basic salts of copper and zinc
Copper Cupferron -- a copper phenylhydroxylamine
Crag 658 -- copper-zinc-chromate (30% copper - 20% zinc)
Crag 1025 -- (?), Carbide & Carbon
Dow 1003 -- 20% disodium 1,2-propylene dithiocarbamate, Dow
Goodrite Zac -- zinc dimethyl dithiocarbamate-cyclohexyl amine, Goodrich
HL 525 -- California Spray Chemical Corp.
Iscothan -- 15% dinitro capryl phenyl crotonate, Innis, Speiden Co.
Manzate)
Mn EDB) -- manganese ethylene bis dithiocarbamate, DuPont
Manganese carbamate)
Mathieson 916 -- (?), Mathieson Chem.
Methasan -- zinc dimethyl dithiocarbamate, Monsanto
N-84 --
NP 492 -- Pennsylvania Salt Mfg. Co.
Nutri-leaf -- 16-16-16 foliar fertilizer containing minor elements and hormones, Miller Chem. Co., Baltimore
Orthocide 406 -- N-trichloromethylthiotetrahydrophthalamide, California Spray Chemical Corp.
OS 377C -- Shell
OS 377D -- heptadecyl-trimethyl-tetrahyropyrimidine, Shell
Ovotran -- p-chlorophenyl p-chlorobenzene sulfonate, Dow
Phygon XL -- 2,3-dichloro-1, 4-naphthoquinone (50%), U. S. Rubber Co.
PMAS -- Cleary Corp.
Puratized Agricultural Spray -- phenyl triethanol ammonium lactate, Gallowhur
Puraturf 177 -- phenyl amino cadmium dilactate, Gallowhur
Robertson's Fungicide -- copper oxide coating of a copper core
SDDC-A -- a sodium dimethyl dithiocarbamate-cyclohexylamine
SDDC -- 20% sodium dimethyl dithiocarbamate
Spergon SL -- tetrachloro-para-benzoquinone (95%), U. S. Rubber Co.
Sulfenone -- p-chlorophenyl phenyl sulfone, Stauffer
XP 50 -- Shell
4255 -- Pittsburg Agr. Chem.
4268T -- an organic arsenical 7.7%, Geary Chem. Corp.
5379 -- 1,2,3-Trithio-5,8 diazacyclononane-4,9 dithione (75% active), Carbide & Carbon

Chem. Corp.
5400 -- organic cyclic compound of sulfur and nitrogen, Carbide & Carbon

FUNGICIDE EVALUATION STUDIES -- 1951

CANTALOUPE

MACROSPORIUM LEAF SPOT
Field plots: Power spray (and dust where indicated) 6 applications July 3-August 8; Variety Hales Best. Delaware -- J. W. Heuberger.

Order of Disease Control: (1) Bordeaux (6-3-100); (2) Dithane Z-78 (2-100), Tribasic (3-100); (3) Dithane Z-78 first 4 applications followed by Bordeaux on last 2; (4) Parzate (2-100); (5) Manzate (1.5-100); (6) Tribasic (Dust, 7% Cu); (7) Zerlate (2-100); (8) Zerlate (Dust, 10%); (9) Dithane Z-78 (Dust, 6%).

Yield: (1) Dithane Z-78; (2) Parzate; (3) Tribasic (Dust); (4) Dithane Z-78-Bordeaux split schedule; (5) Manzate; (6) Bordeaux; (7) Tribasic; (8) Zerlate; (9) Zerlate (Dust); (10) Dithane Z-78 (Dust).

CELERY

EARLY AND LATE BLIGHTS: Cercospora apii and Septoria apii

Field plots, variety Salt Lake, power sprayer 300 lbs., weekly applications August 15 to September 24. St. Catharines, Ontario, Canada, by J. K. Richardson.

Order of Disease Control: (1) Bay Car (an arsenical thiocarbamate) at 2-100, (2) Basicop 5-100 and Bordeaux 10-5-100, (3) ?, (4) Orthocide 2-100, (5) Ferbam 2-100 and Dow F 1003 at 2 qts. + 1 lb. $ZnSO_4$ to 100 (= Thiodow?), (6) ?, (7) Robertson Cu 1 1/2-100 and Mn Eth Bis 2-100 (Manzate ?).

No injury from any, no yield records.

CORN

1. SEED ROT AND SEEDLING BLIGHT:

Slurry seed treatments, field plots, varieties U. S. 13 and Ill. 972. Urbana, Illinois, by Benjamin Koehler.

In Order of Yield: (1) Arasan SF 1/2 oz. per bu. and 1 oz. per bu., Carb. & Carb. 5400 at 1 oz., (2) C & C 5400 at 1/2 oz., Phygon at 1/2 oz., and Spergon SL + DDT at 1 oz., (3) Spergon SL + DDT at 1/2 oz.

Both pre- and post-emergence benefits were notable as spring temperatures were cool. Ratings on stand were very similar to yield ratings above.

2. SEED AND SOIL-BORNE ROTS:

Dust seed treatments, small plots, variety Golden Bantam. Auburn, Alabama, by James A. Lyle.

In order of disease control and of plant safety and over-all preference same: (1) Agrox at 2 oz./bu., (2) Spergon at 3 oz./100 lbs., (3) Arasan at 2 oz./100 lbs., (4) Check, (5) Aagrano at 2 oz./bu.

3. NORTHERN LEAF BLIGHT: Helminthosporium turcicum Pass.

Power spraying, field plots, 3- to 7-day schedule. Belle Glade, Sanford, and Bradenton, also Homestead and Ft. Pierce, Florida, by Robert A. Conover and James M. Walter.

Order of disease control except at Homestead: (1) zineb 2 lbs./100 gals. and nabam + $ZnSO_4$ 2 qt.-3/4-100., (2) Orthocide 4 lbs.

Order of Safety: (1) zineb, (2) nabam + $ZnSO_4$, (3) Orthocide.

Order of Preference: (1) zineb and nabam.

At Homestead -- Order of disease control: (1) zineb 2 lbs., (2) ziram 2 lbs. or ferbam 2 lbs. or Puratized Agr. Spray 1 pt., (3) Phygon XL 3/4 lb.

Order of Safety: (1) zineb, or ziram, or ferbam, (2) Phygon or Puratized.

Over-all Preference: (1) zineb or nabam + $ZnSO_4$.

Notes: Orthocide not worth further trial. Zineb, ziram, ferbam and Phygon XL incompatible with DDT emulsion. Phygon XL and Puratized too injurious at Homestead.

COTTON

DAMPING-OFF: Colletotrichum gossypii and Rhizoctonia solani

A. Approximate maximum non-toxic dosages of certain fungicides on seeds when incorporated with pelleting materials such as feldspar, vermiculite, and Methocel sticker. Clemson, South Carolina -- C. H. Arndt

Ceresan M 0.3%, Dow 9B 0.3%, Phygon 0.5%, Arasan 3%, Zerlate 3%, Dithane Z-78 3%, Crag 5400 3%, pentachloronitrobenzene 3%, Orthocide 5%, Spergon 5%, Crag 531 5%.

Orthocide and Crag 5400 deserve further testing in pelleting method.

B. Approximate maximum non-toxic dosages when mixed with upper 2-3 cm. of soil containing 80 percent of its field moisture capacity previous to sowing acid delinted cotton seed.

Dowicide F. 4 lbs./acre, Vancide 51 50

lbs. /acre, Crag 640 160 lbs. /acre, Arasan and Crag 5400 100 lbs. /acre, Orthocide, Crag 531, Dithane Z-78, and pentachloronitrobenzene 200 lbs. /acre. Worthy of further testing when applied to furrow while seeding are Arasan, Orthocide, and pentachloronitrobenzene.

CUCUMBER

POWDERY MILDEW

Field plots: Hand duster, 3 applications at 2-week intervals; Variety Marketer. California -- John Middletown and J. B. Kendrick, Jr.

Order of Disease Control: (1) Iscothan; (2) Ovotran; (3) Cu-S; (4) sulfur; (5) zineb; (6) Sulfenone; (7) N-84 (all dust at 10% material).

Slight injury from Ovotran.

No Yield Data:

Over-all Preference: Iscothan.

DOWNY MILDEW

Field plots: Power sprayer (and hand duster), 5-day schedules; Variety Early Green Market. Florida -- George Swank, Jr.

Order of Disease Control: (1) Manzate (1 1/2-100), Dithane D-14 + $ZnSO_4$ (2-1-100), Parzate + $ZnSO_4$ (2-1-100); (2) Z.A.C. (3-100); (3) ziram (2-100), ferbam (2-100).

Plant Safety: All about equal.

No Yield Data:

Over-all Preference: Same order as disease control.

Dust applications at five-day intervals did not control Downy Mildew with following materials: Mathieson 916 (10%), Dithane Z-78 (6%), SR 406 (5%), ziram (10%), Tribasic (5%), ferbam (10%).

Plant Safety: 377B phytotoxic; Mathieson 916 slightly phytotoxic.

ANTHRACNOSE AND DOWNY MILDEW

Field plots; hand duster, 8 applications at 5-day intervals; Variety Palmetto (fall crop). South Carolina -- W. M. Epps.

Order of Anthracnose Control: (1) Manzate (6%); (2) SR 406 (5%), HL 525 (5%), Dithane (3.9%), Zerlate (6.1%), Parzate (3.9%); (3) Pittsburg 4255, C. & C. 5379; (4) NP 492, Tribasic.

Order of Downy Mildew Control: (1) Manzate; (2) Dithane, Parzate, Tribasic; (3) SR 406, HL 525, Zerlate, 4255, 5379, NP 492.

Yield: (1) Manzate, SR 406, (2) HL 525, Dithane, Zerlate, NP 492; (3) Parzate, Tribasic; (4) 4255, 5379.

No apparent injury from any material.

Over-all Preference: (1) Manzate; (2) Dithane, Parzate.

Note: 4255, 5379, NP 492, and Tribasic not worthy of further trial.

ANTHRACNOSE

Field plots: hand duster, 4-day schedule; Variety Marketer. Louisiana -- N. L. Horn and J. G. Atkins.

Order of Disease Control: (1) Dithane Z-78 (8% and 6%), Parzate (8%), Orthocide 406 (8%), Fermate (8%); (2) Crag 658 (8%); (3) Tribasic (7% Cu); (4) NP 492 (8%).

Plant Safety: (1) Dithane Z-78 (8% and 6%), Orthocide 406, NP 492; (2) Fermate, Parzate; (3) Crag 658, Tribasic.

Yield: (1) Dithane Z-78 (8%); (2) Dithane Z-78 (6%), Parzate, Orthocide 406, Fermate; (3) Crag 658; (4) Tribasic, (5) NP 492.

Over-all Preference: (1) Dithane Z-78 (8%); (2) Parzate, Orthocide 406, Fermate; (3) Crag 658, Tribasic; (4) NP 492.

Note: NP 492, Crag 658 and Tribasic are not considered worthy of further trial for control of Anthracnose.

ONION

MILDEW and THRIPS: Peronospora destructor and Thrips tabaci

Small plots, sprayed at weekly intervals February 20 to May 2, with knapsack hand sprayer. At Baton Rouge, Louisiana, by E. C. Tims and E. H. Floyd.

No mildew but heavy thrips development.

Compared Dithane Z-78 with and without DDT and Cop-O-Zinc with and without DDT.

Noted "Dithane-DDT plots looked much better and leaves stayed green longer, and yielded at 5075 lbs. /acre while Cop-O-Zinc plots were no better than checks and checks gave yield of 3912 lbs. /acre."

PURPLE BLOTCH: Alternaria porri

Field, power-sprayed, 125 g. p. a., 5 applications at 10-day intervals. At Rocky Ford and Ft. Lupton, Colorado, by W. D. Thomas, Jr.

Order of Disease Control: (1) OS-377D at 2 lbs., (2) Dithane Z-78 at 2 lbs. or Parzate 2 lbs. or Yellow Cuprocide at 2 lbs., (3) Cu A Comp. at 4 lbs. or Tribasic $CuSO_4$ at 4 lbs., (4) Manzate at 2 lbs., (5) Puratized Apple Spray at 2 lbs.

All equally safe except Puratized.

In Order of Yields: (1) Manzate, (2) OS-377D or Dithane or Parzate, (3) Yellow Cuprocide, (4) Cu A Comp. or Tribasic, (5) Puratized.

Over-all Preference: (1) Os-377D, Dithane, Parzate, (2) Yellow Cuprocide, Cu A Comp., Tribasic, (3) Manzate, (4) Puratized.

PEANUT

SEED AND SOIL-BORNE DISEASES

Dust Seed Treatments: small plots, pre- and post-emergence disease control. Auburn, Alabama -- by J. A. Lyle

In Order of Preference: (1) Agrox 1 oz./bu., (2) Agrox 2 oz./bu., (3) Aagrano 1 oz./bu. or Arasan 3 oz./100 lb., (4) Arasan 2 oz./100 lb. or C & C 5400 at 2 oz./100 or 4268-T at 5 oz./100, (5) C & C 5400 at 1 oz./100 or 4268-T at 10 oz./100, (6) Spergon 2 oz./100 or at 3 oz./100, (7) Check or Aagrano at 2 oz./bu.

PEAS

SEED DECAY AND DAMPING-OFF

Field and Greenhouse Temperature Tanks (14-16°C): Dust and slurry; Variety Wisconsin Perfection. Wisconsin -- D. J. Hagedorn.

Order of Disease Control: (1) KF 467 at 1 2/3 oz./100 lb., Phygon XL at 2 and 4 lbs./gal.; (2) Spergon SL at 4 lbs./gal.; (3) Arasan at 2 oz./100 lb.; Spergon at 3 oz./100 lb.; (4) Arasan SF at 3 lb./gal.; (5) Phygon at 2 oz./100 lb.; (6) Arasan SF at 1.5 lb./gal.; (7) Spergon SL at 2 lb./gal.; (8) Dow 9B at 3 2/3 oz./100 lb.; (9) Check.

Over-all Preference: (1) Phygon at 2 oz./100 lb.; (2) KF 467; (3) Phygon XL at 2 lb./gal.; (4) Phygon XL at 4 lb./gal.; (5) Spergon at 3 oz./100 lb.; (6) Spergon SL at 2 lb./gal.; (7) Spergon SL at 4 lb./gal.; (8) Arasan at 2 oz./100 lb.; (9) Arasan SF at 3 lb./gal.; (10) Arasan SF at 1.5 lb./gal.; (11) Dow 9B.

Note: KF 467 is a mercury compound; dust is irritating to operator. Dow 9B is not worth further trial.

POTATO

EARLY BLIGHT: Alternaria solani

Replicated field plots, power sprayed 7 times, June 15 to August 13 at Willard, Ohio -- J. D. Wilson

Disease severe, causing defoliation of 80 percent on checks. L.S.D. at 19:1 = 53 bu. DDT used in all sprays at 1 lb.

In Order of Yield: (1) Vancide 51 + $ZnSO_4$, 4-1-100 (564 bu.), (2) CHCO + p.e.p.s., 4-1/2-100 (563 bu.), (3) Dithane D-14 + $ZnSO_4$, 4-1-100 (554 bu.), (4) Dithane Z-78, 2-100 (552 bu.), (5) SEBD + $MnSO_4$, 4-1-100 (550 bu.), (6) Comp. 1217, 7-100 (547 bu.), (7) Manzate, 2-100 (538 bu.), (8) Robertson Fun. + p.e.p.s., 2 1/2-1/2-100 (536 bu.), (9) SDDC-A + $ZnSO_4$, 4-1-100 (532 bu.), (10) SDDC + $ZnSO_4$, 4-1-100 (532 bu.), (11) Cu Cupferron, 3-100 (530 bu.), (12) Crag #658, 2-100 (527 bu.), (13) Tribasic + p.e.p.s., 4-1/2-100 (523 bu.), (14) Cop-O-Zinc + p.e.p.s., 4-1/2-100 (517 bu.), (15) Tribasic 4-100 (503 bu.), (16) OS337D, 4-100 (498 bu.), (17) Check (475 bu.).

EARLY BLIGHT (severe):

A comparison with 9 fungicides used at 1X concentration at 160 gal. per acre and the same at 2X concentration and 80 gal. per acre, applied 7 times with power sprayer to replicated field plots at Willard, Ohio -- J. D. Wilson.

Results showed defoliation was less, therefore control better, with 2X in 9 of 11 instances, and yields were greater with 2X in 8 of the 11.

Materials used in order of 2X yields were: (1) Dithane Z-78, Vancide 51, Manzate, (2) Tribasic, (+ 4 different insecticides), Zerlate, Cop-O-Zinc, Crag 658, (3) OS377 (injurious).

Another experiment with COC-S and with Manzate indicated that no loss of control of early blight resulted from quadrupling the concentration and reducing the gallonage correspondingly from 160 to 40 gals. per acre, respectively.

EARLY BLIGHT (severe):

Replicated field plots, Katahdin, power sprayed, 8 applications plus DDT between July 5 and September 10, at Wooster, Ohio. -- J. D. Wilson

In Order of Yields: L.S.D. at 19:1 = 32 bu.: (1) SEBD + $MnSO_4$ 4-1-100 (601 bu.), (2) Same plus $ZnSO_4$ (596), (3) Methasan S 3-100 (590) and SDDC-A + $ZnSO_4$ (590), (4) Dithane Z-78 2-100 (573) and Manzate 2-100 (572), (5) SDDC + $ZnSO_4$ 4-1-100 (570), (6) Vancide 51 + $ZnSO_4$ 4-1-100 (568), Zerlate 2-100 (566), (7) Copper hydrate 3 1/2-100 (546), COC-S 4-100 (544), (8) Tribasic + p.e.p.s. 4-1/2-100 (520), (9) Copper Cupferron 3-100 (515), CHCO 3-100 (514), COC-S-cl 4-100 (510), (10) Cop-O-Zinc 4-100 (499), Crag #658 2-100 (494), Bordeaux 8-8-100 (494), Tribasic 4-100 (491), (11) Crag #1217 7-100 (482), (12) Baycar 2-100 (457), (13) OS377 4-100 (438), (14) Check (429).

LATE BLIGHT: Phytophthora infestans

Small replicated field plots; power sprayed 400 lbs. conventional drop boom; 11 applications July 13 to September 20. A Dithane D-14 concentration experiment at Ottawa, Canada, by K. M. Graham and J. B. Julien, reported by H. N. Racicot, comparing 2 qt. + 1 lb. $ZnSO_4$ in 100 g. - 66 g. - and 33 g. per acre. Av. foliage blight was 5.8 - 5.3 - 5.0% vs. 98.5% in check. The percentage surface of tubers with lesions was 1.94 - 1.77 - 1.68 for sprayed and 25.07 for checks.

LATE BLIGHT:

Power sprayed field plots; var. Green Mountain; 5 applications of 100 g.p.a.; July 19 to August 30 at Charlottetown, Prince Edward Island, by L. C. Callbeck.

Note: Of 5 new materials tested, only Perenox (Cu_2O) gave good control on foliage. (80 g = 100 U.S. g.)

Order of Disease Control: (1) Bordeaux 8-4-80, or Perenox 3 lb./80 g., (2) Dithane D-14 + $ZnSO_4$ 2-1-80 g. or #1189 + Cu 5 lb./80 g., (3) Cop-O-Zinc 4 lb./80 g. or #1189 5 lb./80 g., (4) Crag 658 at 2/80 g. or Emulsifiable Copper Mercury 4 qt./80 g., (5) Emulsifiable Cu 4 qt./80 g. or Orthocide 2 lb./80 g.

Order of Yields: (1) Bordeaux, or Perenox, (2) Dithane or #1189 or Emulsifiable Copper Mercury, (3) Cop-O-Zinc, or Emulsifiable Cu, or #1189 + Cu, (4) Orthocide, (5) Crag 658.

Over-all Preference: (1) Bordeaux, Perenox, (2) Dithane, #1189 + Cu, (3) Cop-O-Zinc, #1189, (4) Crag, Emulsifiable Copper Mercury, (5) Orthocide, Emulsifiable Cu.

EARLY BLIGHT: Alternaria solani

Small plot field test of 5 replicate plots; small power sprayer 250 lbs.; 6 weekly applications of 150 g.p.a. on Cobblers beginning June 1, 1951, at Huttonsville, West Virginia, by M. E. Gallegly. (Some late blight present; DDT in all applications).

Order of Disease Control: (1) Manzate 1 1/2-100, (2) Parzate + Nutri-Leaf in last 2 applications 3-6-100, (3) Parzate Liquid + $ZnSO_4$ 2-3/4-100, (4) Bordeaux 8-4-100, (5) C & H CuO + peps 3-1/2-100, (6) Parzate 2-100, (7) C & H CuO + Bentonite 3-1/2-100, (8) C & H CuO 3-100, (9) Parzate-Tribasic Cu alternating, (10) C & H CuO + Nutri-Leaf 3-6-100, (11) Tribasic 4-100, (12) Crag #658 2-100, (13) C & C #1217 7-100, (14) Check, DDT only.

Order of Yield: (1) Manzate, (2) C & H CuO + Bentonite, (3) Tribasic, (4) Parzate + Nutri-Leaf, (5) Parzate Liquid + $ZnSO_4$, (6) C & C #1217, (7) C & H CuO + peps, (8) Bordeaux, (9) C & H CuO + Nutri-Leaf, (10) Parzate, (11) Parzate-Tribasic alternate, (12) C & H CuO, (13) Check, (14) Crag #658.

Over-all Preference: (1) Manzate, Parzate, Parzate + $ZnSO_4$, Parzate + Nutri-Leaf, (2) Tribasic, C & H CuO + Bentonite, or same + peps, Bordeaux, (3) C & C #1217, C & H CuO, Crag #658, (4) Check.

Significant differences found between percentages of defoliation but not between yields.

EARLY BLIGHT (plus moderate amount late blight):

Small field plots, 4 replicates, power sprayed, 4-nozzle boom, 300 lbs.-150 gal., 6 applications, August 3 to September 22. Variety Pontiac, at Selbyville, Delaware, by J. W. Heuberger.

In order of yields, with percentage defoliation in parentheses: Dithane Z-78 2-100 (28) 341 bu., Parzate 2-100 (54) 294 bu., Dithane D-14 2 qt.-1-100 (28) 283 bu., Dithane Z-78 1-100 (50) 283 bu., Orthocide 406 2-100 (50) 281 bu., Parzate + $ZnSO_4$ 2 qt.-3/4-100 (35) 276 bu., Manganese E D B 1-100 (38) 276 bu., Same 1/2-100 (70) 267 bu., Robertson's Cu 1.7-100 (48) 263 bu., F 1003 + $ZnSO_4$ 2 qt.-1-100 (34) 256 bu., Vancide 51 + $ZnSO_4$ 1 1/2 qt.-1-100 (50) 249 bu. Dithane D-14 + $MnSO_4$ 2 qt.-1-100 (54) 247 bu., Baycar #4255 4-100 (85) 241 bu., Bordeaux 6-3-100 (45) 237 bu., Tribasic 3-100 (56) 224 bu., Cop-O-Zinc 3-100 (76) 211 bu., Check (89) 208 bu., Baycar #4255 + lime 2-1/2-100 (86) 199 bu., Same without lime (90) 182 bu., Same + lime 4-1/2-100 (93) 151 bu.

(L.S.D. 5% = 60 bu. and 1% = 79 bu.).

EARLY BLIGHT:

Field plots, Bean power sprayer, 4 applications July 6 to August 10. Brookings, South Dakota, by L. T. Richardson, reported by A. A. Cook.

Temperatures below normal, rainfall above. "No treatment prevented ultimate complete defoliation. Differences not statistically significant."

Order of Disease Control: (1) Dithane Z-78 2 lbs.-100 g., (2) Crag 658 2 lbs.-100 g., (3) Zerlate and Tribasic 2 lbs.- and 4 lbs.-100 g., (4) Bordeaux 8-8-100, (5) Cop-O-Zn 4 lbs.-100 g., (6) Tribasic 4 lbs.-100 g., (7) Phygon XL 1 lb.-100 g., (8) Zerlate 2 lbs.-100 g.

Order of Yields: (1) Zerlate, (2) Zerlate and Tribasic, (3) Tribasic, (4) Dithane Z-78, (5) Crag 658, (6) Bordeaux, (7) Phygon, (8) Cop-O-Zn.

SEED PIECE ROT: Fusarium sp.

Random split plot field comparison between Dithane 1 to 5 in talc and Arasan 1 to 11 in talc applied as dust to seed pieces, varieties Bliss Triumph and Russet Burbank, May 31 at Eaton and Yumpa, Colorado. G. H. Lane and C. A. Schaal, reported by W. D. Thomas, Jr.

Results: "Both materials provided 94 percent control, 6 percent increase in stand, and 13 to 30 percent increase in yield."

No preference (soil hot and dry) between Arasan 1:11 and Dithane Z-78 1:5 in talc.

RED CLOVER

One 20-replicate test of seed treatment with .5 percent Arasan in randomized field test at Urbana, Illinois, by J. W. Gerdemann showed 70.4 percent emergence, for both treated and check.

One similar comparison, on alfalfa, showed 80.5 percent emergence for Arasan-treated seed against 77.6 percent for check, significant at 5 percent level.

SPINACH

DOWNY MILDEW

Field plots, variety Viroflay, 3 weekly applications of spray at 400 lbs. pressure, Riverside, California, by John T. Middleton and J. B. Kendrick, Jr.

In order of disease control at 1 lb./100 at 500 g.p.a.: (1) Mn Eth Bis, (2) Phygon and Orthocide, (3) CuO+S, (4) Parzate, (5) Check.

All safe, no yield differences, over-all preference MnEBD.

SWEET POTATO

BLACK ROT

Small plots, chemical dips of vine cuttings prior to planting. Ashford, Alabama, by J. A. Lyle. "Extremely dry soil conditions affected yields of all treated plots."

In Order of Preference: (1) Zerlate 1 lb./50 g., (2) Puratized Agricultural Spray 1:4500, (3) Phygon 1 lb./50 g., (4) Semesan Bel 1 lb./10 g. or $HgCl_2$ 1 oz./8 g., (5) Elgetol 1:400 or Fermate 1 lb./50 g., (5) Borax 1 lb./10 g. of water, (6) $HgCl_2$ 1 oz. + W Sul. 1.83 lbs. in 8 g. or Tersan 75 1 lb./50 g., (7) Puratized 178 1 lb./12 g. or Manzate 1 lb./50 g., (8) Bordeaux 4-4-50, (9) Spergon W 1 lb./50 g., (10) Check.

Plant bed, chemical dip prior to bedding, at Auburn, Alabama, by J. A. Lyle.

In Order of Preference: (1) Semesan Bel 1 lb./8 g. for 1 min., (2) Fermate 1 lb./50 g. instant dip, (3) $HgCl_2$ 1 oz./8 g. for 8 min., (4) Zerlate 1 lb. + W Sulf. 1.83 lbs. in 50 g. instant or $HgCl_2$ 1 oz./8 g. for 8 min. or W Spergon 1 lb./8 g. instant or Phygon 1 lb./8 g. instant or Puratized Agr. Spray 1:4500 instant or Check or Borax 1 lb./6 g. for 10 min.

Borax not worth further trial.

SHADE TOBACCO

BLUE MOLD (DOWNY MILDEW): Peronospora tabacina

Plants of field size in greenhouse converted to shade tent. Hand duster and sprayer. Applications twice a week for 6 weeks vs. once a week, comparing ferbam with zineb. Windsor, Connecticut, by P. J. Anderson.

Conditions under shade cloth covered greenhouse were 60 to 70° F. and relative humidity 80 to 90 percent, inoculated every 3 or 4 days.

General Conclusions: (1) Either ferbam 4 lbs. or zineb 3 lbs. in 100 gal. or as 30% dusts will control. (2) Zineb slightly better than ferbam. (3) Dusts a little better than sprays. (4) Necessary to apply twice a week. (5) Dusts less objectionable residue than spray. (6) All safe to plants and all gave good yields.

Order of Disease Control: (1) Zineb 30% dust bi-weekly at 12 lbs./acre. (2) Same weekly, or ferbam 30% dust weekly at 16 lbs./acre, or zineb spray bi-weekly at 3 lbs./100 gal. (3) Ferbam dust bi-weekly, or ferbam spray at 4 lbs. bi-weekly, or zineb spray at 3 lbs. weekly.

Plant bed, small plots, plunger duster 3 times a week for 5 weeks at 360 lbs./acre. North Florida Experiment Station, Quincy, Florida, by R. R. Kincaid.

Over-all Preference: (1) Dithane Z-78 or Parzate at 6.5% active. (2) Fermate at 15.2% active.

Order of Disease Control: (1) Dithane, Parzate, Mn Eth Bis 7%, (2) Fermate 15.2%, (3) Vancide 51 (no Zn) at 3.5%, (4) Phygon at 2%, (5) Orthocide 5%.

Vancide, Phygon injured 1951 and Mn Eth Bis injured 1952 only.

Yields: (1) Dithane, Parzate, Mn Eth Bis, (2) Fermate, Orthocide, (3) Phygon, (4) Vancide 51.

TOBACCO

BLUE MOLD: Peronospora tabacina

Plant beds, sprayed twice a week, using 72 gal. per 100 sq. yds., April 3 to April 30 as plants reached size of a dime, using hand pump bucket sprayer, at Pee Dee Experiment Station, Florence, South Carolina, by Quintin L. Holdeman.

Disease light and spotty, so although poorer chemicals could be determined, best could not be critically evaluated.

Over-all Preference: (1) Ferbam 4 lbs./100 and zineb 3 lbs./100.

Order of Plant Safety: (1) Eight safest were ferbam at 4 lbs., zineb at 3 lbs., Crag 5379 at 1 lb. and at 2 lbs./100, Vancide 51 at 3 and 6 lbs./100, $ZnSO_4$ 1 lb., Orthocide at 6 lbs./100, and NP-492 (Penn Salt Co.) at 8 lbs., (2) Crag 5400 at 1 lb., (3) Crag 5400 at 2 lbs., (4) Mn Eth Bis 100% active at 1 lb., (5) Same at 2 lbs. Unsafe were AC-F-54 at 1 lb. and AC-F-79 at 1/2 lb., and perhaps Orthocide at 8 lbs.

Poor control from NP-492, AC-F-79, partial control from Orthocide at 6 lbs., AC-F-54 at 1 lb. and Vancide 51 at 1 lb.

Objectionable odor to AC-F-54 and AC-

F-79.

TOMATO

LATE BLIGHT

Field Plots: Power sprayer, 15 applications at 3 to 7 day intervals; Variety Mo. S-34 Florida -- Robert A. Conover.

Order of Disease Control: (1) Manzate (1 5/16-100), Orthocide 406 (4-100), Phygon XL (3/4-100), Parzate (2-100), Nabam + $ZnSO_4$ (2-1-100), Dithane Z-78 (2-100); (2) Tribasic (4-100); (3) OS377C (1 qt. and 2 qts.-100).

Plant Safety: (1) Manzate, Orthocide 406, Phygon XL, Parzate, Dithane Z-78, Tribasic; (2) Nabam + $ZnSO_4$; (3) S377C (1 and 2 qts.).

Yield: (1) Manzate; (2) Orthocide 406, Phygon XL, Parzate, Nabam + $ZnSO_4$, Dithane Z-78, Orthocide 406; (3) Tribasic; (4) OS377C (1 qt. and 2 qts.).

Over-all Preference: (1) Manzate, Phygon XL, Parzate, Dithane Z-78; (2) Nabam + $ZnSO_4$; (3) Orthocide 406, Tribasic; (4) OS377C (1 qt. and 2 qts.).

EARLY BLIGHT AND NAILHEAD LEAF SPOT

Field Plots: Power sprayer, 10 applications at 7 day intervals; Varieties Marglobe and Break-O-Day. West Virginia -- M. E. Gallegly.

Order of Disease Control: (1) Dithane Z-78 (3-100); (2) Bordeaux (8-4-100); (3) Parzate (3-100); (4) C. & H. CuO + p.e.p.s. (3-1/2-100); (5) Manzate (1 1/2-100); (6) Liquid Parzate + $ZnSO_4$ (2-3/4-100); (7) C. & H. CuO + Bentonite (3-1/2-100); (8) Parzate (2-100); (9) C. & H. CuO (3-100); (10) Parzate-Bordeaux*; (11) Methasan-Tribasic**; (12) Parzate-Tribasic (alternating); (13) Tribasic (4-100).

Plant Safety: (1) Parzate (2 and 3), Dithane Z-78, Liquid Parzate, Manzate; (2) Parzate-Bordeaux*, Parzate-Tribasic (alternating), Methasan-Tribasic**, Tribasic, C. & H. CuO (all); (3) Bordeaux.

Yield: (1) Parzate (3-100); (2) Parzate (2-100), Parzate-Tribasic; (3) Dithane Z-78, Methasan-Tribasic**; (4) Parzate-Bordeaux*; (5) Liquid Parzate; (6) Bordeaux; (7) Tribasic; (8) Manzate; (9) C. & H. CuO + p.e.p.s., C. & H. CuO + Bentonite; (10) C. & H. CuO (=check).

Over-all Preference: (1) Parzate (2-or-3-100), Dithane Z-78, Liquid Parzate + $ZnSO_4$; (2) Parzate-Bordeaux*, Bordeaux, Parzate-Tribasic (alt.), Manzate, Tribasic; (3) Methasan-Tribasic**, C. & H. CuO (all).

* Parzate until first fruit ripe, then Bordeaux

**Methasan for first two applications, rest tribasic.

Note: Calument and Hecla Copper Oxide is 75% metallic copper.

EARLY BLIGHT

Field Plots: Hand duster, 11 applications at 7 day intervals; Variety Rutgers. Alabama -- Raymond L. Self.

Order of Disease Control: (1) Zineb (7% and 10%), Manganese Carbamate (6%); (2) Crag 658 (6%); (3) Tribasic (5%); (4) Zineb (5%); Tribasic (7%).

Yield: (1) Manganese Carbamate; (2) Zineb (10%); (3) Zineb (7%); (4) Crag 658; (5) Tribasic (5%); (6) Tribasic (7%); (7) Zineb (5%).

Over-all Preference: (1) Manganese Carbamate; (2) Zineb (7% and 10%); (3) Crag 658; (4) Tribasic (5%), Zineb (5%); (5) Tribasic (7%).

Note: Hot dry season, foliage diseases not serious in most locations. Tests were principally phytotoxicity tests.

EARLY BLIGHT

Field Plots: Hand spray, 8 to 12 applications at 7 day intervals at four locations; Variety Rutgers. Alabama -- Raymond L. Self.

Order of Disease Control: (1) Manganese carbamate (1 1/2-100), Liquid Parzate + $ZnSO_4$ (2-3/4-100), Dithane D-14 + $ZnSO_4$ (2-3/4-100); (2) Zineb concentrate (2-100); (3) Tribasic (4-100), Crag 658 (1 1/2-100).

Plant Safety: (1) Manganese carbamate, Crag 658; (2) Zineb concentrate, Tribasic; (3) Liquid Parzate, Dithane D-14.

Yield: (1) Manganese Carbamate; (2) Crag 658, Control; (3) Tribasic; (4) Zineb concentrate; (5) Liquid Parzate, Dithane D-14.

Over-all Preference: (1) Manganese Carbamate; (2) Zineb concentrate; (3) Tribasic, Crag 658; (4) Liquid Parzate, Dithane D-14.

EARLY BLIGHT

Field Plots: Hand duster, application May 9, 18, 28, June 9, 20; Varieties Rutgers and Ontario. South Carolina -- W. M. Epps.

Order of Disease Control: (1) Tribasic (6%); (2) Dithane Z-78 (3.9%), Parzate (3.9%), HL 525 (5%); (3) Phygon (1%), Pittsburg Agricultural Chemical 4255 (1%); (4) Orthocide 406 (5%).

No apparent injury from any material.

Yield: (1) Tribasic; (2) Phygon, Pitts. 4255; (3) HL 525, (=control); (4) Orthocide 406; (5) Parzate; (6) Dithane Z-78 (differences in yield not significant).

Over-all Preference: (1) Tribasic; (2) Dithane Z-78, Parzate.

ANTHRACNOSE AND EARLY BLIGHT

Field Plots: Power spray, 5 applications July 15 to August 31; Varieties Gem and Red Jacket. New York -- W. T. Schroeder.

Order of Early Blight Control: (1) Zerlate-Bordeaux (Z-Z-B-Z-B. 4 lbs./acre Z, 16-8/acre B), Manzate (4 lbs./acre), Orthocide (6 and 8 lbs./acre); (2) Zerlate (4 lbs./acre).

Anthracnose Control: All equal.

No apparent differences in plant safety.

Yield: (1) Manzate, Orthocide (6 and 8 lbs); (2) Zerlate-Bordeaux; (3) Zerlate.

Over-all Preference: All except straight Zerlate.

ANTHRACNOSE

Field Plots: Power sprayer, 5 applications at 10 day intervals; Variety Rutgers. New Jersey -- B. H. Davis.

Order of Disease Control: (1) Orthocide 406 (4-100), Dithane D-14 (2-100), Parzate (2-100), Dithane D-14 + Zerlate (tank mix 1-1-100), Zerlate-Tribasic (2-100 and 4-100)*, Dithane D-14-Tribasic (2-100 and 2-100)*, Manzate, Zerlate alternating with Tribasic; (2) Zerlate + Tribasic (tank mix 1-2-100); (3) Tribasic; (4) Gen. Chem. Co. compound 1189, Shell XP-50.

No apparent injury.

No significant difference in yield.

Over-all Preference: (1) Zerlate; (2) Zerlate alternating with Tribasic; (3) Manzate; (4) Orthocide; (5) Dithane.

*Three applications of first material followed by two applications of second material.

SEPTORIA LEAF SPOT AND ANTHRACNOSE

Field Plots: Power sprayer with orchard-type gun, 5 applications on 10-day schedule begun 20 days after first cluster flowered; Variety Illinois 97A. Illinois -- M. B. Linn and P. M. Miller.

Order of Septoria Control: (1) Manzate (1.3-100), Dithane Z-78 (2-100); (2) Orthocide 406 (3-100), Tribasic (4-100), Tribasic + p.e.p.s. (3-0.5-100), Dithane Z-78 + p.e.p.s. (2-0.5-100).

Order of Anthracnose Control: (1) Manzate, Orthocide 406, Dithane Z-78, Dithane Z-78 + p.e.p.s.; (2) Tribasic, Tribasic + p.e.p.s.

Yield: (1) Manzate, Orthocide 406, Tribasic + p.e.p.s.; (2) Tribasic, Dithane Z-78, Dithane + p.e.p.s.

Over-all Preference: (1) Manzate, Tribasic, Dithane Z-78 (2) Orthocide 406, Tribasic + p.e.p.s.; Dithane Z-78 + p.e.p.s.

SEPTORIA LEAF SPOT

Field Plots: Power sprayer, applications July 6, 16, and 26; Variety Victor. South Dakota -- A. A. Cook and L. T. Richardson.

Order of Disease Control: (1) Alternating Zerlate-Tribasic-Zerlate; (2) Cop-O-Zink (4-100); (3) Tribasic (4-100); (4) Yellow Cuprocide (1 1/2-100); (5) Phygon XL (1/2-100); (6) F 1003 (2 qts.-100); (7) Zerlate (2-100); (8) Dithane Z-78 (2-100).

Yield: (1) Alternating Zerlate-Tribasic; (2) Phygon XL; (3) F 1003; (4) Tribasic; (5) Zerlate; (6) Cop-O-Zink; (7) Dithane Z-78; (8) Yellow Cuprocide.

Over-all Preference: Alternating Zerlate-Tribasic-Zerlate.

TURNIP GREENS

CERCOSPORELLA LEAF SPOT

Field Plots: Power sprayer, applications 10, 15 days. Tennessee -- J. A. Andes.

Order of Disease Control: (1) Fermate (2-100), Bordeaux (4-3-50); (2) Dithane Z-78 (2-100).

Plant Safety: Bordeaux caused serious injury.

Yield: (1) Fermate, Dithane Z-78; (2) Bordeaux.

Over-all Preference: (1) Fermate; (2) Bordeaux; (3) Dithane Z-78.

RASPBERRY

ANTHRACNOSE:

Power sprayed field plots: 4 varieties, 1 semi-dormant and 1 pre-blossom application at 500 lbs. pressure and 300 g.p.a. -- at Kentville, Nova Scotia, by K. A. Harrison.

Over-all Preference: (1) Lime sulfur 1-10 followed by ferbam 2 lbs./100, (2) Elgetol 1% followed by ferbam 2 lbs./100, (3) Bordeaux 10-10-100 followed by bordeaux 5-5-100.

Order of Disease Control: (1) Bordeaux-bordeaux, (2) Lime sulfur-ferbam, (3) Elgetol-ferbam.

Standard practice has been Elgetol followed by ferbam but this year others were better.

RED AND BLACK CURRANT AND GOOSEBERRY

WHITE PINE BLISTER RUST: Cronartium ribicola

Small Power Sprayed Field Plots: 2 applications, May 11 and June 9, leaves sprayed from beneath with special nozzles -- Kentville, Nova Scotia, by Carl O. Gamley.

Order of Disease Control and Percentage Infected Leaves 30th July: (1) Phygon XL at 1 lb./100, 2.14%, (2) Ferbam 7.85%, (3) Mag. 70 sulfur 9.19%, (4) Tag 15.49%.

Tag not worthy of further trial.

ORNAMENTAL PLANTS

Turf

P. A. Miller, University of California, Los Angeles, reports results of treatments of Seaside Bent turf for control of dollar spot (Sclerotinia homoeocarpa). Materials applied bi-weekly with sprayer maintaining 40 lbs. pressure, 10 gals. per 1000 sq. ft.; first application June 12, last September 5. Based on disease control and plant safety the rankings were as follows, in descending order: Cadminate (1.6 oz./10 gals.), Calo-clor (2.0 oz./10 gals.), PMAS (0.1 pint/10 gals.), Puraturf 177 (1.6 oz./10 gals.), Calo-cure (2.0 oz./10 gals.), Crag 1025 (3.0 oz./10 gal.), Orthocide 406 (3.0 oz./10 gals.).

Rose

W. D. Thomas, Jr., Ft. Collins, Colorado, tested several materials for control of powdery mildew (Sphaerotheca pannosa f. rosae) on greenhouse roses. Two applications 9 days apart were made with a power sprayer. Excellent results were obtained with Manzate (2 lbs./100 gals.), Iscothan (8 oz./100 gals.), and Goodrite z.a.c. (2 lbs./100 gals.). Results with Dithane Z-78, Zerlate, Crag 658, Dow DHAS, OS377D, all at 2 lbs./100 gals., 51-P-162 (1/4 oz./100 gals.) and Puratized Agricultural Spray (1/2 pint/100 gals.) were fair to poor, and these materials were not considered worthy of further trial.

Iris

Leafspot (Didymellina macrospora). Spray tests reported by A. W. Dimock, Ithaca, New York. Materials applied with power sprayer about once a week from mid-June until September. Good control was obtained with Dithane Z-78 (1 lb./100 gals.), Crag 5400 (2 lbs./100 gals.), Crag 5379 (2 lbs./100 gals.), and Puratized Agricultural Spray (3/4 pint/100 gals.). Poor control was obtained with Geary 4255, Crag 341 plus lime (1 qt./1/2 lb./100 gals.), Vancide 51 plus zinc sulfate (2 qts./1 lb./100 gals.), Vancide 51 plus Pyrax AAB (2 qts./1 lb./100 gals.), and COCS (1 lb./100 gals.). Severe injury occurred with COCS.

Chrysanthemums

Leafspot (Septoria obesa). Methods, materials, and application as above. Excellent control obtained with Vancide 51 plus zinc sulfate, Crag 5400, Crag 341 plus lime, COCS, Vancide 51 plus Pyrax AAB, and Crag 5379. Fair control with Dithane Z-78, Geary 4255, and Puratized Agricultural Spray. The poor ranking of Z-78 is hard to understand since zineb wettable powders have given excellent results in previous trials.

Snapdragons

Rust (Puccinia antirrhini). Methods, materials, and application as above. Good control was obtained with Dithane Z-78, Vancide 51 plus zinc sulfate, Crag 341 plus lime and Crag 5379. Fair control was obtained with Crag 5400 and Vancide 51 plus Pyrax AAB. Poor control was obtained with Puratized Agricultural Spray and COCS. Geary 4255 killed the plants. Plant injury was noted with Puratized and Vancide plus Pyrax.

China asters

Rust (Coleosporium solidaginis). A. W. Dimock reported an unreplicated, but checked, test of Dithane Z-78 for control of aster rust. Applications were made about once a week from mid-July until September. Although rust was present in the plots when treatments were started, further spread was checked and the contrast between the treated and untreated beds was striking at the end of the season.

FUNGICIDES FOR FRUIT CROPS -- 1951

Cooperators

California: L. J. Klotz, T. A. deWolfe, E. C. Calavan, T. R. Sulvicool, J. T. Middleton -- Phytophthora rot of citrus, Botrytis blossom blight of citrus.

E. E. Wilson, W. H. English -- brown rot (Monilinia laxa) on apricot, G. A. Zentmyer, W. A. Thorn -- avocado rot

Connecticut: S. Rich -- apple scab

Delaware: P. L. Poulos, J. W. Heuberger -- apple scab, fly speck and sooty

	blotch on apple
Florida:	R. F. Suit -- melanose on grapefruit
Georgia:	J. R. Cole, pecan scab
Illinois:	D. Powell -- apple scab, fire blight on apple, Botrytis rot ot strawberry
Indiana:	J. R. Shay -- black pox on apple
Iowa:	H. L. Lautz, W. F. Buchholtz -- apple scab, O. F. Hobart, W. F. Buchholtz -- Fabraea spot on pear
Kansas:	E. Abmeyer -- apple scab, black rot on apple
Maine:	M. T. Hilborn -- apple scab
Massachusetts:	E. F. Guba -- apple scab, apple foliage tolerance
Michigan:	A. E. Mitchell, W. Toenjes -- apple scab
Missouri:	H. G. Swartwout -- apple scab, spray russet on apple, fire blight on apple and pear, sooty blotch and fly speck on apple, black rot and downy mildew of grape, strawberry leaf spot and scorch, brown rot and scab on peach, leaf spot on cherry
New Hampshire:	M. C. Richards, R. Eggert and O. R. Murphy -- apple scab
New York:	J. M. Hamilton, M. Szkolnik -- apple scab, cherry leaf spot and arsenical injury, D. H. Palmiter -- apple scab, A. J. Braun -- downy mildew of grape
North Carolina:	H. C. Fink, C. N. Clayton, J. F. Fulkerson, apple scab, black rot, bitter rot and fruit spot on apple, bacterial spot and brown rot of peach.
Ohio:	H. F. Winter -- apple scab, raspberry anthracnose
Oregon:	J. R. Kienholz -- Gloeosporium rot on apple P. W. Miller, walnut bacteriosis
Pennsylvania:	F. H. Lewis, H. W. Thurston -- apple scab
South Carolina:	H. H. Foster -- brown rot on peach
Virginia:	A. B. Groves -- apple scab
Washington:	R. Sprague, powdery mildew on apple, fire blight on pear, powdery mildew on peach
Wisconsin:	J. B. Moore, G. W. Keitt -- apple scab
CANADA	
British Columbia:	M. F. Welsh, G. R. Thorpe -- apple scab
Nova Scotia:	J. F. Hockey, R. C. Ross -- apple scab
Ontario:	G. C. Chamberlain -- apple scab, downy mildew of grape.

APPLE SCAB

Connecticut, S. Rich. Apple scab on McIntosh. Schedule April 24, May 3, 14, 25, June 7, 21 (half tree plots).

Order of Disease Control: (1) Phygon XLN 1/2-100. (2) Orthocide 406 2-100. (3) 406 1/2-100, Cr 305 2-100. (4) Ferbam-sulfur 1-3-100. (5) Cr 305 1/2-100

Order of Plant Safety: (1) 406 1/2-100, 406-2-100, ferbam sulfur. (2) Phygon. (3) Cr 305, 1/2-100. (4) Cr 305 2-100.

Order of Preference (1) Phygon, 406 2-100. (2) Ferbam-sulfur. (3) 406 1/2-100. (4) 305 2-100. (5) 305 1/2-100.

Delaware, P. L. Poulos and J. W. Heuberger. Scab on Red Delicious and Stayman.

Schedule: Delayed dormant April 6, prepink + K April 12, pink April 19, fall pink April 25, bloom April 30, petal fall May 7, 1st cover May 14, regular Delaware schedule of Mag 70 2nd cover and bordeaux in 4 more covers.

Light scab infection Mag 70. Sulfur Nu Green and Nu Green alone gave control used in prepink, pink and petal fall, with LS or sulfur in other sprays. Fruit russet was negligible in Red Delicious but moderate for all treated Stayman trees. NuGreen alone or with sulfur caused no effect on color development or fruit development.

Illinois, D. Powell. Apple scab and fire blight on Jonathan, Rome, Starking and Golden Delicious. Scab counts on all varieties, fire blight counts on Jonathan and Rome Beauty. Schedule prepink, May 1, pink May 8, bloom May 12, calyx May 21, covers June 1, 11, 25.

Order Scab Control (percentage leaves with scab June1): Dithane D-14 1 qt. $ZnSO_4$ 1 lb. (.08), Parzate 2-100 (.08), Permacide 1 pt.-100 (0.16), Zineb 2-100 (.42), Dithane D-14-$Fe_2(SO_4)_3$ 1 qt.-1-100 (.42), manganese ethylene bis 2-100 (.66), Orthocide 406 2-100 (.92), 5379 2-100 (.92), 5400 2-100 (1.60), Kolospray 8-100 (1.83), Check 7.5 percent L.S.D. .05 = 2.18.

(July 6) Permacide (02), 5400 (.66), Zineb (1.25), Kolospray (1.40) Orthocide 406 (1.58), Parzate (1.75), Man. bis (2.00) Dithane D-14 + Zn (2.40), Dithane D-14 + Fe (2.80), Dithane 278 (2.80), 5379 2.80, Check 30.4 percent L.S.D. .05 = 6.96.

Order Scab Control (1% fruit scab): Orthocide (1.1), Dithane Z-78 (1.8), Parzate (2.0), Man-bis (2.3), zineb (3.6), 5400 (3.9), Kolospray (3.9), 5379 (4.5), Permacide (5.2), Dithane D-14 + Fe (6.0), Dithane D-14 + Zn (7.3), Check (41.7). L.S.D. .05 = 7.28.

Injury: Slight russet with Dithane D-14 plus zinc or iron, no injury on others.

Order of Blight Control (blighted twigs per tree August 3): Parzate (4.3), Dithane 278 (4.3), Man bis (8.9), 5400 (13.0), Dithane D-14 Fe (13.7), Dithane D-14 + $ZnSO_4$ (16.2), Orthocide (20.8), zineb (22.0), 379 (23.2), Permacide (24.7), Kolospray (35.8), Check 17.3. (No significant differences).

Discussion: Scab was not serious this season, as shown by the low infection of the check plot. Orthocide was excellent for scab control. All treatments gave good control. The tank-mixed zineb was not so good as the formulated material. Manganese ethylene bisdithiocarbamate shows definite promise as an apple fungicide. Although the blight counts were not statistically significant, the zineb formulations of Parzate and Dithane Z-78 looked promising. In view of the increased infection from June 26 to August 3, it appears as though blight sprays should be continued through July for best results.

Iowa, H. L. Lautz and W. F. Buchholtz. Apple scab on Delicious.

Order of Scab Control on Leaves (percentage of control): Puratized (Agricultural)-wettable sulfur 1 pint - 4-100 (100) (99.9) L. S. - wettable sulfur 1/2-4-100 (99.9). L.S. + ferbam + wettable sulfur 1/2-3/4-2-100 (96.6). Crag 341 + lime 1 1/2 qt.-1/2-100 (96.4). One Pak 10-100 (93.8).

Order of Scab Control on Fruit: (1) 341 (91.0), Puratized (89.0), (2) One Pak (85.5), (3) L.S.-wettable S. (77.7), L.S.-ferbam-wet S. (77.7), (4) Puratized + wet. S. (68.0).

Kansas, E. Abmeyer. Apple scab and black rot on Jonathan, Winesap.

Schedule: pink, calyx, 1st cover.

"We were late in getting our fungicide program started last spring" ... Only the eradicant type fungicides such as Puratized Agricultural Spray gave anything like effective control. The protective type fungicides such as ferbam and wettable sulfurs were not effective as used last spring."

Maine, M. T. Hilborn. Apple scab on McIntosh.

Schedule prepink, pink, mid-bloom, petal-fall, 4 covers. Heavy carry-over, excellent infection weather. Scab was a major problem in commercial orchards.

Order of Scab Control: (1) Mike sulfur 8-100 all but petal fall and 1st cover Puratized Agricultural Spray 1 pint-100. (2) Phygon XL 1/2-100. (3) 341SC 1 1/2 qt.-100. (4) L.S. + PEPS 8-1/2-100. (5) Mike sulfur 8-100. Checks 100 percent scab.

Order of Plant Safety: (1) Mike sulfur + Puratized Agricultural, 341SC, Mike sulfur. (2) L.S. + PEPS. (3) Phygon

Order of Yield: (1) 341SC. (2) LS-PEPS.

(3) Mike S. (4) Phygon. (5) Mike sulfur - Puratized in 2 sprays.

Order of Preference: (1) Phygon. (2) 341SC. (3) Mike S + Puratized (4) Mike sulfur. (5) LS-PEPS.

Order of Scab Control (concentrates 8X): (1) sulfur-Phygon ferbam 3.5-1/2-3/4-100; (2) sulfur-Phygon 3.5-1/4-100; (3) Dry LS to bloom 8-100, then ferbam 3/4-100; (4) sulfur-Phygon-ferbam-TMTD 3.5-1/8-1/4-1/4-100; (5) Phygon-ferbam 1/4-3/4-100; (6) Mag. 70 10-100; (7) Dynacide 1/2-100 to bloom then 341SC 1 1/2 qt.-100. Check 48 percent.

Order of Plant Safety (8X concentration): (1) sulfur-Phygon-ferbam-TMTD; (2) sulfur-Phygon-ferbam; (3) Phygon-ferbam; (4) LS to bloom then ferbam; (5) Mag 70; (6) sulfur-Phygon; (7) Dynacide to bloom then 341SC.

Massachusetts, E. F. Guba. Apple scab and foliage tolerance.

Scab control was satisfactory generally.

McIntosh and Rhode Island Greening -- The following combinations caused no injury. DDT-lead arsenate 2-2-100 plus: ferbam 1 1/2-100, Epsom Salts 20-100, NuGreen 5-100, borax 1-100.

Koppers flotation sulfur paste 12-100 plus: DDT-Lead Arsenate 2-2-100. Epsom Salts 20-100, NuGreen 5-100, Borax 1-100.

Northern Spy and Delicious -- The following combinations caused no injury: Ferbam 1 1/2-100 plus: LA-DDT 2-2-100, Niagara TEPP 1/3 pt.-100, Epsom salts 20-100, NuGreen 5-100, borax 1-100.

DDT-LA 2-2-100 plus: Flotation Sulfur Paste 12-100, TEPP 1/3 pt.-100, Epsom Salts 20-100, NuGreen 5-100, borax 1-100.

Michigan, A. E. Mitchell and W. Toenjes. Scab on Jonathan (mercury vs. sulfur)

Delayed dormant wettable sulfur 8-100, Dynacide 1/2-100 or wettable sulfur 8-100 in pink, late bloom, and first cover, followed by ferbam rest of season.

Scab on leaves and fruit was less than 1 percent with both treatments. Severe fruit russeting in Dynacide block was less than 1 percent, but in the sulfur block was 15 percent. (Small trees and 600 lbs. pressure; injury was aggravated by sulfur but not by mercury).

Michigan, A. F. Mitchell and W. Toenjes. Apple scab on Jonathan, Red Delicious, and McIntosh. 2x and 4x concentrates in speed sprayer.

Schedule: Delayed dormant LS 2-100. Pink Magnetic 70 sulfur 8-100. Late full bloom Dynacide + Magnetic 70 sulfur 1/2-4-100 (65 hours after start of rain). 2nd, 3rd and 4th covers ferbam 3/4-100 or Crag 341 1 1/2 pint-100.

Less than 1 percent scab on Jonathan and Red Delicious leaves and fruit.

Order of Scab Control (McIntosh fruit): ferbam covers (16 percent scab) Crag 341 (22 percent). Trees omitting late full bloom, receiving ferbam covers with Dynacide-Mag 70 Paste in 2nd cover 1/2-4-100, 54 percent scab.

Order of Scab Control (Red Delicious): Wettable sulfur 8-100 pre-bloom, calyx and 1st cover (52 percent scab). Wettable sulfur 8-100 prepink - Dynacide 1/2-100 pink, calyx, 1st cover (19 percent scab). Both received ferbam in remaining covers.

Missouri, H. G. Swartwout. Apple scab eradication on Rome Beauty. No fungicides until 2nd cover spray then 2 sprays June 5 and 18. Considerable leaf scab and moderate fruit scab was present

Order of Scab Control: (1) Puratized Agricultural Spray 1 pint alone and with ferbam 3/4 lbs. (both highly effective; little difference between them). (2) Puratized Agricultural spray 1 pint + wettable sulfur 3 pounds (reduced effectiveness of Puratized). (3) Sulfur-ferbam mixture.

"Injury was light, consisting only of a yellowing and falling of a few of the more heavily scabbed leaves."

Missouri, H. G. Swartwout. Spray russet on Jonathan and Golden Delicious.

EPN and both powder and liquid parathion greatly increase russet on Golden Delicious over a sulfur ferbam/lead arsenate mixture. There was no great difference between materials on Jonathan.

New Hampshire, M. C. Richards, R. Eggert, and O. R. Murphy. Apple scab on McIntosh.

Order of Scab Control: (1) Phygon XL 1/2-100; (2) Kolospray 100, 3 1/2-100; (3) Kolofog 100, 3 1/2-100; (4) Puratized Agricultural Spray 1 pt.-100; (5) Dynacide 1/2-100; (6) Kolospray 6-100.

No differences in injury or yield.

Order of Preference: (1) Phygon, (2) Kolofog 100, (3) Kolospray 100, (4) Puratized Agricultural, (5) Dynacide, (6) Kolospray.

New York, J. M. Hamilton and M. Szkolnik. Fungicide tests on apples and cherries in 1951. New York State Hort. Soc. Proc. 97: 69-80. 1952. Rome apple in greenhouse, Cortland in field.

Fungicides Applied Before Infection Periods.

A number of carbamate materials chemically related to Fermate were tested for protection against scab, both on potted Rome Beauty trees grown in the greenhouse and on

Cortland in the field. Six field applications were made, the last being June 26. The 10-day spray was put on six days after the petal fall spray, and the first cover after an infection period of 36 hours. Fermate 1 1/2-100, as in previous years, was definitely superior to Micronized sulfur 5-100. Manzate 1 1/2-100 gave indication of being more effective than Fermate but there was some injury to the fruit when used in a complete schedule. Since the material is light colored and tends to improve the color of the fruit, it is hoped that it can be used in the cover sprays. A tank mix of Dithane D-14 1 qt.-100 reacted with micronized ferric sulfate 1/2-100 was weak on scab control, but this may be due to formulation. Dithane D-14 1 1/2 pts.-100, ferric sulfate 3/8-100, and Micronized 3-100 gave good scab control without injury. Dithane D-14 used at higher concentrations but without the sulfur gave injury. Two Carbide and Carbon materials, 5400, related to Fermate, and 5379, related to Manzate and Dithane D-14, gave promising results at comparable concentrations but neither is as retentive as Fermate or Manzate. Product 5379 gives the poorer protection. Both materials need reformulating. As in the case of Fermate, all of these carbamates may be expected to give excellent control of the rust fungi.

Crag 341 1 qt.-100 gave scab control comparable to Fermate in 1951. OS-377C, a Shell Oil material, was found to be an interesting material, particularly in regard to improving the finish of fruit. Injury is a possible factor but reformulation may minimize this drawback. Orthocide 406 gave a good scab control in this not not too critical field test, although greenhouse tests showed that it has rather poor sticking properties.

An experiment comparing standard spraying with 8x concentrate on Cortland, Macoun and Delicious.

There is evidence, as might be expected, that better scab control can be obtained by hand spraying than by fixed outlet machinery. This shows up first at the interfaces of the trees. However, it is true that this varies with the material used. Tag 8x concentrate gave perfect scab control, whereas Fermate and Micronized gave 11 and 15 percent scab, respectively. Sulfur followed by Fermate in the cover sprays was a more effective spray schedule than sulfur throughout. Tag at 8x concentration severely russeted 30 percent of the Macoun and about 12 percent of the Cortland. Hand spraying caused 15 percent fruit russet on Macoun and light russet on Cortland. Fermate 8x concentration caused a black stippling on the Macoun. It was reported from New Jersey that Fermate caused enlarged lenticels and a roughened skin on McIntosh. Crag 341 1 qt.-100-8x, Orthocide 406 2-100, and Manzate 1 1/2-100 were put on as cover sprays, but about all that can be said is that the red mite infestation was probably less on the Crag 341 trees.

Cortland -- Order Disease Control (percent scab in parentheses): (1) Tag 1/2 pt. precover, Fermate 1 1/2-100 covers (T). (2) Tag 1/2 pt. precover, 406 2 lbs. covers, 8x (1 percent). Tag 1/2 pt. precover, Manzate 1 1/2 lbs. covers 8x (1 percent). (3) Fermate 1 1/2-100 (4 percent). (4) Micronized 5-100 precover, Fermate 1 1/2-100 covers 8x (9 percent); micronized 5-100 (10 percent); Fermate 1 1/2-100 8x (11 percent); Fermate 1 1/2-100 precover, 341 1 qt.-100 covers, 8x (12 percent); micronized sulfur 5-100 8x (15 percent).

Delicious -- Order Disease Control: (1) Tag-Fermate, Tag-Fermate 8x, Tag-406 8x, Tag-Manzate 8x (T); (2) Fermate (4 percent), Micronized (5 percent); (3) Micronized 8x, (8 percent); Micronized-Fermate 8x (8 percent); (4) Fermate 8x (12 percent).

McIntosh sprays after 24-44 hours infection periods. Order disease control (percent of scab): (1) Crag 341 1 pt. + Tag 1/4 pt. (4 percent). (2) Orthocide 406 2-100 (8 percent). (3) Manzate 1 1/2-100 (11 percent). (4) Phygon 1/2-100 (24 percent). (5) Fermate 1 1/2-100 (28 percent). (6) Unsprayed (98 percent).

After-infection sprays of 69-96 hours on McIntosh. Order of Disease Control (percent of scab): 96-78, 82 and 87 hours -- (1) Tag 1/2 pt.-100 (5 percent). (2) L.S. 2-100 (28 percent). (3) Micronized sulfur (74 percent). (4) unsprayed 100 percent. 96, 78, 78, and 69 hours -- (1) Tag (7 percent). (2) L.S. (59 percent). (3) Micronized sulfur (92 percent).

Golden Delicious. Order of plant safety, russet rating -- 10 = complete russet and one is none: (1) Orthocide 406 2-100, 2.3; (2) micronized sulfur 5-100, 4.5; (3) Tag 1/2 pt. Fermate 1 1/2-100, 6.8; (4) Fermate 1 1/2-100, 8.2.

Lead Arsenate 2-100 and DDT 75% 1.3-100 was added in 10-day and 3 covers.

B1956 2 oz. was added to Fermate and Dupont spreader sticker 2 oz. to micronized and Orthocide in last 2 covers.

Unsprayed potted Rome trees were set under Cortland trees that had been sprayed. After 2.14 inches of rain the trees were taken to greenhouse, inoculated and given infection period. Hydraulic sprays -- Order of disease control (scab lesions per leaf on heaviest infected leaf per shoot): (1) fermate 1 1/2-100, 0; (2) micronized sulfur 5-100, 7; (3) Tag 1/2 pint-100, 49. Concentrate sprays -- (1) Fermate, 0; (2) Micronized sulfur, 5; (3) Tag 1/2 pt., 48; (4) unsprayed 97.

New York, D. H. Palmiter. Apple scab on McIntosh.

Schedule: Delayed dormant April 18, prepink April 25, pink May 2, bloom May 9, calyx May 14, curculio May 21, special May 28, covers June 2, 8, 25.

Disease Control (1 percent fruit scab): Phygon-ferbam 1/2-100, 1 1/2-100 (0.16). Crag 341-lime 1 1/2-3-100 (0.17). Tag-ferbam 1/2 pt.-100, 1 1/2-100 (0.22). Flotation Sulfur 12-100, 10-100 (0.35). Flotation-ferbam 12-100, 1 1/2-100 (0.42). Ferbam 1 1/2-100 (0.55). Micronized sulfur 8-100, 5-100 (1.23). Micronized sulfur + lime 8-5-100, 5-3-100 (1.31).

Order Disease Control: (1) Phygon-ferbam, (2) 341, (3) Tag-ferbam, (4) flotation, (5) flotation-ferbam, (6) ferbam, (7) micronized sulfur, (8) micronized S + lime.

Order of Yield (3 years average): (1) micronized sulfur + lime, (2) flotation sulfur-ferbam, (3) Tag-ferbam, (4) micronized sulfur, (5) ferbam, (6) Phygon-ferbam, (7) Crag 341, (8) flotation sulfur.

Order of Preference: (1) Flotation sulfur-ferbam, (2) Tag-ferbam, (3) ferbam, (4) Phygon-ferbam, (5) micronized sulfur + lime, (6) micronized sulfur, (7) Crag 341 + lime, (8) flotation sulfur.

Schedule: Green tip April 17, delayed dormant April 24, prepink May 1, pink May 8, calyx May 18, curculio May 25, special June 4, covers June 13, 25, July 7, 18.

Leaf Scab Lesions/30 Terminals: (1) Phygon + ferbam 1/4-3/4-100 (0.5). (2) Orthocide 406 2-100, 2. Manzate 1 1/2-100, 3.3. (3) Sulfur-ferbam 4-3/4-100, 20.8. (4) Ferbam 1 1/2-100, 90. (5) Micronized sulfur 8-100, 102.

Percent of Fruit Scab: (1) Manzate 1 1/2-100, t; 406, t; Phygon ferbam, t; Puratized + ferbam, t. (2) Sulfur + ferbam, 1.0. (3) Micronized sulfur, 2.7; ferbam, 2.7.

Order of Disease Control: (1) Phygon-ferbam, Puratized-ferbam. (2) 406. (3) Manzate. (4) Sulfur + ferbam. (5) Ferbam. (6) Micronized sulfur.

Order of Preference: (1) Phygon + ferbam, Puratized-ferbam. (2) 406. (3) Ferbam. (4) Sulfur-ferbam. (5) Micronized sulfur. (6) Manzate, ferbam, in cover sprays after Manzate, Phygon ferbam and Puratized ferbam.

North Carolina. H. C. Fink and C. N. Clayton. Apple scab and fruit finish on Red Delicious, Golden Delicious, Stayman, Rome Beauty.

Order of Disease Control:

Red Delicious -- no fruit scab with 341, sulfur-BM, Phygon-ferbam, or 406. Checks 7 percent.

Golden Delicious -- (1) no scab with 341, sulfur-bordeaux, Phygon-ferbam or 406; (2) 1 percent with Phygon-ferbam.

Stayman -- (1) 406 (none) (2) sulfur-bordeaux (1 percent) (3) 341, Phygon-ferbam (2 percent) (4) check (6 percent) Rome Beauty (1) sulfur-bordeaux, Phygon-ferbam, 406 (1 percent).

Order of Plant Safety (russet):

Red Delicious -- (1) none on 341, sulfur-bordeaux, 406. (2) Phygon-ferbam (spotting)

Golden Delicious -- (1) 406 (very light). (2) 341, Phygon-ferbam, (light). (3) Sulfur-bordeaux (very bad).

Stayman -- (1) 341, 406 (light). (2) Sulfur-bordeaux, Phygon-ferbam, (bad).

Rome -- (1) 341, sulfur-bordeaux, 406 (none). (2) Phygon-ferbam (light).

Order of Plant Safety (color):

Golden Delicious -- (1) 406 (excellent). (2) 341, Phygon-ferbam, (good). (3) Sulfur-bordeaux (poor).

Stayman -- (1) 406 (excellent). (2) 341, sulfur-bordeaux (good). (3) Phygon-ferbam (poor).

North Carolina, H. C. Fink and C. N. Clayton. Scab, leaf spot, and russet on Delicious.

Order of Disease Control -- leaf scab (percent): (1) Phygon-ferbam (1 percent). (2) SEM, 406, (2 percent). (3) 341, (6 percent). Fruit scab (percent): (1) 406 (0.5 percent); Phygon-ferbam (0.6 percent); 341 (0.7 percent); sulfur-bordeaux (1.2 percent).

Order of Plant Safety (russet -- 0 = none, 5 = severe): (1) 341 (0.2), 406 (0.2), sulfur-bordeaux (0.5). (2) Phygon-ferbam (4.2)

Crag 341-lime 1 1/2 qt.-1/2-100. Nine sprays with parathion 1-100 in five. Lime sulfur 1 1/2 prepink, 2-100 pink; flotation paste 12-100 calyx and 1st cover; bordeaux 2-4 in 2nd cover, 3-6 in 3rd cover, 4-8 in last 3 covers. Parathion 1-100 in five sprays. Phygon XL-sticker 3/4 lbs.-2 oz.-100 in four sprays, ferbam 1 1/2-100 [?] sprays. Lead arsenate in five sprays. Orthocide 406 2-100 nine sprays, EPN 3/4-100 in five sprays.

Order of leaf spot: (1) 341, (1). Phygon-ferbam (1). (2) Sulfur-bordeaux (2). (3) 406 (6). Check (9)

Ohio, H. F. Winter. Apple scab on McIntosh, Cortland, Red Delicious and Rome.

Order Disease Control (percent scab) B & E Orchard:

McIntosh -- (1) Puratized Agricultural Spray 1 pint, 1.6. (2) Crag 341 3 pt., lime 1/2 lb., 11.2. (3) M. sulfur 5 lbs., 49.2. (4) Check 100.

Table 1. Apple scab tests, Ohio, 1951. Concentrate versus dilute, Apple Creek orchard.

Materials in 100 gallons	Gallons per tree	Percent scab	
		Red Delicious	Rome
M. Sulfur 6 lbs. (1X)	18	0.5	12.0
M. Sulfur 30 lbs. (5X)	3 1/2	1.8	6.6
M. Sulfur 48 lbs. (8X)	1 3/4	1.0	12.0
Flot. Sulfur 12 lbs. prebloom, Tag 1/2 pt. petal fall and 1st. cover, M. Sulfur 5 lbs. remainder (1X)	18	0.0	1.5
Flot. Sulfur 96 lbs. prebloom, Tag 4 pts. petal fall and 1st. cover, M. Sulfur 40 lbs. remainder (8X)	1 3/4	1.4	3.1
Crag 341 3 pts., lime 1/2 lb. (1X)	18	0.4	0.5
Crag 341 24 pts., lime 4 lbs. (8X)	1 3/4	1.0	3.3
Orthocide 406 2 lbs. prebloom, M. sulfur 5 lbs. remainder of season (1X)	18	0.0	0.7
Orthocide 406 16 lbs. prebloom, M. sulfur 40 lbs. remainder of season	1 3/4	0.6	0.0
MnEBD 1 1/2 lbs. (1X)	18	0.0	0.0
MnEBD 12 lbs. (8X)	1 3/4	0.8	0.5

Cortland -- (1) Puratized 0.3, 341 1.4. (2) M. sulfur 11.7, Check 100.

Rome -- (1) Mn EBD 1 1/2 lbs. 4.3. (2) Fermate 1 1/2 lbs. peps 1/2 lb., 11.1; Fermate 1 1/2 lbs. 12.1; M. sulfur 6 5 lbs., peps 1/2 lb., 12.0. (3) M. sulfur 6 5 lbs. 33.1. (4) Check 100.

Apple Creek Orchard (See Table 1)

Red Delicious -- (1) Orthocide 406 2 lbs. pre-bloom, M. sulfur 5 lbs. in remainder, MnEBD, 0.0; Crag 341 3 pt. lime 1/2 lb., 0.4; M. sulfur 5 lbs., 0.5.

Rome -- (1) MnEBD 0.0; Crag 341 3 pt. + lime 1/2 lb., 0.5; Orthocide 406 prebloom, M. sulfur post bloom, 0.7. (2) M. sulfur bloom 5 lbs. 12.0.

Pennsylvania, F. H. Lewis, Apple scab and mites on Stayman, Black Twig. (See Table 2). Applications April 24, 30, May 14, 21, June 1, summer sprays June 15, 29, July 9, 21.

Dilute sprays: Through 1st cover, Mag. 70S, 8-100 prepink, ferbam sulfur 1-4-100 through 1st scab. Summer sprays with ferbam DDT 1-2 gave 2.67 percent fruit scab on Stayman, 1 percent fruit scab on Black Twig; with phenophthiazene lead arsenate mixture (du Pont), 5-100 (ferbam, DDT Aramite 1-2-2-100 in 5th cover) gave 1.33 percent fruit scab on Stayman, 1 percent fruit scab on Black Twig.

Concentrate spray (3X): Order of scab control (average percent of fruit scab on Stayman and Black Twig October 1) -- (1) Puratized Agricultural Spray 1 pt.-100 through 1st cover, 341SC-DDT 1 1/2 qt.-2-100 summer (2.9 percent); Puratized Agricultural Spray 1 pt.-100 through 1st cover, phenophthiazene-lead (du Pont)-DDT 5-2-400 in summer (ferbam-DDT. Aramite 5th cover) (3.2 percent); Puratized 1 pt.-100 through 1st cover, Orthocide-DDT 2-2-100 summer (3.5 percent) (See Table 2)

Plots were 3 rows wide and 5 or 6 trees long. Sprays applied with Speed Sprayer 35,000 cubic feet of air per minute, 2 1/4 miles per hour, and 3 1/2 to 4 gallons of spray per tree for concentrate (varied some with different sprays) and 13 gallons for dilute.

Dormant spray, March 21 -- Concentrate on Plots 1, 2, 3, 4, 5, 6, 7, 9, 11, 12, 13, 15, and 16, using DN 1 1/2 quarts plus oil, 3 gallons. No dormant on 8, 10, and 14.

Delayed-dormant, April 16 -- Plots 1 and 2 dilute, Bordeaux mixture 2-2-100 plus oil 1 gallon. Plots 3, 4, 5, 6, 7, 9, 11, 12, 13, 15, and 16, Bordeaux 3-3-100 concentrate plus oil 3 gallons. Plots 8, 10, 14, concentrate Mag-70, 24 pounds.

Where BHC is listed, it was used in pre-

Table 2. Apple scab tests in Pennsylvania, 1951

Stake No.	Treatment through first cover, April 24, 30, May 14, 21, June 1.	Treatment in summer June 15, 29, July 9, 21	Fruit scab July 19-20[a]	Scab on Stayman, Oct. 1	Scab on Black Twig, Oct. 1	Mites per leaf, July
			%	%	%	
1.	Dilute Fermate-Sulfur	Dilute Fermate-DDT	0.75	2.67	1.0	37.20
2.	Dilute Fermate-Sulfur	Dilute Pheno-lead	1.00	1.33	1.0	4.56
		All other plots concentrate -- usually 3X				
3.	Fermate-Sulfur	Fermate - DDT	5.00	8.33	13.0	35.68
4.	Fermate-Sulfur	*Pheno - lead	6.25	7.0	8.0	13.68
5.	Mercury	Fermate - DDT	11.75	5.0	14.0	35.84
6.	Mercury	*Pheno - lead	4.25	10.0	10.67	8.00
7.	Mercury	341SC - DDT	0.50	3.5	2.33	21.75
8.	Mercury - BHC - Parathion	*Pheno - lead	3.50	3.0	3.33	0.64
9.	Mercury	Orthocide - DDT	8.75	3.0	4.0	32.56
10.	Mercury - BHC - Aramite	*Pheno - lead	5.00	7.33	8.0	0.56
11.	Phygon	Fermate - DDT	13.50	11.67	26.0	47.12
12.	Phygon	*Pheno - lead	13.50	2.67	17.67	16.08
13.	Phygon	341SC - DDT	28.30	16.67	56.5	52.64
14.	Phygon - BHC - Parathion	*Pheno - lead	41.25	42.3	54.33	2.00
15.	341SC	341SC - DDT	52.80	38.3	60.33	32.24
16.	341SC	*Pheno - Lead	42.30	31.3	43.33	30.80

[a] Later found to be counts on mixed Stayman and Black Twig.
* (2nd, 3rd, 4th covers).

pink only at 6 lbs. concentrate. Where parathion or Aramite is listed, they were used in petal-fall and 1st cover in concentrate at 6 pounds Aramite, or 1 1/2 pounds parathion.

Lead arsenate on all plots in petal-fall and 1st cover, and in 2nd cover on DDT plots, used at 3 pounds in petal-fall and 2nd cover and 4 pounds in 1st cover in dilute sprays, 3 times that amount in concentrate.

Russet (not bad year for this) Least to Most: Plots 15, 12, 4 and 16, 10, 5, 7, 2, 3, 9, 13, 1, on Red Delicious. On Stayman, Plots 16, 7, 12, 13, 8 and 6, 14, 5, 2 and 15, 4, 11, 9, 19, 1, 3.

Base Concentrations for Dilute Sprays -- Concentrates at 3 Times Amount Listed:

(1) Fermate-Sulfur: 8 lbs. Magnetic-70 alone in prepink followed by Fermate 1 lb. plus Mag-70, 4 lbs.
(2) Mercury: 1 pint Puratized Agricultural Spray.
(3) Phygon: 1/2 lb. Phygon XL.
(4) 341SC: 1 1/2 quarts.
(5) Fermate (no sulfur): 1 lb.
(6) Pheno-lead: 5 lbs. duPont's phenothiazine-lead arsenate mixture.
(7) DDT: 2 lbs.
(8) Orthocide: SR 406 - 2 lbs.

All pheno-lead plots received Fermate, DDT, and Aramite in 5th cover.

August 6, 6th cover, Plots 7 and 13: 341SC 4 1/2 quarts plus lime 3, plus parathion 3, plus Rhothane 3 qts. Plot 9: SR406 6 lbs. plus parathion 3, plus Rhothane 3 qts. Plots 1 and 2: Fermate 1 1/2, Parathion 1, Rhothane 1 qt. All other plots: Fermate 4 1/2, Parathion 3, Rhothane 3 qts.

Comments:

(1) This orchard had an unusually heavy carryover of the scab fungus.
(2) Half or more of the infections occurred during the June 9 to 14 period in the last half of the period between first and second cover. Thus, those treatments which were most effective as protectants or eradicants gave fair to good control.
(3) The results with Phygon bear out previous experience here that 1/2 lb. is not sufficient with our customary spray timing. Control has been excellent with 3/4 lb.
(4) Better scab control with dilute spray may have been due to the use of about 20 percent more chemicals per acre on those plots. The amount in all cases was relatively low.
(5) Work with antifoaming agents with Fermate and 341SC mixtures should result in better control.

Pennsylvania, H. W. Thurston, Apple scab, russet, yield, gloss on Stayman, Grimes, Starking

Stayman -- Order of Disease Control (percent of fruit scab): Phygon prebloom, Crag 341 post bloom (0.3 percent), Crag 341 all sprays (0.7), Tag prebloom, Crag 341 post bloom (0.8), Ferbam and Mag 70 sulfur 1.2, Mnbis (2.1)

Order of Plant Safety (percent russet): (1) Crag 341, (2) Ferbam + Mag 70, (3) Tag prebloom, Crag 341 post bloom (3.5), (4) Phygon prebloom, Crag 341 post bloom (5.8)

Order of Plant Safety (gloss index): (1) Tag Crag 341 (100), (2) Mnbis (98), (3) Crag 341 (95), (4) Phygon-Crag 341 (87), (5) ferbam-Mag 70 (85).

Order of Yield (bu./tree): (1) Crag 341 (18.5), (2) Tag-Crag 341 (14.9), Phygon-Crag 341 (14.5), (3) Mnbis (13.4), (4) ferbam-Mag 70 (5.7)

Order Disease Control 1x vs 8x:

Lime-sulfur-Mag 70 -- Stayman 1x (0.9), 8x (9.0). Grimes 1x (0.1), 8x (1.0). Starking 1x (2), 8x (15).

Tag-Crag -- Stayman 1x (3.0), 8x (18.0). Grimes 1x (0.3), 8x (5.2). Starking 1x (4), 8x (2.9).

Order of Russet 1 x vs. 4x:

Lime-sulfur-Mag 70 -- Stayman 1x (10), 4x (5). Grimes 1x (36), 4x (44). Starking 1x (38), 4x (12). Gloss, Starking 1x (88), 4x (90).

Tag-Crag -- Stayman 1x (2), 4x (2). Grimes 1x (20), 4x (23). Starking 1x (14), 4x (2). Gloss, Starking 1x (100), 4x (98).

Percent Scab 1x vs 4x: Lime-sulfur-Mag 70 1x (0.7), 4x (14.3); Tag-Crag 1x (10.9), 4x (10.9); Crag 341 1x (1.6), 4x (14.0); 406 1x (2.8).

Percent Russet 1x vs 4x: Lime-sulfur-Mag 70 1x (8.2), 4x (2.5); Tag-Crag 1x (2.0), 4x (1.4); Crag 1x (3.3), 4x (0.9); Orthocide 1x (1.2).

Virginia, A. B. Groves. Apple scab on Rome and York.

Order of Disease Control: (1) Carbon and Carbide 5379 2 lbs.; (2) Shell XP 50 48 fluid ounces, Puratized Agricultural Spray 1 pint; (3) Aaventa 20 oz.; (4) Orthocide 406 2 lbs.; (5) C. and C. 5400. 2 lbs.

Order of Plant Safety: (1) Orthocide 406; (2) Puratized Agricultural; (3) Aaventa; (4) C. and C. 5379; (5) C. and C. 5400; (6) Shell XP 50.

Order of Preference: (1) 406; (2) Puratized; (3) 5400; (4) XP50; (5) 5379; (6) Aaventa.

C. and C. 5379 and 5400 produced sulfur-like scald in hot weather.

Aaventa Mathieson (Dutch origin), present formulation not satisfactory. Shell XP 50 produced some spray pattern type of injury where droplets dried.

Wisconsin, J. D. Moore and G. W. Keitt. Apple scab on McIntosh.

Schedule: May 8, 17, 29; June 11, 26; July 6, 17.

"Data are not too accurate due to spotty crop and could not be analyzed statistically."

Order of Disease Control on Fruit: (1) Puratized Apple Spray 1/2 pint (2) ferbam 1-100 (2) (2.6 percent scab); L.S. 1-50 prebloom 1-60 post bloom (2.7 percent); LS 1-50, 1, Mike S 5-100 later (2.6 percent); LS 1-50, 1, 341SC 3 pts. after (3.1 percent); 341SC 3 pts. (3.4 percent); Tag 1/2 pt. (2) Ferbam (2) (3.3 percent); LS 1-50, 1, ferbam 1-100 later (4.2 percent). (2) LS 1-50, 1, 1-75 later (6.6 percent); LS 1-50, 1, ferbam 1/2 lb. + Mike S. 1/2 lb. later (9.7 percent); LS 1-50, 1, Microdritime S. 5 lbs. + Filmfast 1/2 lb. later (11 percent); Ferbam 1 1/2 lb., 1, 1 lb. later (13.7 percent). (3) Stanofide 1/2 pt. (26 percent)

Order of Disease Control on Leaves (n.s.d.): LS/microdritomic S (17 percent), LS 1-50/1-60 (17.2 percent) 341SC + lime (17.8 percent), LS 1-50/1/15 (18.3 percent), Puratized Fermate (20.3 percent), Tag 1 Tag-Fermate (22.7 percent), LS 1-50/Fer (23.8 percent), LS/341 SC (23.7 percent), Mag 70 + lime (30 percent), LS/Mike 3 (31.3 percent), Stanofide (35 percent), ferbam (39.7 percent), LS/Mike S + lime (41.8 percent).

Order of Safety to Leaves: (1) 341SC + lime (48.5), Tag/Fer (51.7), Fer (51.8) Puratized/Fermate (53.5), Mag 70 + lime (58.1). (2) LS/341SC, LS/Fer Mike S (98.5). (3) LS/microdritomic S + Filmfast (120.5), Stanofide (123.0). (4) LS 1-50/1-75 (148.6). (5) LS 1-50/1-60 (161.8).

British Columbia, M. F. Welsh and G. R. Thorpe, Apple scab on McIntosh and Delicious.

McIntosh protectants in prepink, pink, calyx, 2 covers. Eradicants immediately after infection periods (24 hours with over 70 percent relative humidity).

Order of Disease Control (summer fruit scab): (1) LS 1-50, ferbam-wettable sulfur 1-3-100, Crag 341C 1 qt. + lime 1/2 lb., Venturicide 3-100 followed by one cover Orthocide 406 2-100. (2) Orthorix 2 qt.-100 about 12 percent summer scab.

Order of Disease Control (pin-point scab): (1) ferbam + sulfur none. (2) 341C, Venturicide (trace). (3) LS, Orthorix.

Order of Plant Safety: (1) 341C, 406, ferbam/sulfur (100 percent scab). (2) LS, Orthorix.

Order of Preference (1) ferbam + sulfur. (2) 341C. (3) Venturicide. (4) LS. (5) Orthorix.

Orthorix not worth further trial (plant toxicity, cost). Venturicide, Lunevale Products, England, Leytosan Co., phenyl mercuric chloride. Eradicant plot received 2 after-infection sprays (pink and late calyx X) followed by Orthocide.

Mites per leaf, average of 3 counts, June 11, 25 and July 10: LS 0.66, ferbam-sulfur 8.73, Venturicide-Orthocide 23.40, Orthorix 0.96, Crag 341C 9.97. (DDT and mite sprays omitted until mid-July), unsprayed check 10.84.

Third year of yield comparison on LS and ferbam-sulfur (4th year of spraying) LS 9.0 boxes per tree, ferbam-sulfur 15.2 boxes. Three-year average, LS 15.3, ferbam 19.5 boxes.

Delicious, same schedule as McIntosh.

Order of Disease Control (percent of summer scab): (1) LS, ferbam-sulfur, 341C, Orthorix (all approximately 7 percent scab). (2) Orthorix (13 percent)

Order of Disease Control (pin point scab): (1) ferbam-sulfur. (2) 341C, Venturicide. (3) LS, Orthorix.

Order of Preference: (1) ferbam-sulfur. (2) 341C. (3) Venturicide. (4) LS. (5) Orthorix

Yield Results 1951: LS 5.6 boxes per tree, ferbam-sulfur 9.7 boxes. Three-year average, LS 10.6 boxes, ferbam-sulfur 13.5 boxes.

Nova Scotia, J. F. Hockey and R. G. Ross. Apple scab on Gravenstein, McIntosh

Schedule: 6 sprays, 1st bordeaux 5-10-100, 4 sprays of test materials, last spray bordeaux 3-10-100 (Imperial gallons).

Gravenstein

Order of Scab Control (percent fruit scab): Phygon 1-100 (0.8 percent), Phygon 1-100 (after rain) (1 percent), Crag 341C 1 qt.-100 (3.4 percent), SR 406 2-100 (4.7 percent), Mag 70 9-100 (5.6 percent), Crag 341 1 1/2 qt.-100 (8.2 percent)

Order of Plant Safety: (1) Crag 341, Mag 70; (2) 341C, 406; (3) Phygon 1-100 (protectant), Phygon 1-100 (after rain).

Order Over-all Preference: (1) 341C; (2) Mag 70, 406; (3) Crag 341; (4) Phygon protectant schedule and Phygon eradicant schedule.

"Phygon caused some russeting, both deep and net to the McIntosh fruit. It also caused a slight mottling to the foliage of both varieties."

McIntosh

Order of Scab Control (percent fruit scab): (1) Phygon (3 percent). (2) Crag 341C (6.6 percent). (3) Crag 341 (16.5 percent)

Order Plant Safety: (1) Crag 341. (2) Crag 341C. (3) Phygon.

Order of Preference: (1) Crag 341C. (2) Crag 341. (3) Phygon.

Ontario, G. C. Chamberlain, McIntosh, apple scab.

Schedule: delayed dormant-1, prepink, pink, calyx, three covers. (Imperial gallons). After-rain sprays prepink to calyx followed by ferbam covers.

Order of Scab Control (percent of fruit scab): (1) Dynacide 10 oz. -100 (1.09 percent). (2) Tag 1/2 pt. -100 (3.97 percent), manganese carbamate 2-100 (4.41 percent). (3) Orthocide 406 2-100 (6.51 percent). (4) Phygon-$MgSO_4$ 3/4-100 (13.3 percent). (5) Mag 70 sulfur control plot (45.26 percent).

Order of Plant Safety: (1) Man. carb., Tag, Dynacide, 406. (2) Phygon

Order of Preference: (1) Man. carb., Tag, Dynacide. (2) 406. (3) Phygon

Protectant schedule in complete schedule.

Order of Scab Control (percent of fruit scab): (1) Mag 70 sulfur 9-100, 7-100 covers (1.36 percent), Colsul colloidal sulfur 40% 2-100, Mag 70, 7-100 covers (3.46 percent), Orthocide 406, 2-100 (0.35 percent). (2) Crag C 1qt. -100 (2.81 percent), Crag SC 1 1/2 qt. -100 (6.15 percent). (3) Kolofog 100, 4 1/2-100 (11.39 percent). Check (100 percent)

Order of Plant Safety: (1) Mag 70, Colsul, 406, Crag 341SC. (2) Kolofog 100 (russet). (3) Crag 341C (serious russet).

Order of Preference: (1) Mag 70, Colsul, 406; (2) 341SC; (3) Kolofog 100; (4) 341C.

New Materials: Colsul colloidal sulfur 40%, Fruit Growers Chemical Ltd. Port Mapoa, New Zealand. Dynacide, 10% phenyl mercury acetate, O. E. Linek Co., Clifton, New Jersey. Manganese ethylene bis dithiocarbamate 75% active.

OTHER APPLE DISEASES

Indiana, J. R. Shay. Black pox (*Helminthosporium papulosum* Berg) on Gallia and Golden Delicious.

Gallia

Order of Disease Control: (1) Mn E Bis 2 lbs. 1st and 2nd cover, 1 1/2 lbs. 3rd and 5th (14.6 percent). (2) Dithane D14 1 1/2 qt., + $ZnSO_4$ 3/4 lb. 2nd cover, + 1/2 lb. $FeSO_4$ 3rd + 5th cover (30.4 percent). (3) 341 1 1/2 qt. 1st and 2nd cover, 1 qt. 3rd and 5th cover (67.8 percent). (4) Sulfur 8 lbs. 1st cover (May 24), 6 lbs. 2nd, 3rd and 5th covers (June 7, 19, July 25), (93.6 percent). No injury with four fungicides on Gallia.

Golden Delicious

Order of Disease Control: (1) Dithane (86.7 percent). (2) Mn E Bis (93 percent). (3) 341 (97.4 percent). (4) Sulfur (98.8 percent).

Order of Plant Safety (total percent russet): (1) Sulfur (71.4 percent). (2) Mn E Bis (99.7 percent). Dithane D-14 (99.1 percent). 341 (100 percent). Percentage of total in severe class: (1) sulfur 40.4, (2) MnBis (59.8), (3) Dithane (75.3), (4) 341 (86.1). "Poor test since fungicides were omitted in 4th cover on July 5. 341, Mn E Bis, and Dithane were mighty rough on Golden Delicious fruits"

Missouri, H. G. Swartwout. Fire blight on Jonathan and Golden Delicious.

Order of Blight Control: (1) bordeaux 1 1/2-3-100 (good control), (2) Dithane D14 2 1/2 qts. + zinc sulfate 1 pound + Triton B 1956 1 ounce (no better than fair control), (3) Dithane Z-78 + Triton B1956 1 ounce (fair).

"Untreated controls were heavily but not severely blighted."

Order of Plant Safety: (1) the Dithane materials caused little or no russet on Jonathan and Golden Delicious, (2) bordeaux caused moderate russeting on Jonathan and heavy russeting on Golden Delicious.

Missouri, H. G. Swartwout, sooty blotch and fly speck on Golden Delicious, 2nd through 6th cover

Order Disease Control (percentage U.S. No. 1 fruit 9/28): (1) ferbam + lead arsenate 1/4-1-100 (99.7 percent), lead arsenate-zinc-lime 3-1-1-100 (98.3 percent). (2) Ferbam 1-100 (79.5 percent). (3) Orthocide 406 1-100 (43.3 percent). (4) DN 111 1-100 (10.2 percent). (5) Nabam-$ZnSO_4$ 2 qt. -2/3-100 (6.6 percent), zinc-lime 1-1-100 (5.8 percent). (6) Phygon XL 602-100 (2.4 percent). Check 0.0 percent

No foliage injury.

(1) No fruit injury from 406, DN111, lead arsenate + Zn-lime or lead arsenate and ferbam, (2) some from ferbam, (3) considerable from Phygon and from nabam plus $ZnSO_4$.

Missouri, H. G. Swartwout, sooty blotch and fly speck on Rome apple.

Order of Disease Control (1 percent fruit free from sooty blotch and fly speck): (1) ferbam 1 1/2-100 4 covers (81.1 percent); (2) ferbam 1 1/2-100 3 covers (40.2 percent); (3) sulfur 6-100 and 4-100 4 covers (25.9 percent); (4) sulfur 6-100, 4-100 3 covers (16.3 percent); Check 13.0 percent.

No injury.

Missouri, H. G. Swartwout. Sooty blotch eradication on Golden Delicious, Red Delicious, Ben Davis.

DN111 1 1/2 lb. + Triton B1956 1/2 oz., and 1 oz.

Orthocide 406 1 1/2 lb. + Triton B1956 1/2 oz. and 1 oz.

Lead arsenate 1 1/2 lb. + ferbam 1/4 lb. + 1 oz. 1956.

Bordeaux 1 1/2-1 1/2-100 + 1 oz. 1956 alone and + DN111 1/4 lb. with 1 oz. B1956.

Sprays began when first spots or light film of blotch appeared; 3-4 sprays at 10-day intervals. All materials effective. More effective with 1 ounce B1956 than with 1/2 ounce; removed light film, ineffective after film of blotch darkened.

"Only bordeaux caused injury. Foliage injury from bordeaux. B1956 combination was severe on Golden Delicious and moderately heavy on several other varieties including Red Delicious, Jonathan, and Ben Davis. Injury was so great that the bordeaux sprays were discontinued after the second spray."

Missouri, H. G. Swartwout. Sooty blotch on Golden Delicious.

Early cover sprays of wettable sulfur much less effective than early cover sprays of ferbam (both where 3 and 4 cover sprays were used). Sulfur and ferbam were the only fungicides and parathion only insecticide. As in past several years lead arsenate in calyx and 1st two cover sprays delayed onset of blotch and checked late development. "It did not provide adequate protection to harvest where conditions were highly favorable for sooty blotch."

Order of Blotch Control (protective schedule): (1) lead arsenate 3 lbs. + 1-1-100 powdered zinc sulfate lime, lead arsenate 1-100 + ferbam 1/4 lb., (2) ferbam 1-100; (3) Orthocide 1 lb.; (4) DN111 1-100; (5) Phygon XL 602-100; (6) Dithane D14 3 pints plus 2/3 lb. powdered zinc sulfate; (7) ferbam Cuprocide, split schedule ferbam Cuprocide.

Lead arsenate combinations gave best control and least damage to finish. Orthocide shows most promise of the organics.

North Carolina, H. C. Fink and C. N. Clayton. Black rot, bitter rot, and fruit spot on Red Delicious, Golden Delicious, Stayman, Rome Beauty.

Order of Disease Control (black rot):

Red Delicious -- (1) Phygon-ferbam, 406; (2) sulfur-bordeaux (2 percent); (3) 341 (4 percent); check 1 percent.

Golden Delicious -- (1) 341 (5 percent), sulfur-bordeaux (5 percent), 406 (6 percent); (2) Phygon ferbam (10 percent).

Stayman -- (1) 406 (2 percent); (2) 341 (4 percent), sulfur-bordeaux (4 percent); (3) Phygon-ferbam (6 percent).

Rome -- (1) 406 (1 percent); (2) sulfur-bordeaux (3 percent), 341 (5 percent), Phygon-ferbam (5 percent)

Order of Disease Control (percent of black rot in drops):

Red Delicious -- (1) 40.6 (80 percent), sulfur-bordeaux (82 percent), Phygon-ferbam (84 percent), 341 (92 percent).

Golden Delicious -- (1) 406 (72 per cent); (2) sulfur-bordeaux (81 percent); (3) 341 (96 percent); (4) Phygon-Fermate (100 percent).

Stayman -- (1) Phygon-ferbam (65 percent); 341 (69 percent); (2) sulfur bordeaux (80 percent), 406 (55 percent); (2) 341 (67 percent); (3) Phygon-ferbam; (4) sulfur bordeaux (82 percent).

Order of Disease Control (bitter rot in drops):

Red Delicious -- (1) none in 406, and sulfur-bordeaux, Phygon (1), 342 (2). Check 0.

Golden Delicious -- (1) Phygon-ferbam (0). (2) 341 (3), 406 (4). (3) Sulfur-bordeaux (7).

Stayman -- (1) 406 (3), sulfur-bordeaux (3); (2) 341 (8); (3) Phygon-ferbam (13).

Rome -- (1) Phygon-ferbam (3), sulfur-bordeaux (4), 406 (4), 341 (6)

No Brooks fruit spot on any sprayed plots. Checks: Red Delicious (0), Golden Delicious (0), Stayman (57 percent), Rome Beauty (54 percent).

At harvest unsprayed Rome fruits 16 percent black pox. Almost none on sprayed fruits.

Black rot, bitter rot, russet on Golden Delicious.

Order of Disease Control, black rot: 406 (0.7), Tag-341 (1.3), Puratized, 406, Man. Carb. (1.7), dry lime sulfur, sulfur-ferbam, ferbam (2.2), Phygon-Cop-O-Zink, Phygon (3.3), Check 72.2.

Order of Disease Control, bitter rot: 406 (0), 406-Man. Carb. (0.2), dry lime sulfur, sulfur-ferbam, ferbam (0.3), Tag 341 (0.6), Phygon-Cop-O-Zink, Phygon (0.5), Check (92.7).

Schedules:

Tag 1/2 pt.-100, prepink and pink; 341-lime 1.5 qts. 5-100, calyx and 5 cover sprays.

Puratized Agricultural Spray 1 pt.-100 prepink and pink; 406 2-100 calyx; manganese ethylene bis dithiocarbamate 1 1/2-100, 5 covers.

Dry lime sulfur 15-10 prepink and pink; Mike sulfur ferbam 3-1-100 in calyx and 2 covers; ferbam 1 1/2-100 in 3 covers.

406 2-100 through pink.

North Carolina, H. C. Fink and C. N. Clayton. Blackrot, bitter rot, and russet on Golden Delicious.

Order of Disease Control, black rot: 406 (0.7), Tag-341 (1.3), Puratized-406-Man. Carb. (1.7), dry lime sulfur, sulfur-ferbam,

ferbam (2.2), Phygon-Cop-O-Zink, Phygon (3.3), Check 72.2.

Order of Disease Control, bitter rot; 406 (0), 406-Man.-carb. (0.2), dry lime sulfur, sulfur-ferbam, ferbam (0.3), Tag 341 (0.6), Phygon-Cop-O-Zink, Phygon (0.5), Check (92.7).

Schedules:

Tag 1/2 pt.-100, prepink and pink; 341-lime 1.5 qts. 5-100, calyx and 5 cover sprays.

Puratized Agricultural Spray 1 pt. 100, prepink and pink; 406 2-100, calyx; manganese ethylene bis dithiocarbamate 1 1/2-100, 5 covers.

Dry lime sulfur 15-100, prepink and pink; Mike sulfur-ferbam 3-1-100 in calyx and 2 covers; ferbam 1 1/2-100 in 3 covers.

406 2-100 throughout.

Phygon XL-sticker 3/4-202-100, prepink, pink, 1st cover; Cop-O-Zink-lime 2-2-100, calyx and 4 covers.

In all programs but dry lime sulfur thiophosphates used in 2 sprays, and lead arsenate in 4 dry lime sulfur plots and 8 lead arsenate sprays.

Order of Plant Safety:

Percent area with russet: (1) 406 (3 percent), Puratized-406-man. carb. (4 percent), Tag-341 (5 percent); (2) dry lime sulfur, sulfur-ferbam, ferbam (14 percent).

Color: (1) 406 (excellent); (2) Tag-341, Puratized-406-Man. carb. (good to excellent); (3) dry lime sulfur, sulfur-ferbam, ferbam (poor), Phygon-Cop-O-Zink, Phygon (poor).

North Carolina, J. F. Fulkerson and C. N. Clayton. Bitter rot and black rot on Grimes Golden, Stayman, Winesap, Golden Delicious, Delicious.

Order of Bitter Rot Control (percent of infected fruit):

Grimes Golden -- (1) Orthocide 406 2-100 1 percent, flotation sulfur paste 12-100 petal fall and 2 covers, bordeaux in last 5 covers 5 percent, check 16 percent.

Stayman -- 406 1 percent, bordeaux 1 percent, Check 2 percent.

Winesap -- 406 none, bordeaux none, check 2 percent.

Golden Delicious -- 406 none, bordeaux 1 percent, check 23 percent.

Red Delicious -- 406 1 percent, bordeaux 2 percent, check 2 percent.

Order of Black Rot Control (percent of fruit):

Grimes -- (1) 406 58 percent, (2) bordeaux 74 percent, check 73 percent.

Stayman -- Bordeaux 28 percent, 406 31 percent, check 39 percent.

Winesap -- 406 17 percent, bordeaux 17 percent, check 35 percent.

Golden Delicious -- Bordeaux 24 percent, 406 26 percent, check 38 percent.

Red Delicious -- (1) bordeaux 16 percent, (2) 406 20 percent, check 19 percent.

Necrotic spotting of leaves of Red Delicious in particular and of other varieties to a lesser extent occurred following one spray of 406.

North Carolina, C. N. Clayton and J. F. Fulkerson. Bitter rot, black rot, cracking on Golden Delicious, Stayman.

Order of Bitter Rot Control (percent of fruits):

Golden Delicious -- (1) Flotation sulfur paste 12-100 bordeaux 2-4, 3-4, 4-8 (0.6 percent); (2) Dithane D-14 + ferric sulfate 1 1/2 qt.-3/4-100 (1.8 percent); Orthocide 406 2-100 (1.7 percent) Phygon XL + U. S. Rubber Fung. Sticker 1-1/4-100 (1.6 percent); (3) ferbam 1 3/4-100 (2.1 percent); (4) Crag 341 + lime 1 1/2 qt.-1/2-100 (3.5 percent); (5) Manganese ethylene bis dithiocarbamate 1 1/2-100 (4.4 percent).

Stayman -- (1) Phygon (0.6 percent); (2) bordeaux (1.5 percent); ferbam (1.4 percent); (3) Dithane + Fe (2.4 percent); (4) 406 (3 percent), Mn. bis (3.7 percent); (5) 341 (5.5 percent).

Order of Black Rot Control (percent of fruit):

Golden Delicious -- (1) 406 17.6, Phygon 18.4, Mn. bis 19.2, 341 19.7, bordeaux 20.0, ferbam 20.3. (2) Dithane-Fe 32.7. Check 40.

Stayman -- (1) Bordeaux 24.8. (2) 406 31.1. (3) Dithane-Fe 35.6, Phygon 30.5, M-bis 40.2. (3) Ferbam 44.5, 341 47.3. Check 48.2.

Order of Cracking (Stayman): (1) 406 (16.7), bordeaux (17.1); (2) 341 (32.5) M-bis (35.7), ferbam (35.8), Phygon (37.8), Dithane (38.6).

Order of Plant Safety (russet on Golden Delicious): (1, very slight) 406, M-bis, Phygon (spotting, delay in ripening), check. (2, slight) ferbam (conspicuous lenticels). (3, moderate) Bordeaux, 341. (4, severe) Dithane-Fe (conspicuous lenticels).

Oregon, J. R. Kienholz, *Gloesporium perennans* fruit rot on Newtown and Spitzenberg. Schedule July 25, September 18.

Disease Control: Newtown data not yet available for disease control. On Spitzenberg: (1) Phygon 3/4-100, 50 percent reduction of rot (2). OS-377B 2 qts.-100 poor control.

Order Plant Safety: (1) ziram 1 1/2-100, Orthocide 406 2-100, OS-377B 2 qts.-100 (all safe); (2) copper dimethyl dithiocarbamate safe on Spitzenberg but caused red spots on Newtown. Phygon 3/4-100 safe on Spitzenberg but caused black spotting on Newtown.

Washington, R. Sprague, Powdery mildew on Jonathan and Black Jen.

Schedule: pink calyx, 1 to 4 covers 2-week intervals.

Order of Mildew Control: (1) Lime sulfur 2 1/2-100 pink, 2-100 calyx; (2) 3579 2-100 3-6 sprays; (3) Niagara polysulfide (1.2 lbs. = 1 gal. liquid); (4) wettable sulfur 3-100 3 sprays; (5) Manganese carbamate 2-100 4 sprays; (6) Vancide 51 4-100, 5 sprays.

Recommended schedule, lime sulfur 2 1/2-100 dilute or up to 4x with 20 percent less acre dosage for the pink, lime sulfur 2-100 calyx, wettable sulfur 3-100 14-17 days after calyx. Niagara polysulfide may be substituted for 1st 2 sprays, 3-100 in pink, 2 1/2-100 in calyx. When available will recommend 5379 at 1st and 2nd cover. Sulfur in 2nd cover is risky. 5379 also looks good on pear and cherry but less so against peach mildew.

PEAR DISEASES

Washington, R. Sprague. Fire blight on Bartlett pear.

Sprays: (1) 60 percent open April 18, (2) May 2, (3) May 18, (14) June 11.

Dusts: (1) April 21, (2) May 4, (3) June 18.

Treatments on single rows of 7-12 trees, alternate rows were checks. On August 16 all check rows contained 1 to 5 blighted branches. Only basic $CuSO_4$ 2-100 showed single blighted branch. The following materials were also used: bordeaux 1/2-1/2-100, monohydrated 20% copper-lime dust 60-80 lbs. per acre, 5379 2-100, Cop-O-Zink 2-100, Parzate 1 1/2-100, Tersan 1 1/2-100 (3 sprays), Tag 1/2 pint-100 (3 sprays). Yields were compared with checks on each side. Bordeaux 1/2-1/2-100 did not depress yield very much in 1951 but some other copper sprays seemed to be more depressing on yield. The basic $CuSO_4$ caused some leaf injury also.

The copper dust did not appreciably depress yield. Trees with Parzate yielded slightly more than adjoining checks. 5379 and Tag caused most of fruit to drop while Tag caused a permanent brown discoloration and stunting of the leaves. Both materials were applied during freezing weather which probably accounts for the unusual injury, at least with 5379. "Tag XX is known to be sometimes injurious to pears but is also said to have bactericidal value."

Parzate, bordeaux, and copper dust are worth further consideration. Dust is easily applied and is not expensive. It also tends to check pear mildew. Parzate does not check mildew but there is no appreciable danger of injury as there always is with coppers in the Wenatchee area. Parzate could probably be applied by plane.

Washington, R. Sprague, fire blight on Bartlett pear.

Schedule: blossom time, 2 and 4 weeks later.

Order of Disease Control: (1) Nabam 1 1/2-100, bordeaux 1/2-1/2-100, 20-80 copper lime dust 60 lbs./acre. (2) Cop-O-Zink 2-100. (3) Tersan 1 1/2-100, 5379 1 1/2-100. (4) Basic copper sulfate 2-100, Tag 1/2 pint-100.

Order of Plant Safety: (1) Nabam; (2) bordeaux, copper-lime dust; (3) basic copper sulfate; (4) Tersan; (5) Cop-O-Zink; (6) 5379; (7) Tag.

Order of Yield: (1) Nabam; (2) bordeaux; (3) copper dust; (4) Tersan; (5) basic $CuSO_4$; (6) Cop-O-Zink; (7) Tag; (8) 5379.

5379 was applied when trees were covered with a heavy frost (about 20° F. April 19). No injury has been noted before or since on apples, pears, peaches or cherries. Tag also caused fruit drop. Cop-O-Zink caused slight to moderate russeting at 2-100. Tersan 1 1/2-100 caused no apparent injury (75% active).

Iowa, O. F. Hobart and W. F. Buchholtz. Fabraea leaf spot on pear seedlings. Seven sprays June 12-August 31, 10-day intervals.

Order of Disease Control (percent of diseased leaves): (1) bordeaux 8-8-100 (15.6), tri-basic copper 4-100 (16.5). (2) Phygon XL 2-100 29.7, Puratized Agricultural spray 1 pt.-100 (32.6). (3) Orthocide 406 2-100 (48.5). (4) 341C 1 quart-100 (57.3), 341SC 1 1/2 qt.-100 (58.6), Dithane D-14 2 qt.-100 (58.3), ferbam 1 1/2-100 (60.1). (5) Sulfur-on 4-100 (67.9). (6) Dry lime sulfur 6-100 (97.8). Check 99.5 percent.

PEACH DISEASES

Washington, R. Sprague "Improved" Elberta peach, powdery mildew.

Order of Disease Control: (1) Magnetic 70 paste sulfur 4-100; (2) Kolofog 100 3 1/2-100; (3) Vancide 51 + Multifilm 4-302-100; (4) 4279 2-100; (5) 5400-100; (6) ferbam 1 1/2-100.

Order of Plant Safety: (1) Mag 70, ferbam; (2) 5379, Kolofog 100; (3) 5400; (6) Vancide 51.

Order of Preference: (1) Mag 70; (2) Kolofog 100; (3) 5379; (4) 5400; (5) ferbam; (6) Vancide 51 (shot hole).

Vancide 51 (R. T. Vanderbilt Co.) caused shotholing when used with 302 of Multifilm. Should be tried without Multifilm; suspect the oil caused the shotholing. Materials not worth further trial, 5379 and 3400.

North Carolina, C. N. Clayton, Elberta peach, bacterial spot, brown rot.

Order of Disease Control (percent bacterial spot): Cop-O-Zink (1), zinc + lime + sulfur (16), Vancide + Kolofog (16), 406 (20), sulfur (31), lime + sulfur (65), MgO + sulfur (87).

Order of Index of Severity of Bacterial Spot: (1) zinc + lime + sulfur (2), Cop-O-Zink + lime (2), 406 (6). (2) Sulfur (11). (3) Lime + sulfur (20). (4) MgO + sulfur (30). L.S.D. .05 = 5, .01 = 8.

Order of Brown Rot Control (percent of brown rotted fruit (harvest)): 406 (17), Cop-O-Zink + lime (26), lime + sulfur (33), zinc + lime + sulfur (36), MgO + lime (36), sulfur (41), Vancide + Kolofog (48).

Materials: 12 sprays except sulfur 6 sprays --

406 2-100

$ZnSO_4$ (36% Zn) + hydrated lime + wettable sulfur 4-4-4-100

Hydrated lime + wettable sulfur 25-4-100

Magnesite (MgO) + wettable sulfur 12 1/2-4-100 ($MgSO_4$ + lime + wettable sulfur 4-4-100 used in 1st spray).

Vancide 51 + Kolofog 1 pt.-6-100 (2 pt.-6-100 in last 3 sprays)

Wettable sulfur 6-100 only in 6 regular sprays.

Parathion 1 1/2-100 included in all treatments in 4 sprays.

Bacterial spot was relatively less severe than usual in 1951 owing to the drought of April, May, and June. Bacterial spot on foliage was not affected by sprays. More bacterial spot occurred with high dosages of lime or Magnesite. These were not finely ground, and may have caused minute injuries in which bacterial infections occurred.

Brown rot was very severe before end of harvest. Blossom blight (0.1 percent) was present on all trees. Drought held rot in check until near harvest. 406 was most effective, Cop-O-Zink and lime + sulfur next.

Cop-O-Zink caused some shotholing of leaves, purpling of dorsal leaf surface, and about 1 percent defoliation by early May, which intensified later. By early July 10 to 20 percent defoliation, rest of leaves badly shotholed. Foliage in late August was slightly yellower than with other treatments. No injury with other treatments. Fruits showed excessive residues with lime sulfur, very attractive finish with 406; Cop-O-Zink fruits showed a yellow color.

South Carolina, H. H. Foster, J. H. Hale variety, brown rot.

Order of Disease Control: (1) wettable sulfur 6 lbs. (4.7 percent rot), Orthocide 2 lbs. (5.0), duPont's manganese ethylene bis dithiocarbamate (5.6); (2) wettable sulfur 4 lbs. (11.4), Rohm & Haas Dithane D-14 1 1/2 qts. + ferric sulfate 6/10 lb. (15.8), General Chemical 1189 (50% wettable) 3 lbs. (16.1); (3) Rohm & Haas CR2379 2 lbs. (44.7); (4) dispersible sulfur (50% wettable) 3 lbs. (68.5), H.T.H. calcium hypochlorite (70%) 1/2 lb. (82.6), Parathion 1 1/2 lbs. (60.6).

Order of Plant Safety: (1) wettable sulfur 4 lbs., 6 lbs., dispersible sulfur, 1189, 406 (none); (2) 2379 (slight), hypochlorite (slight); (3) manganese (moderate bronzing); (4) Dithane (moderate to severe).

Fungicides not worthy of further trial: dispersible sulfur at the rate used, 1189, CR2379, Dithane and ferric sulfate, calcium hypochlorate.

Parathion used with all fungicides except 1189. In last 2 sprays wettable sulfur substituted for 1189. Dithane ferric sulfate plots received wettable sulfur 6 lbs. in last 2 sprays owing to dark off-color of peaches.

Peaches sprayed with 406 usually showed better color than fruits sprayed with wettable sulfur.

Missouri, H. G. Swartwout, Carman, Belle varieties, brown rot.

Microfine wettable sulfur parathion used in 2 schedules (1) all season beginning with bloom spray and continuing until 2 weeks before harvest (August 13). (2) Same schedule except pre-harvest sprays beginning one month before picking were omitted. Last spray was July 13.

Both programs gave better than 99 percent control. Because of dry weather during bloom blossom blight was negligible. Unsprayed checks showed 9.8 percent and 14.9 percent brown rot for Carman and 18.9 percent and 31.9 percent for Belle. Unsprayed trees were moderately damaged by insects. No cat-facing, curculio or fruit moth in sprayed fruit.

Missouri, H. G. Swartwout, peach scab on Carman, Belle.

Lead arsenate 1 1/2-100 with zinc lime gave excellent control of peach scab. Control was better than with microfine sulfur 2-100. However, the lead arsenate/zinc-lime caused considerable foliage and fruit injury.

DDT, BHC, methoxychlor and parathion are not effective against peach scab.

It is evident that lead/zinc-lime sprays were a factor in scab control. Since the organic insecticides are ineffective more attention to fungicides for scab control will be required.

California, E. E. Wilson and W. H. English, Royal Apricot brown rot (*Monilinia laxa*)

Order of Disease Control (number of

blight blossom clusters per 50 branches): (1) Phygon XL 3/4-100 (3), Dithane D14 2 qt. + ferric sulfate 12 oz.-100 gal., home-made ferric dimethyl dithiocarbamate (3). (2) Bordeaux 10-10-100 (6), Tag 1/2 pint-100 (6), Orthocide 406 2-100 (6), Carbon and Carbide 640 1 1/2-100 (8). (3) Puratized Agricultural Spray 1 pint-100 (14), ferbam 2-100 (16). (4) 341C 2 pints + 1/2 lb. lime (24). (5) Check (34).

Sprays: (1) red bud, (2) 20-40 percent blossoms open February 22-23, March 10.

CHERRY DISEASES

Missouri, H. G. Swartwout, leaf spot on sour cherries.

Order of Leaf Spot Control: (1) bordeaux 2-3-100 in first spray, 3-4-100 in second, gave longest protection. (2) Cycloheximide (Actidione), best protection for 1st 2 months after last spray, then leaf spot developed rapidly causing defoliation in a few weeks. (3) Ferbam 1 1/2-100 + yellow cuprous oxide 4 ounces, third in duration of protection. (4) Ferbam 1 1/2-100 + copper ammonium silicate 3/4 lb. and ferbam 1 1/2-100 alone, good protection for the shortest period.

Order of Mildew Control: (1, no mildew) ferbam/yellow cuprous oxide, Actidione, bordeaux; (2, light) ferbam/copper ammonium silicate; (3, considerable) ferbam.

Order of Plant Safety: (1) ferbam (no injury); (2) ferbam/copper ammonium silicate (very light); (3) ferbam/yellow cuprous oxide (slight browning on underside of leaves -- light injury), Actidione (some injury -- a chlorosis and slight hardening of leaves); (4) bordeaux (5 percent of leaves yellowed and fell from copper injury and a high percentage of remaining leaves showed considerable discolored areas on the underside).

Wisconsin, J. D. Moore and G. W. Keitt. Montmorency cherry, leaf spot.

Order of Leaf Defoliation August 29-September 1:

(1) Dithane D-14 1 quart + $ZnSO_4$ 1/2 lb. 1, 2, 2A, 3 (23), Dithane D14 1qt. + $Fe_2(SO_4)_3$ 1/2 lb., 1, 2, 2A, 3 (31).

(2) Bordeaux 6-8-100 1 ferbam 2, 2A, 3, (45), COCS/lime 1 1/2 3-100 1, 2, 2A, 3 (52), ferbam 1 1/2-100 1, 2, 2A, 3 (52), 341SC 1 qt. + lime 1/2 lb., 1, 2, 2A, 3 (54).

(3) Cop-O-Zink/lime 3-3-100 + Orthex 1 pt. 1, 2, 2A, 3 (73), bordeaux 6-9-100 1 341B 2, 2A, 3 (80), bordeaux 6-8-100 1 bordeaux 3-4-100 2 Ferbam 1 1/2 lb. 2A, 3. (81), Tenn. 34/lime 3-3-100 + Orthex 1 pt. 1, 2, 2A, 3 (86), bordeaux 6-8-100 1 Tenn 34/lime 3-3-100 + Orthex 1 pt. 2, 2A, 3 (92), 341B 1 1/2-100 1, 2, 2A, 3 (114) bordeaux 6-8-100, 3-4-100 2, 2A, 3 (100), bordeaux 6-8-100 1, 2, 3 (112).

Order of Leaf Spot Control:

(1) Bordeaux 6-8, 1, 3-4, 2, 2A, 3 (15), bordeaux-Tenn. 34 (35).

(2) Dithane + Zn (46).

(3) Tenn. 34 (51), Cop-O-Zink (86).

(6) Bordeaux 6-8, 1, Ferbam 2, 2A, 3 (109), Dithane + Fe. (111).

(7) COCS. (132).

(8) Ferbam (131), 341SC (163).

(9) Bordeaux 6-8, 1, 341B 2, 2A (181).

(10) 341B (185).

Order of Weight 100 Fruits:

(1) ferbam (421), Dithane + Zn (417), Tenn. 34 (416), 341B (408), COCS (406), Cop-O-Zink (404), 341SC (407).

(2) Dithane + Fe (392), bordeaux 6-8 1 341B 2, 2A 3 (381), bordeaux 6-8, 1, 2, 3, (377), bordeaux 6-8, 1, ferbam 2, 2A, 3 (371), bordeaux 6-8, 1, Tenn. 34 1, 2, 2A, 3 (371).

(3) Bordeaux 6-8, 1, 2, ferbam 2A, 3, (365), bordeaux 6-8, 1, bordeaux 3-4, 2, 2A, 3, (358).

Order of Sugar Content (Brix at harvest):

(1) Bordeaux 6-8, 1, 3-4, 2, 2A, 3 (13.75).

(2) Bordeaux 6-8, 1, 2, 3 (12.83), Dithane + Zn (12.96), bordeaux 6-8 1, Tenn. 34 2, 3 (12.79), Tenn. 34, 1, 2, 2A, 3 (12.88), 341B (12.50), COCS (12.42), Dithane + Fe (12.67), Cop-O-Zink (12.54).

(3) Bordeaux 6-8, 1, ferbam, 2, 2A, 3 (12.29), ferbam 1, 2, 2A, 3 (12.29), ferbam 1, 2, 2A, 3 (12.29), 341SC (12.15), bordeaux 6-8, 1, 341B 2, 2A, 3 (11.92).

Best leaf spot control was on trees receiving only copper and poorest on those receiving only an organic fungicide. Mixed programs of copper and organic fungicide gave intermediate control except 10 Dithane + zinc sulfate which gave very good control and practically no spray injury at the time of after-harvest counts. A moderately heavy loss of leaves occurred about 10 days later. Because of spray injury bordeaux-sprayed trees had about as much defoliation as 341B that gave the poorest leaf spot control. Dithane/zinc was a better fungicide than Dithane/$FeSO_4$. Fermate was poorer yet. The most spray injury was on copper plots with more injury with bordeaux than with "insoluble" copper. In 1951 the best control with least injury was with Dithane plus zinc sulfate.

Can corrosion studies of 1951 will not be available until 1953. Results of cans placed at 70° F. in 1951 are not yet available. Most cans stored at 100° F. in 1951 had failed by 427 days after canning, time varied with sprays used. "Data are by no means conclusive, but present indications are that the 'can life' of fruits sprayed with a dithiocarbamate was shortened by 2 to 5 months of $100^{o}F$."

Data on frozen cherries are not conclusive. Until 1950 sugar was added. In 1950 half of cans received sugar. In 1951 no sugar was added. Results are not yet available.

Studies of effects of defoliation on winter hardiness have been inconclusive, in spite of striking differences in defoliation in 1950 preceding the extremely cold winter of 1950-51.

New York. J. M. Hamilton and M. Szkolnik. Dry stem (arsenical injury) on English Morello.

Micronized sulfur 6-100 + lead arsenate lime 1-1-100 applied to all trees at petal fall. Five sprays of materials listed were made.

Order of Plant Safety (percent of dry stem July 24): (1) unsprayed, 1 percent; Fermate 1 1/2-100 + Marlate 3-100, 1 percent; Orthocide 406 2-100 + Marlate 3-100, 1 percent. (2) Coposil 3-5 + lead arsenate 1-100, lead omitted in 1st 2, or 5 sprays, 2 of sulfur 7-100 and 3 of Coposil 3-5-100, 5 percent. (3) Fermate, lead arsenate, lime 1 1/2-1-100, 16 percent. (4) Crag 341B 2 lbs. + lead arsenate 1 lb. + lime 1 lb., 23 percent; COCS 2-4-100 + lead arsenate 1-100 22 percent. (5) Fermate lead arsenate 1 1/2-1-1-100, 29 percent.

Order of Plant Safety (percent of dry stem August 9): (1) Unsprayed 5 percent; Fermate + Marlate 6 percent; 406 + Marlate 6 percent. (2) Coposil 16 percent. (3) Fermate-lead arsenate-lime 34 percent. (4) Fermate-lead arsenate 46 percent. (5) COCS-lead arsenate 54 percent; 341B-lead-lime 56 percent.

GRAPE DISEASES

Missouri, H. G. Swartwout. Black rot on Concord Grape, 5 sprays from shoots 2 inches long to two weeks after bloom.

Order of Black Rot Control (1 percent infected fruit): Ferbam 1 1/2-100 + DDT (1.6), Ferbam 1 1/2-100 + lead arsenate (2.6), Orthocide 406 2-100 (3.0). Checks (52.1) and (57.3). No injury occurred.

Missouri, H. G. Swartwout. Black rot and downy mildew on grape.

Order of Black Rot Control: (1) ferbam 1 1/2 lb.; (2) Orthocide 406 2 lbs. (a little less effective). Neither caused any injury but Orthocide was more effective against downy mildew.

Order of Downy Mildew Control (protective schedule): (1) ferbam 1 1/2 lbs. + yellow cuprous oxide 44 ounces and 6 ounces; (2) ferbam 1 1/2 lbs. + copper ammonium silicate 3/4 lb.; (3) Orthocide 406 (good control during spraying period but shorter residual protection than bordeaux); (4) ferbam 1 1/2 lbs.

Order of Plant Safety: (1) ferbam, Orthocide; (2) copper ammonium silicate (no injury on Concord and Fredonia); (3) ferbam, yellow Cuprocide (slight injury to Concord, none to Fredonia, serious to Catawba).

Order of Downy Mildew Control (eradicative program): (1) Orthocide 2-100; (2) bordeaux 3-3-100 (some injury); (3) ferbam 1 1/2 Coposil 8 oz. (less effective but less injury); (4) ferbam 1 1/2 lbs. yellow Cuprocide 402 (less effective but less injury); (5) ferbam 1 1/2-100 + copper sulfate 6 oz. (not effective in severe mildew, good control when mildew was moderately light).

Most fungicides were used with and without Triton B1956. It had questionable value.

New York, A. J. Braun. Downy mildew on Catawba grape.

Order of Disease Control: (1) bordeaux 16-16-100 (4x concentrate), 0.1 percent; 4-4-100, 0.1 percent. (2) Ferbam 6-100, 4.3 percent. (3) Check 18.6 percent.

Order of Plant Safety: (1) ferbam, (2) bordeaux concentrate, (3) bordeaux.

Order of Preference: (1) bordeaux concentrate, (2) bordeaux, (3) ferbam.

COCS (6% Cu) with and without lime, wet and dry, showed trace of mildew, no differences; 2-80 copper-lime 6%, wet and dry, also no differences. Check 7.3 percent mildew.

Results are not in accord with previous years.

Results with concentrates are very encouraging. Ferbam shows more promise for downy mildew than previously thought, , could be used in pre-bloom sprays on varieties subject to both black rot and downy mildew, with a fungicide more effective against mildew in post bloom sprays.

Ontario, G. C. Chamberlain, Fredonia grape, downy mildew.

Schedule: Pre-bloom, fruit set, and 2 weeks later (Imperial gallons).

Order of Disease Control (percent of infected clusters): (1) Bordeaux 5-5-100, .85 percent; bordeaux 7 1/2-10-100, .92 percent; bordeaux 3 3/4-3 3/4-10, 1.02 percent Orthocide 406 2-100, 0.77 percent; bordeaux (fruit-set spray omitted), 1.06 percent; bordeaux cover omitted, 0.68 percent. (2) Robertson's fungicide *(73% Cu) 1-100, 6.61 percent. (3) bordeaux (pre-bloom omitted), 11.83 percent. Check 17.5 percent infected clusters. No injury occurred.

Order of Preference: (1) Bordeaux 5-5-100, 7 1/2-10-100, 3 3/4-3 3/4-100 bordeaux

Table 3. Order of anthracnose control, lesions per cane. Ohio experiments. Counts made July 20.

Delayed dormant	Prebloom	Post bloom	Lesions per cane
Lime-sulfur 8-100	--	--	24.6
Lime-sulfur 8-100	Ferbam 2-100	--	7.4
Lime-sulfur 8-100	Ferbam 2-100	Ferbam 2-100	1.6
Lime-sulfur 8-100	--	Ferbam 2-100	9.2
--	Ferbam 2-100	Ferbam 2-100	13.0
Lime-sulfur 8-100	MnEBD 2-100	(MnEBD 2-100 ?)	2.9
Lime-sulfur 8-100	Ferbam-Phygon 1-1 1/2-100	Ferbam-Phygon	2.3
Lime-sulfur 8-100	Orthocide 406 2-100	406 2-100	2.1
Lime-sulfur 8-100	Crag 341 1 1/2 qt.-100	341 1 1/2 qt.-100	11.8
--	--	--	79.3
		LSD .05	8.0
		.01	10.7

fruit-set omitted, bordeaux 2-weeks omitted, Orthocide. (2) Robertson's. (3) Bordeaux prebloom omitted.

Downy mildew of fruit clusters moderate.

* Robertson's fungicide 19% cuprous oxide, 73% metallic copper, H. H. Robertson, Pittsburgh, Pa.

STRAWBERRY DISEASES

Illinois, D. Powell. *Botrytis cinerea* on Blakemore and Robinson strawberry varieties.

Schedule: April 23, first appearance of bloom, May 15, full bloom.

Order of Disease Control on Blakemore (percent of berries with rot): (1) ferbam 2-100, 10.0 percent; (2) bordeaux 4-6-100 23.6 percent; check 23.7 percent.

Order Disease Control on Robinson: (1) ferbam 2-100, 4.8 percent; (2) Orthocide 406 2-100, 6.6 percent; (3) bordeaux 4-6-100, 14.6 percent; check 11.6 percent.

Missouri, H. G. Swartwout, leaf spot and leaf scorch on strawberry.

Order of Disease Control: (1) Actidione 5 p.p.m., 10 p.p.m., 20 p.p.m., Dithane D-14 2 quarts plus zinc sulfate 1 lb.; (2) Orthocide 406 2-100 (most attractive berries); (3) bordeaux 6-6-100, Phygon XL 3/4-100 (poorest but better than check).

Order of Plant Safety: (1) 406, Dithane (no injury); (2) Actidione (trace to light injury according to concentration); (3) bordeaux (light to moderate injury); (4) Phygon (moderately heavy injury, enough to make it an undesirable material to use).

RASPBERRY ANTHRACNOSE

Ohio. H. F. Winter. Anthracnose of raspberry (see Table 3).

AVOCADO

California, G. A. Zentmyer and W. A. Thorn, Fuerte Fruit rot on Avocado (*Botryosphaeria ribis* (*Dothiorella*)). Fruit picked and disease reading made in January 1952.

Order of Disease Control: (1) Yellow Cuprocide 2 lbs. (10 lbs./acre). (2) Bordeaux 4-4-100 (40 lbs. $CuSO_4$/acre). (3) Crag Fungicide 658 2 lbs. (10 lbs./acre). (4) Parzate 2 lbs. (10 lbs./acre), Orthocide 406 2 lbs. (10 lbs./acre)

No difference in safety or yield. Bordeaux residue objectionable.

Order of Preference: (1) Cuprocide, (2) 658, (3) bordeaux

CITRUS FRUITS

Florida, R. F. Suit. Melanose on Marsh grapefruit. 1 spray April 5, 1951.

Order of Disease Control (percent of No. 1 fruit): (1) Tribasic copper sulfate 1 1/2-100, 88.2 percent. (2) bordeaux 3-3-100, 86.5 percent. (3) Tribasic copper + PEPS 1 1/2 pt.-100, 84.6 percent. (4) Tribasic copper 1 1/2-100, 82 percent. (5) Tribasic copper 1-100, 81.1 percent. (6) Orthocide 406, 4-100, 73.1 percent, 2-100, 73.4 percent.

No difference in safety or yield.

California, L. J. Klotz, T. A. deWolfe, E. C. Calavan, J. R. Sufficool, and J. T. Middleton. Phytophthora brown rot on lemon.

Order of Disease Control: (1) Orthocide 406-4 lbs. (2) Crag 640 2 lbs. (3) bordeaux (homemade) 3-3. (4) Orthocide 406 2 lbs. + Z-1 spreader 1/4 lb. (5) $ZnSO_4$ Tag + $CuSO_4$ 5 ag. + $Ca(OH)_2$ 2-2-2. (6) duPont Copper A + $Ca(OH)_2$ + duPont Spreader Sticker 1 1/2-3-1/2. (7) COCS (Code R 72 Niagara) + Zn spreader 2-1/2. (8) Orthocide 406 2 lbs. (9) Zinc 20% copper 4% Fungorex + Citra Flo oil + S20 spreader (Leffingwell Co.) 8-1 qt. -3/8. (10) Crag 169 2 lbs. (11) Copper A + duPont Spreader Sticker 1 1/2-1/8. (12) Dithane D14 + $Fe_2(SO_4)_3$ 3/4 gal. -3/4-1 qt. (13) Orthocide 406 1 lb. (14) Crag 658 2 lbs. (15) $ZnSO_4$ $CuSO_4$ $Ca(OH)_2$ 5-1-4. (16) Zinc Coposil (19 percent Cu, 19 percent Zn) Cal Spray. (17) Bordeaux 101. (18) Dithane D-14 + $Fe_2(SO_4)_3$ + $ZnSO_4$ 7 ag. (19) AlCuFe Fungorex + oil + spreader 1/2 gal. -1/2-1/2. (20) Dithane D-14 + $Fe_2(SO_4)_3$ 9 ag. + $ZnSO_4$ 7 ag. 1 gal. -1-1.

Order Plant Safety (leaves): (1) 406-4, 406 + 21 2 1/2, 406-2, 406-1. (2) Crag 169 (3) Fungorex-Citra Flo oil 3/4 gal. -3/4-1 qt. zinc copper lime 5-1-4. (4) Zinc-copper-lime. (5) Crag 640, Copper A-lime-sticker, Crag 658. (6) Bordeaux. (7) Copper-A-Sticker. (8) Dithane D-14 + Fe-Zn.

Over all Preference: (1) 406-4. (2) Crag 640. (3) 406 + spreader. (4) Zinc copper lime. (5) 406-2. (6) Copper A-lime-sticker, COCS-21, 406-1. (7) Fungorex Citra Flo, Crag 169, Crag 658. (8) Bordeaux. (9) Dithane D-14, Fe Zn sticker. (10) Copper A-spreader sticker.

California, E. C. Calavan, J. R. Sufficool Botrytis blossom blight of lemon. (1) spray during bloom April 20.

Order of Disease Control: (1) Dithane D-14 + $Fe_2(SO_4)_3$ 6 H_2O + duPont Spreader Sticker 1 1 gal. -1-3/8. (2) AlCuFe Fungorex* + oil + Leffingwell S-20 spreader 6-1 1/2 pts. -5/16, bordeaux + duPont spreader sticker 3-3-3/16. (3) Crag 658 + duPont spreader sticker 2-3/16.

Order of Plant Safety: (1) 658, (2) Fungorex, (3) bordeaux, (4) Dithane D-14 + Fe.

Order of Preference: (1) Dithane D-14 + Fe, (2) 658, (3) Fungorex, (4) bordeaux.

*AlCuFe Fungorex contains 6% copper (composed of hydroxides of aluminum, copper and iron).

NUT TREES

Georgia, J. R. Cole. Scab on Schley pecans. Seven sprays of regular schedule, dilute and mist concentration 5x.

Order of Disease Control: (1) Bordeaux 6-2-100 dilute. (2) Zineb-summer oil emulsion 2-1 qt. -100 dilute, ziram-oil 2-1 qt. -100, Orthocide 4-100. (3) Tag 1 pt. -100. Puratized Agricultural 1 pt. -100, Puratized Apple 1 pt. -100 (4) poor, ziram 10-100 (mist concentrate), Vancide 51 2-100 (dilute).

Order of Plant Safety: (1) Zineb, ziram dilute, and concentrate Vancide 51, Orthocide. (2) Tag, Puratized Agricultural, Puratized Apple.

Order of Yield: (1) Bordeaux. (2) Zineb, ziram/dilute, Orthocide 406. (3) Not suitable, Tag, Puratized Agricultural, Puratized Apple.

Not recommended: Ziram (conc.) Vancide 51, Orthocide

Oregon, P. W. Miller. Walnut bacterial blight on Franquette var. Persian Walnut. Schedule: (1) yearly prebloom, (2) late prebloom, (3) early post bloom.

Order of Disease Control: (1) Bordeaux 12-6-100 (semi 3x concentration); (2) bordeaux 4-2-100; (3) yellow Cuprocide 1-100; (4) yellow Cuprocide 3-100 (3x); (5) Crag 531*-2-100; (6) Manzate* 2-100.

Order of Plant Safety: (1) Manzate, (2) 531, (3) Cuprocide 1x, (4) Cuprocide 3x, (5) bordeaux 1x, (6) bordeaux 3x.

Order of Overall Preference: (1) Cuprocide (3x), (2) Cuprocide (1x), (3) bordeaux (3x), (4) bordeaux (1x), (5) 531, (6) Manzate.

*Crag 531 = Cadmium-zinc-copper calcium chromate. Manzate = Manganese ethyl bisdithiocarbamate.

Correction: In the report by P. W. Miller on walnut bacteriosis, Yellow Cuprocide (Rohm & Haas) and Copper Compound A (duPont) should have been listed by the writer as new fungicides under category 1 of the mimeographed summary sheet, not under category 3 of materials not worth further trial. The last line "which are not worth further trial" should be marked out on your 1950 summary -- (W. D. Mills).

SOIL TREATMENTS - 1951

Contributors Reporting

State	Contributor	Location of tests
California	M. W. Allen D. J. Raski	Berkeley
Colorado	N. R. Gerhold W. J. Henderson	Conejos Co., Brush Conejos Co., Greeley
	W. D. Thomas G. H. Lane	Greeley, Rocky Ford
	James Twomey C. E. Seliskar	Brush Greeley
Delaware	H. W. Crittenden	Bethel
Florida	Fred Clark George Swank, Jr.	Gainesville Sanford
Maryland	J. N. Sasser B. F. Lownsbery	Beltsville Beltsville
Massachusetts	Ralph W. Ames E. C. Gasiorkiewicz W. L. Doran	Waltham Waltham Amherst
South Carolina	T. W. Graham	Florence
Tennessee	J. O. Andes	Knoxville
Virginia	R. S. Mullin	Norfolk
Washington	Roderick Sprague	Wenatchee

LIST OF MATERIALS TESTED

Material	Active ingredient	Source
Agrox	phenyl mercury urea (4% mercury)	Chipman Chemical Co.
Arasan	50% TMTD	E.I. duPont de Nemours & Co.
CBP-55	chlorobromopropene	Shell Chemical Corp.
Ceresan M	7.7% ethyl mercury p-toluene sulfonanilide	E. I. duPont de Nemours & Co. Semesan Div.
Cold Smoke	1% nicotine, 5.6% barium	Cold Smoke Products Co.
Crag 658	copper zinc chromate	Carbide & Carbon Chemical Corp.
Crag 341	2-heptadecyl glyoxalidine acetate	Carbide & Carbon Chemical Corp.
Crag 5379	1, 2, 3-trithia-5, 8-diazocyclononi-4, 9-dithione 75%	Carbide & Carbon Chemical Corp.
D-D	dichloropropene-dichloropropane	Shell Chemical Corp.
Dow 9B	50% zinc 2, 4, 5-trichlorophenate	The Dow Chemical Co.
Dowfume MC-2	98% methyl bromide, 2% chloropicrin	The Dow Chemical Co.
Dowfume W-40	41% ethylene dibromide	The Dow Chemical Co.
DN-111	20% dinitro-o-cyclohexylphenol, dicylohexylamine salt	The Dow Chemical Co.

Material	Active ingredient	Source
Dithane Z-78	65% zineb	Rohm and Haas Co.
Dithane D-14	19% nabam	Rohm and Haas Co.
F-531	thiocarbamate	E.I. duPont de Nemours & Co.
Goodrite ZAC	thiocarbamate	B.F. Goodrich Chemical Co.
Iscobrome D	32% ethylene dibromide	Innis, Speiden & Co.
Mathieson 275	25% pentachloronitrobenzene	Mathieson Chemical Corp.
Natriphene	sodium 2-hydroxydiphenyl	Natriphene Co.
Orthocide 406	50% N-trichloromethylthio tetrahydrophthalimide	California Spray Chemical Corp.
OS-1199	18% technical dibromobutene	Shell Chemical Corp.
OS-1199(Powder)	25% technical dibromobutene	Shell Chemical Corp.
Oxy-Quin	8-hydroxy-quinoline benzoate	Wilson Chemical
Permacide	pentachlorophenol	Miller Products Co.
P-162	chlorinated hydrocarbon	Julius Hyman Co.
Phygon XL	50% 2, 3-dichloro-1, 4-naphthoquinone	U.S. Rubber Co.
Parzate	65% zineb	E.I. duPont de Nemours & Co.
Spergon	96% tetra chloro para benzoquinone	U.S. Rubber Co.
Systox (E-1059)	organic phosphate	Geary Chemical Corp.
Vancide 51	30% sodium salts dimethyl dithiocarbamic acid & 2-mercaptobenzothiozole	R.T. Vanderbilt Co.
XP-47	dibromobutene	Shell Chemical Corp.
Zerlate	76% ziram	E.I. duPont de Nemours & Co.
1182	4-chloro-3, 5-dimethylphenoxyethanol	Carbide & Carbon Chemical Corp.
1207	2-norcamphanemethanol	Carbide & Carbon Chemical Corp.

NEMATODE CONTROL

At Berkeley, California, M. W. Allen and D. J. Raski applied fumigants 8 inches deep to sandy loam infested with Pratylenchus sp. Treatments were made April 17, 1951 and tuberous begonias planted in May. Soil temperature at time of treatment was 56° F. and no surface seal was used except for dragging the surface. Control was based on tuber weights and number of nematodes per gram of root. Treatments listed in order of efficacy are: (1) CBP-55, 40 gal. /A. (2) CBP-55, 20 gal. /A. (3) D-D, 40 gal. /A. (4) D-D, 60 gal. /A. (5) CBP-55, 60 gal. /A.

In a second similar experiment the same investigators applied fumigants 8 inches deep with a chisel type applicator to loam infested with the strawberry root lesion nematode, Pratylenchus sp. Treatments were made in January 1951 and strawberry plants set in February. Soil temperature at time of treatment was 50° F. and the soil surface was dragged. Control of the lesion nematode was determined by counts of live nematodes in soil and number nematodes per gram of root. Treatments listed in order of control are: (1) D-D, 80 gal. /A. (2) CBP-55, 30 gal. /A. (3) D-D, 40 gal. /A. (4) D-D 20 gal. /A. Highest yields were obtained from CBP-55, 30 gal. /A. with D-D, 80 gal. /A. second.

In tests at Bethel, Delaware, H. W. Crittenden applied chemicals 6 inches deep with hand applicators to sandy loam field plots of 12 by 50 feet. Treatments were made September 22, 1950 and pepper plants (California Wonder) set May 10, 1951. Soil temperature was above 60° F. at time of treatment. No surface seal was used. Treatments listed in order of efficacy are: (1) D-D, 27 gal. /A. (2) Iscobrome D, 36 gal. /A. (3) D-D, 20 gal. /A. (4) Iscobrome D, 26 gal. /A. (5) D-D, 14 gal. /A. (6) Iscobrome D, 16 gal. /A. All treatments were significant at 5% level for root knot nematode control but no treatments were significant as regards yields.

In a second similar experiment, tomato plants (Rutgers) were set as indicator plants in treated field plots. Treatments listed in order of efficacy are: (1) D-D, 27 gal. /A. (2) Iscobrome D, 36 gal. /A. (3) Iscobrome D, 26 gal. /A. (4) D-D, 20 gal. /A. (5) D-D, 14 gal. /A. (6) Iscobrome D, 16 gal. /A. Use of D-D at 20 gal. /A. resulted in highest yields with Iscobrome D, 26 gal. /A, resulting in the lowest yields, exclusive of check plots.

In tests at Gainesville, Florida, Fred Clark applied ethylene dibromide at 7-8 gal. /A. and D-D at 10 gal. /A. 8 inches deep to field and plant beds of Norfolk fine loam for control of root-knot nematodes. CBP-55 at 1 gal. /sq. yd. was applied as emulsion. No data are given on control except that CBP-55 "looks promising as herbicide."

In tests at Beltsville, Maryland, J. N. Sasser applied Systox (E-1059) to 5-inch pots of root-knot infested soil. Three hundred ml. of 0.05 to 0.5% mixtures were applied one week before planting cucumbers. Root systems were examined 31 days after seeding. Root knot was controlled at the 0.1% level. Higher concentrations were phytotoxic. Laboratory studies indicated that control was due to inhibition of hatching of larvae from egg masses and death to larvae after exposure for several days. Nematodes were not killed by feeding on plants which had absorbed chemical from treated sterile soil.

In other tests at Beltsville, Maryland, B. F. Lownsbery treated 6-inch pots of sandy clay containing a mixture of Rhabditis, Criconemoides, Tylenchorhynchus, Helicotylenchus, Pratylenchus, Tylenchus, Mononchus, Aleimus, and Dorylaimus. Three replications of each of the following treatments were made January 23, 1951: OS-1199, 100, 200, and 500 lbs./A.; paraformaldehyde, 500, 1000, 2000 lbs./A.; Mathieson 275, 500, 1000, 2000 lbs./A.; and "Cold Smoke", 500, 1000, 2000 lbs./A. Numbers of living nematodes were counted five weeks after treatment by screening nematodes from 250 cc of soil and counting nematodes in a given aliquot. Only OS-1199 was nematocidal.

In tests at Florence, South Carolina, T. W. Graham treated outside tobacco plant beds on October 13-16, 1950, to control root-knot nematodes and weeds. Tobacco plants were planted in April and May, 1951. Chemicals listed in order of efficacy against root knot nematodes are: (1) Methyl bromide, 1 lb./100 sq. ft. beneath Sisalkraft paper. (2) Uramon-Cyanamid, 1 lb. and 1/2 lb./sq. yd. (3) Allyl alcohol and sodium azide, 6 qt. and 6 lb./100 sq. yd., CBP-55, 10 qt. /100 sq. yd. (4) Cyanamide, 100 lbs./100 sq. yd. Highest yields were obtained from the Uramon-Cyanamid and allyl alcohol-sodium azide treatments. Weed control was best on plots treated with Uramon-Cyanamide and CBP-55.

In tests at Norfolk, Virginia, R. S. Mullin conducted two experiments to control root-knot nematodes on sweetpotatoes. In the first experiment, D-D at 2.6 ml./sq. ft. and Dowfume W-85 at 2.6 ml./sq. ft. were injected 6-8 inches deep with hand injectors. Control of cracking of sweetpotato and yields were about equal for the two treatments. In the second experiment, Dowfume W-40 was applied with a power injector at 15-20 gal./A in April and sweetpotatoes planted in May with "no apparent control of cracking."

CONTROL OF FUNGI

In tests in Conejos County, Colorado, N. R. Gerhold and W. J. Henderson applied chemicals at time of seeding green pod peas to control Fusarium sp. Chemicals were mixed dry with sand and applied with seed sowed 3 inches deep in fields infested with Fusarium sp. Seeds were planted June 1, 1951 and stands determined on August 10. Listed in order of efficacy, treatments are: (1) Dow 9B, 4 lb./A. (2) Phygon XL, 2 lb./A., Dithane Z-78, 2 lb./A., Orthocide 406, 4 lbs./A. (3) Arasan, 3 lbs./A., Ceresan M, 1 lb./A., tribasic copper sulfate, 4 lb./A., tribasic copper sulfate, 8 lb./A. Order of yields were: (1) Dow 9B (2) Orthocide 406, (3) Phygon XL, Dithane Z-78, (4) tribasic copper sulfate, 3 lb., Ceresan M, Arasan, (5) tribasic copper sulfate, 8 lb.

In tests conducted at Greeley and Rocky Ford, Colorado, W. D. Thomas, Jr. and G. H. Lane applied chemicals to onion fields to control Fusarium bulb rot on Sweet Spanish onions. All chemicals were applied at time of planting except CBP-55 and Dowfume MC-2 which were applied two weeks before planting. Treatments listed in order of control are: (1) Ceresan M, 2 lb./A. (2) Orthocide 406, 4 lb./A., Goodrite Zac, 4 lb./A. (3) Dowfume W-40, 25 gal./A. (4) Parzate, 4 lb./A. (5) Zerlate, 4 lb./A., Dithane Z-78, 4 lb./A., Arasan, 4 lb./A., CBP-55, 25 lb./A. (6) Phygon XL, 4 lb./A., Dowfume MC-2, 25 lb./A. Treatments with Ceresan M and Dowfume W-40 resulted in the highest yields, with Dowfume MC-2 and CBP-55 in the lowest yields.

In tests conducted at Rocky Ford, Colorado, the same investigators applied chemicals at time of planting, except for CBP-55, to fields to control pink root of onion. Treatments listed in order of disease control are: (1) Dowfume W-40, 25 gal./A., Orthocide 406, 4 lb./A. (2) Goodrite Zac, 4 lb./A. Parzate, 4 lb./A., Dithane Z-78, 4 lb./A. (3) Phygon XL, 4 lbs./A., Arasan, 3 lb./A. (4) CBP-55, 25 lb./A. (5) Ceresan M, 2 lb./A. Highest yields were obtained from treatments with Dithane Z-78, Parzate, and Goodrite Zac. Lowest yields resulted from CBP-55 treatment.

In tests conducted at Brush, Colorado, N. R. Gerhold and J. Twomey applied chemicals to fields at time of seeding sugar beets for control of Fusarium seedling blight. Listed in order of disease control, treatments are: (1) Arasan, 4 lb./A. (2) Dow DHA, 4 lb./A. (3) Dithane Z-78, 4 lb./A. (4) Cadminate, 4 lb./A. (5) Orthocide 406, 4 lb./A. (6) Ceresan M, 1 lb./A. (7) Crag 658, 4 lbs./A. (8) Phygon XL, 2 lb./A. (9) Yellow Cuprocide, 4 lb./A. (10) Spergon, 4 lb./A. (11) Parzate, 4 lb./A. (12) Dow 9B, 4 lb./A. Highest yields were obtained from treatments with Dithane Z-78 and lowest yields from Spergon, with Dow 9B and Arasan next lowest.

In tests at Greeley, Colorado, C. E. Seliskar and W. J. Henderson applied chemicals with Pinto Bean seed to control Rhizoctonia solani. The soil was a sandy loam of 68° F. at time of treatment. Treatments listed in order of efficacy are: (1) Dithane Z-78, 4 lb./A., Agrox, 1 lb./A. (2) OS-1199, 2 lb./A., Arasan, 3 lb./A. (3) Phygon XL, 2 lb./A. (4) Spergon, 4 lb./A., Orthocide 406, 4 lb./A., (5) Oxy-Quin, 3 lb./A. (6) Dow 9B, 2 lb./A. (7) P-162, 3 lb./A. Highest yields were obtained from treatments with Agrox and Dithane Z-78. Lowest yields were obtained from P-162. Oxy-Quin, Dow 9B, and P-162 were phytotoxic.

In tests at Sanford, Florida, George Swank, Jr. treated field plant beds of sandy soil at 87° F. to control Rhizoctonia solani, Pythium sp. and Fusarium sp. Treatments were D-D, 3 ml./sq. ft. injected 6 inches deep; chloropicrin, 3 ml./sq. ft., injected 6 inches deep and a water seal applied; methyl bromide, 1 lb./50 sq. ft., applied beneath Sisalkraft paper; dibromobutene powder, 3 gm., dibromobutene emulsion, 5 gm., P-162, 1 ml., Arasan, 3 gm., Mathieson 290, 8 gm., Spergon, 6 gm., SR-406, 6 gm., and Robertson Copper, 5 gm., were all mixed with fine vermiculite and tilled in top 3 to 4 inches. All dosages are per square foot of soil. Chlorobromopropene at 1 qt./100 sq. feet was applied in the same manner. Treatments listed in order of efficacy are: (1) Dowfume MC-2, dibromobutene emulsion. (2) Arasan (3) Dibromobutene powder, chloropicrin. (4) Chlorobromopropene, Spergon. (5) Robertson Copper. (6) P-162, Mathieson 290, D-D. SR-406 was phytotoxic. Arasan, Spergon, and Robertson copper were slightly phytotoxic. Good weed control was obtained with Dowfume MC-2; chloropicrin, and dibromobutene.

In tests at Waltham, Massachusetts, R. W. Ames applied Carbide & Carbon 1182 at 0.735 gm./12.5 gal./100 sq. ft. and No. 1207 at 2.94 gm./12.5 gal./100 sq. ft. to sandy loam, for control of Fusarium oxysporum f. dianthi on carnations. Pre- and post-planting treatments were made to greenhouse beds by drenching the surface. No. 1207 gave better control although plants were stunted. Treatment with No. 1182 appeared to stimulate growth and increase number of breaks per plant.

In tests at Amherst, Massachusetts, W. L. Doran reports two experiments conducted in the greenhouse where chemicals were applied dry to soil once before seeding. In the first experiment, "there was some control of club root by Mathieson's chemical 275 and by OS-1199 dust". In the second experiment to control damping-off of several vegetables, "there was some control of damping-off by Vancide, by Orthocide and Shell's OS-1199."

In tests at Waltham, Massachusetts, R. W. Ames and E. C. Gasiorkiewicz drenched the surface of sandy loam greenhouse beds to control Fusarium oxysporum f. dianthi on carnation. Treatments were: F-531, 2 oz./100 sq. ft., Goodrite Zac, 2 oz./100 sq. ft., Dithane Z-78 4 oz./100 sq. ft., Natriphene, 36.5 grains/2.5 gal./100 sq. ft., chlorobromopropene, 1 qt./100 gal., 1/2 gal./sq. yd., XP-47, 10 gm./sq. yd. No data were given on control or yields. Chlorobromopropene was injurious to plants and XP-47 was "highly toxic to plants and handler".

In tests at Knoxville, Tennessee, J. O. Andes applied the following treatments by drenching the top 2 to 3 inches of soil: Tribasic copper sulfate, 20 lb./A., Dithane Z-78, 20 lb./A., calcium cyanamid, 100 lb./A., P-162, 0.2 gm./sq. ft., and DN-111, 0.2 gm./sq. ft. Chemicals were applied to plots previously infested with Sclerotinia trifoliorum and crimson clover was planted one month after treatment. "No control obtained by any of the chemicals used." In a second experiment with the same organism and crop, the following chemicals were applied: 341 SC, Dithane D-14, Phygon, Zerlate, tribasic copper sulfate, Parzate, wettable sulfur, Orthocide 406, Cuprocide, Cyanamid, Panogen, Permacide, and P-162. The last 3 chemicals killed the clover. "Fermate at 2 oz./2 gal. water applied as drench to wet the ground arrested the growth and spread of this disease with no injury to the clover."

In tests at Wenatchee, Washington, Roderick Sprague treated field plots for control of Typhula sp. on winter wheats. Treatments were applied to the soil surface as drench or damp powder October 24, after planting wheat August 20. The treatments listed in order of control are: (1) Ceresan M, 7 lb./A. (2) Orthocide 406, 14 lb./A. (3) Crag 5379, 14 lb./A. (4) Lime-sulfur, 20 gal./A. (5) Wettable sulfur, 60 lb./A. "Only the Ceresan M showed much promise. It cut loss to about one-third of the checks. Cost is still too high."

A 77.512: 214

THE PLANT DISEASE REPORTER

Issued By

THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey

BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

AGRICULTURAL RESEARCH ADMINISTRATION

UNITED STATES DEPARTMENT OF AGRICULTURE

SOME NEW OR UNUSUAL RECORDS AND OUTSTANDING FEATURES OF PLANT DISEASE DEVELOPMENT IN THE UNITED STATES IN 1951

Supplement 214 — August 15, 1952

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

PLANT DISEASE REPORTER SUPPLEMENT

Issued by

THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station — Beltsville, Maryland

SOME NEW OR UNUSUAL RECORDS AND OUTSTANDING FEATURES OF PLANT DISEASE DEVELOPMENT IN THE UNITED STATES IN 1951

Compiled by Nellie W. Nance

Plant Disease Reporter
Supplement 214 — August 15, 1952

As in previous years, this 1951 summary of outstanding plant disease occurrences in the United States has been taken for the most part from reports to the Plant Disease Survey or from articles in Phytopathology.

General Summary of Weather Conditions -- 1951. In general, 1951 was a cold, wet year, with more than the usual number of weather extremes. The temperature averaged 52.4° which was 0.8° below the long-term mean and 0.1° below the average for 1950. The year was warmer than normal in the extreme eastern and southern tier of States from Maine to Arizona and in the southwestern portion of the far Western Plateau, but plus departures exceeded 2° in only scattered areas. Elsewhere the year was colder than normal, with deficiencies of 5° or more in the north-central interior. Monthly temperatures were deficient for all, except 3 months, with November showing the greatest deficiency, 3.6°, and February the greatest excess, 1.4°. Extreme temperatures ranged from -60° at Taylor Park, Colorado, on February 1 to 125° at Case Creek, California, on July 18. This extreme minimum was the lowest temperature ever recorded in Colorado, and the tenth time that a minimum as low as -60° officially has been recorded in the United States. During this coldest period of the year New Mexico recorded an all-time low of -50° and Indiana one of -35°.

Total precipitation for the United States averaged 30.22 inches which was exactly an inch above the long-term mean, and 0.54 inch more than in 1950. The departure pattern was very uneven, especially in the far West. In the extreme eastern and southern portions of the country from Virginia to Arizona precipitation was generally deficient. There were marked excesses in the central and northcentral interior and the extreme Northeast;also in central Arizona and northern Utah. Extreme deficiencies occurred in southwestern Texas and southeastern New Mexico. January, April, May, and August were the only months showing deficiencies based on the United States as a whole. May showed the greatest deficiency, 0.50 inch, and December the greatest excess, 0.66 inch. This was the wettest year on record in Kansas and Michigan. Annual rainfall ranged from 140.16 inches at Valsetz, Oregon, to 0.32 inch at Greenland Ranch, California.

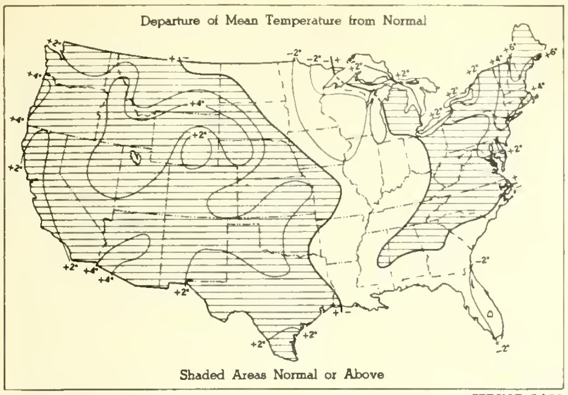
In most areas snowfall was above normal for the year. The average annual snowfall for Iowa, Wisconsin, and Michigan was the greatest on record. Snowfall was not unusually heavy in January and February, although it occurred at stations near the mouth of the Mississippi River for the first time in many years. But March snowfall was extremely heavy in northern areas westward from the Great Lakes. During the first 3 days of June one of the heaviest late-season snowstorms on record occurred in the northern Rockies, with amounts for the storm ranging up to 30 inches in Wyoming. Snowfall began in September in many northern areas and was heavier than usual during the remainder of the year, with two outstanding storms. The first occurred in southern Missouri and surrounding areas from November 5 to 7, and the second during the closing days of December when heavy snowfall from the Sierra Nevada Mountains in central California to the Continental Divide set new all-time records in northern Utah and western Colorado.

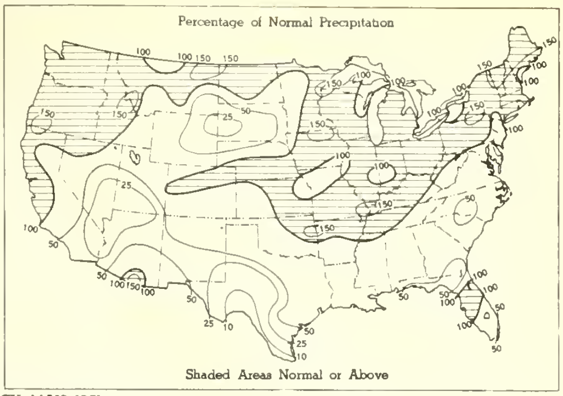
The outstanding feature of the year's weather was the persistent cold, wet weather in the central and north-central interior that resulted in one of the most destructive floods in the Nation's history, and in low yields and lower quality of corn and wheat in many areas.

Severe local storms were frequent during June and July in central areas and caused more than the usual amount of damage. During the closing days of January one of the worst icestorms on record occurred over a large area from eastern Texas to New England and was followed by a damaging freeze in the western Gulf States. The hurricane season was mild; there was no loss of life and in few seasons has damage been less. (Weather Bureau, Department of Commerce,

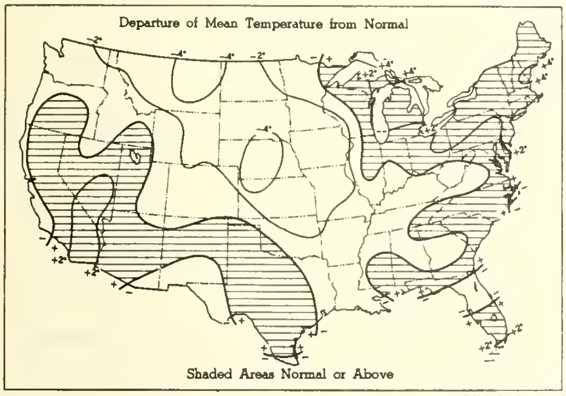
TEMPERATURE AND PRECIPITATION

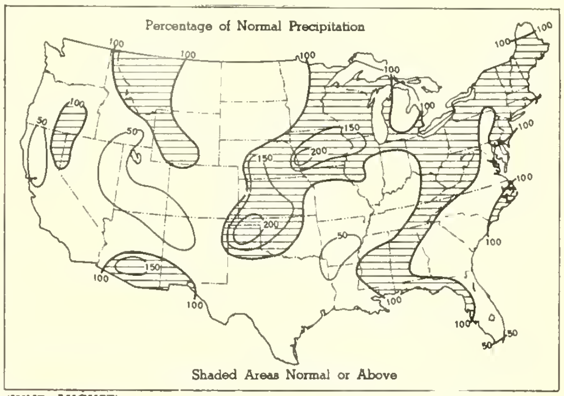
WINTER OF (DECEMBER–FEBRUARY) 1950-51



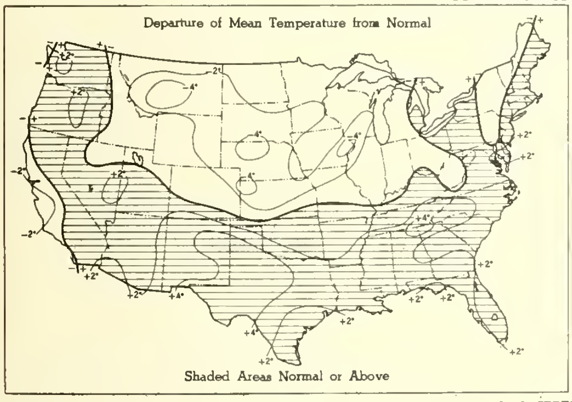


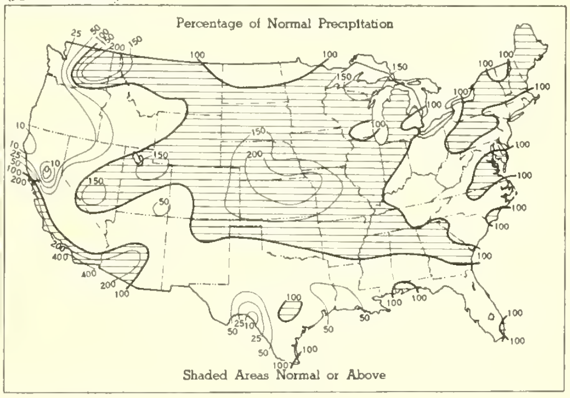
SPRING (MARCH–MAY) 1951



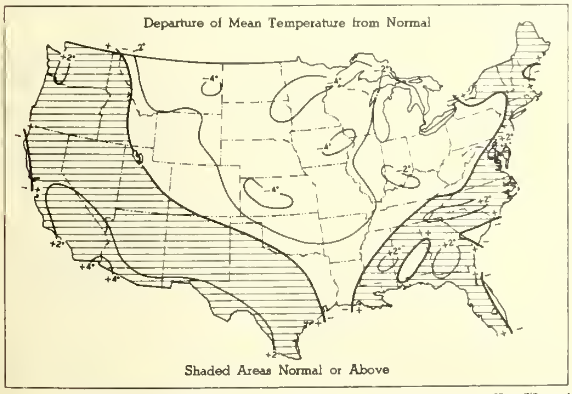


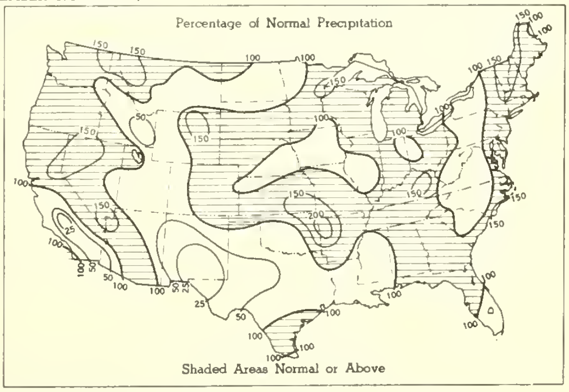
SUMMER OF 1951 (JUNE–AUGUST)





FALL OF 1951 (SEPTEMBER–NOVEMBER)





(From Weekly Weather and Crop Bulletin National Summary, Volume 38, 1951.)

May 11, 1952. Correspondence.)

Maps on page 143 show the temperature and precipitation for the winter of 1950-51, spring, summer and fall of 1951.

Weather in Relation to Plant Disease. Not many of the disease records cited in these compilations are especially concerned with weather relations. Nevertheless, since weather is one of the indispensable components of any disease situation, it seems advisable to give an account of the year's weather each time. Although the weather summaries are necessarily very general, they do show the seasonal progress, and provide a background at least for interpretation of weather's part in the occurrence of disease during the year. The accumulation of plant disease reports and of yearly weather summaries together may be helpful for future reference.

Noteworthy Observations. Following is a brief résumé of some but by no means all of the reports mentioning specific connection with weather conditions or other observations of interest.

In 1951 potato and tomato late blight continued the northwestward spread that was evident in the preceding year, but although widespread acreages were affected reduction in yield was low, owing to the warm dry weather from mid- to late season over the eastern portion of the United States and to adequate use of control measures.

Because of cool weather from late November until the middle of April diseases were not a serious factor in small grains in the southeastern coastal plain in 1950-51.

Botrytis blossom end rot of apple was more general and abundant throughout the Hudson Valley in New York than had ever been noticed before.

A leaf curl epidemic occurred in the peach growing areas of northern South Carolina, the first since the early 1940's. Cool, wet weather during late March and early April favored the spread and development of the disease.

During 1951, there was a severe outbreak of leaf blight of cantaloupe in the Rio Grande Valley of Texas, the first occurrence of such an epidemic in the last 14 years.

The first occurrence of bean rust in central Washington was found in the newly irrigated area of the Columbia Basin. The entire farm was ploughed out of sage brush in the spring of 1951.

Leaf blight (Helminthosporium turcicum) has become a disease of increasing prominence in many corn growing areas. Seed producers and corn breeders are well aware of the need for testing inbred lines and selecting for resistance. Diseased corn leaves are a source of infection in artificial and natural epidemics of the fungus.

Table 1. Diseases reported in States where they had not been found or reported on a particular host until 1951.*

Host Disease (Cause)	Where found	Remarks
CORN		
Cob rot (Nigrospora oryzae)	Maryland	Found on a small number of ears of field corn in two fields. (PDR 35: 386)
ALFALFA		
Gray mould Botrytis of the cinerea type	Wisconsin	During the long rainy and humid period in August 1951, alfalfa flowers turned brown soon after opening and remained adhering to the rachis. On growing plants as many as 5 successive racemes were destroyed. (PDR 36: 61)
Violet root rot (Rhizoctonia crocorum)	North Carolina	Found in alfalfa in one locality in the western part of the State in 1950 and in several locations in this region in 1951. (PDR 36: 60)

* For new State-host records of grass smuts from the Western States see Mycologia 43:67-77. 1951.

Table 1. (Continued)

Host Disease (Cause)	Where found	Remarks
COWPEA		
Red stem canker (*Phytophthora cactorum*)	South Carolina	Observed in a garden at Clemson. About 20 percent of the plants were infected and about 3 to 4 percent were killed. (PDR 35: 418)
SOYBEAN		
Brown stem rot (*Cephalosporium gregatum*)	Minnesota	First found in Sept. 1951 at Expt. Sta. Farm, St. Paul, later found in Freeborn County. (PDR 35: 509)
Stem canker (*Diaporthe phaseolorum* var. *batatatis*)	Minnesota	Found in Waseca, Freeborn, Faribault, and Blue Earth Counties in southern Minn. in Sept. 1951. (PDR 35: 509)
APPLE		
Root rot (*Xylaria polymorpha*)	Georgia	Discovered in a Rabun County orchard on August 8. (PDR 35: 465)
BLUEBERRY		
Stunt (virus)	Maryland	The Scammell variety was severely affected in one location. (PDR 35: 386)
FIG		
(*Macrophoma fici*)	Maryland	Associated with a canker disease of cultivated fig, probably *Ficus carica*. (PDR 35: 385)
PEACH		
Anthracnose (*Glomerella cingulata*)	Michigan	Found in a commercial shipment of Halehaven peaches from St. Joseph, Mich. (PDR 35: 276)
	West Virginia	Erly-Red-Fre variety obtained near Martinsburg, developed 1 to 2 percent of anthracnose lesions during storage tests at Beltsville, Md. (PDR 35: 465)
SWEET CHERRY		
X-disease (virus)	New York	Observed in Ontario County in 1949 for the first time, but not reported until 1951. (PDR 35: 256)
BITTERSWEET (CELASTRUS SCANDENS)		
Anthracnose (*Marssonina thomasiana*)	Maryland	Collected in Washington Co., in summer, 1947. (PDR 35: 413)
CAMELLIA		
Root rot (*Phytophthora cinnamomi*)	California	Severe losses occurred in nursery beds. (PDR 36: 211)

Table 1. (Continued)

Host Disease (Cause)	Where found	Remarks
ENGLISH IVY Scab (Sphaceloma hederae)	Maryland	Found on English ivy growing near Salisbury. (PDR 35: 194, 385)
GERANIUM Verticillium wilt (Verticillium albo-atrum)	Oregon	Specimens were collected from a home planting at Hillsboro, in August 1950. (PDR 36: 51)
HELLEBORUS NIGER Black leaf spot (Coniothyrium hellebori)	California New Jersey Ohio	Reported to be the most destructive disease of this ornamental plant in England and Holland. (PDR 35: 277)
ROSA MULTIFLORA Rose anthracnose (Sphaceloma rosarum)	Maryland	(PDR 35: 194)
COTTON Nematode root rot (Pratylenchus leiocephalus)	Louisiana	Affected cotton plants in Bossier Parish. (PDR 35: 388)
Root rot (Thielaviopsis basicola)	Texas	Isolated from Pima 32 cotton, collected Aug. 27, 1951 in two fields about 5 miles south of Canutillo. (PDR 36: 53)
MENTHA spp. Powdery mildew (Erysiphe sp.)	Oregon	Found in three fields in the Willamette Valley. (PDR 36: 245)
Fusarium sp. Fusarium roseum Pythium sp. Rhizoctonia solani	Oregon	Isolations revealed a complex of these fungi associated with root and rhizome rot. (PDR 36: 245)
MENTHA CANADENSIS M. CITRATA Anthracnose (Sphaceloma menthae)	Maryland	(PDR 34: 392. 1950) First rept. in Md., not included in the 1950 summary.)
TOBACCO Anthracnose (Colletotrichum sp.)	North Carolina	Observed in plant beds in five counties. (PDR 35: 276)
LAWSON CYPRESS, ORNAMENTAL Root rot (Phytophthora cinnamomi)	California	(PDR 36: 211)
OAK Oak wilt (Chalara quercina)	Michigan	Found on red oak in Cass County, Mich. First authentic case in this State. (PDR 35: 383)

Table 1. (Continued)

Host Disease (Cause)	Where found	Remarks
(Oak continued)	West Virginia	Statewide surveys showed oak wilt present in five counties. Evidence suggests that the disease has been present, though unrecognized, for several years. (PDR 35: 382)
PINE Root rot (Phytophthora cinnamomi)	California	(PDR 36: 211)
VIBURNUM OPULUS Spot anthracnose (Sphaceloma viburni)	Maryland	Caused serious damage to foliage at two locations in Somerset County. (PDR 35: 385)
BEAN, SNAP Alternaria leaf spot and dieback	Florida	Distribution of the fungus is limited to the Sanford-Zellwood area. These two locations are 26 miles apart. (PDR 35: 330)
CRUCIFERS Clubroot (Plasmodiophora brassicae)	Florida	Survey of the field revealed no definite source of infestation of the soil. Plants grown for home use were not introduced from other States. (PDR 35: 509)
POTATO Meloidogyne hapla	Maryland	Found in Pontiac potatoes showing small raised areas on the surface. (PDR 35: 386)
SPINACH Smut (Entyloma ellisii)	Washington	Found on Apr. 17, 1950 at Walla Walla. (Phytopath. 41: 854)

Table 2. Diseases found or reported in this country for the first time in 1951 = *; diseases found on new hosts = **.

Host Disease (Cause)	Where found	Remarks
BARLEY Yellow dwarf* (Virus)	California	New aphid-transmissible virus disease that became epidemic in Calif. in 1951. (PDR 35: 471)
PEACH Microstroma sp.**	South Carolina	Specimens found at the S. C. Sandhill Exp. Sta. near Columbia during August 1951. (PDR 35: 497)

Table 2. (Continued)

Host Disease (Cause)	Where found	Remarks
STRAWBERRY Chlorotic phyllody (unknown cause)	Louisiana	Apparently new and undescribed, first observed in 1949 and again in 1950. Found scattered in many fields in four different parishes. (PDR 35: 495)
CALIFORNIA-NUTMEG *Caeoma torreyae* n. sp.	California	Found on current season's leaves, especially on young plants.
Clasterosporium obclavatum n. sp.	California	Found on second and third year leaves. (Mycologia 43: 62-66)
FILBERT *Labrella coryli**	Maryland	Specimen came from Beltsville, growing on an experimental planting of F_1 hybrids. First report from North America. (PDR 35:437)
HIBISCUS ROSA-SINENSIS H. SCHIZOPETALUS Foot rot** (*Phytophthora cactorum* var. *applanata*) Leaf and stem blight** (*P. palmivora*)	Louisiana	Foot rot was widespread both in nurseries and in private gardens. Leaf and stem blight was found chiefly in greenhouses and lath houses in nurseries where vegetative propagation by marcottage was practiced and where high humidities were maintained by frequent syringing. (Phytopath. 41: 19; 42: 144)
JAPANESE LILAC Witches'-broom** (? virus)	Maryland	Found in a yard in Takoma Park. (PDR 35: 556)
KENAF (HIBISCUS CANNABINUS) Powdery mildew* (*Leveillula taurica* f. *hibisci*)	Florida	Found on kenaf leaves at Belle Glade, Nov. 17, 1951. (PDR 36: 52)
LILIUM AURATUM Bulb rot (*Botrytis liliorum*)	? California	Recently isolated from lily bulbs imported from Japan. (Phytopath. 41: 941).
ARBOR VITAE Root rot** (*Phytophthora cinnamomi*)	California	(PDR 36: 211)
BITTERSWEET (CELASTRUS SCANDENS) Anthracnose** (*Marssonina thomasiana*)	New York	Found in Ithaca, in late summer of 1948. (Mycologia 43: 373. 1951)

Table 2. (Continued)

Host Disease (Cause)	Where found	Remarks
DEODAR Root rot** (Phytophthora cinnamomi)	California	(PDR 36: 211)
DOUGLAS-FIR (ROCKY MOUNTAIN) Witches'-broom*	Washington	Collected March 5, 1950, in Pullman. Extremely compact type of witches'-broom on Douglas-fir, first report in N. Amer. (Northwest Science 25: 183)
ILEX CORNUTA var. BURFORDI (BURFORD HOLLY) Phyllosticta leaf spot** P. haynaldi	Georgia	Original specimens were collected in June 1949. In June 1950 the disease was noted throughout northeast Atlanta. The perfect stage of the fungus has not been determined, although the imperfect stage was collected throughout an entire year. (PDR 35: 412)
INCENSE CEDAR Root rot** (Phytophthora cinnamomi)	California	(PDR 36: 211)
ITALIAN CYPRESS Root rot** (Phytophthora cinnamomi)	California	(PDR 36: 211)
MYRTLE Root rot** (Phytophthora cinnamomi)	California	(PDR 36: 211)
SASSAFRAS ALBIDUM Ganoderma sp.**	New York	Large tree found dead on grounds of Brooklyn Botanic Garden in spring of 1950. (PDR 36: 28)
SWEET GUM New disease (undetermined)	Maryland	In 1949, in University Park and vicinity a survey showed that, of about 3,000 trees observed, 20 percent showed various stages of decline. By July 1951, most of these trees had died and about 25 percent of the remaining trees showed signs of the disease. (PDR 35: 295)
VIRGINIA PINE Stem rust (Peridermium appalachianum) n. sp.	North Carolina Tennessee Virginia West Virginia	First specimen collected in N. C. in 1948. No pycnial stage has been observed, and no alternate host yet found. Susceptibility of other pines not known. (PDR 35: 335) Description of new species (Phytopath. 42: 115)

R. W. Leukel reported that in the spring and summer of 1951 eighteen fungicides were tested for the control of bunt of wheat, and nine of these were tested also for the control of the smuts in oats and of stripe disease and covered smut in barley. (PDR 35: 445)

Tervet and Cassell reported that the identification of races of cereal rusts (Puccinia spp.) may be facilitated by using cyclone separators for collecting the spores and spraying them in talc on the host differentials. The period required for identification has been reduced to 10 to 14 days by eliminating the necessity of a primary increase of the rust on a susceptible variety. (Phytopath. 41: 286-290).

Virus diseases

Mosaic (virus), new to California, was reported by Byron R. Houston and John W. Oswald. In May 1951 this virus disease, which resembles Western wheat mosaic in some respects, was found in several barley and wheat plants. Its presence was not recognized soon enough to determine its distribution in 1951. The virus is readily transmitted to seedling wheat, barley, and oats when rubbed with expressed juice from diseased plants. There was no evidence of soil transmission. (Phytopath. 42: 12).

Results of a method for inoculating varietal test nurseries with the wheat streak-mosaic virus was reported by McKinney and Fellows. At Manhattan, Kansas, a fall sown wheat nursery was inoculated on April 26, 1950. All of the 35 varieties developed mosaic in from 80 to 95 percent of the plants. Another fall-sown variety nursery was inoculated on October 10. Fall observations indicated infection in all of the plants examined. Observations made April 30, 1951, indicated the presence of mosaic in each of 81 varieties of wheat in the nursery. Within the varieties, from 95 to 100 percent of the plants had mosaic. (PDR 35: 264). McKinney and Fellows also reported 24 wild and forage grasses found to be susceptible to the wheat streak-mosaic virus (PDR 35: 441).

Yellow dwarf (virus). Investigations reported by Oswald and Houston in California showed that the greenbug, Toxoptera graminum, is a vector of the cereal yellow-dwarf virus. There is a great similarity between the yellow-dwarf disease on oats and certain of the group of oat diseases referred to in the literature as "red-leaf." (PDR 36: 182).

AVENA SATIVA. OATS: H. R. Rosen in his 1950-51 report on oat diseases in Arkansas, stated that for the sixth successive year the fall of 1950 was unfavorable for the seeding of winter oats, so that the acreage dropped still further below that of 1944. While winter oats have outyielded spring oats by 40 percent on the average during the last 30-odd years, the difference of more than 60 percent obtained in 1951 was mostly due to the much heavier leaf hopper infestation on spring oats. The combination of a heavy fall crown rust (Puccinia coronata var. avenae) epidemic and a severe winter was largely responsible for the relatively low average State yield. (PDR 36: 153).

Puccinia coronata var. avenae, crown rust. Rosen and Murphy reported additional information on the identity of the new race of oat crown rust, tentatively identified as race 101, and on some other important aspects of its occurrence. This race offers a serious threat to both Victoria and Bond derivatives as well as to Red Rustproof strains. (PDR 35: 370).

Sclerospora macrospora, downy mildew, was observed in Arkansas, Mississippi, and Georgia in 1951. The disease was found in a field of an unnamed strain of Red Rustproof oats in Coweta County, Georgia, in April 1951. This apparently is the first instance of downy mildew found in Red Rustproof oats. It seems to occur most frequently in the Bond and Victoria derivatives. (Summers, Adair and Stanton, PDR 35: 510).

Whiteheads. S. Goto and others described types of whitehead occurring on oats in Minnesota in 1950-51. (PDR 36: 151).

HORDEUM VULGARE. BARLEY: Sclerospora sp. Downy mildew, which had been reported from California by Mackie in 1929, was not again observed in the State until the spring of 1951, when all the plants in large areas of a field near Davis were dead and the tissues matted and shredded. Only S. macrospora, which does not cause tissue shredding has been reported on barley. The fungus found in 1951 more closely resembles S. graminicola, which does cause severe shredding. (Oswald and Houston, Phytopath. 41: 942).

TRITICUM AESTIVUM. WHEAT: In 1951, yellow spot of winter wheat caused by Helminthosporium tritici-vulgaris was observed causing severe reductions in yield for the first time in Michigan, according to Andrews and Klomparens. (PDR 36: 10).

N. E. Borlaug and others, reporting on "Mexican varieties of wheat resistant to race 15-B of stem rust" (Puccinia graminis var. tritici) cite a considerable amount of circumstantial evidence to indicate that the 1951 summer 15-B epidemic in Mexico originated from spores blown into Mexico from the United States and Canada during the fall and winter of 1950-51. There was relatively little survival of these spores in northern Mexico during the winter season of 1950-51. However, in south central Mexico the disease increased to epidemic proportions during the summer of 1951. (PDR 36: 147).

ZEA MAYS. CORN: Paul E. Hoppe described the glass-tumbler technique for incubating seed corn in cold soil for disease tests without large refrigeration equipment (Phytopath. 41: 747). Later Hoppe reported a glass-tumbler-paper-doll technique for seed corn incubation and germination tests, which eliminates the need for a greenhouse and is simple, reliable, and much faster than methods used heretofore. Since the only special equipment needed is an ordinary refrigerator, the new technique should find wide usage in seed testing and phytopathological laboratories, and for manufacturers of fungicides. (Phytopath. 41: 856).

Bacterium stewartii, bacterial wilt. John R. Warren reported on the use of radioisotopes in determining the distribution of B. stewartii within corn plants. As he says "a new research tool" has been made available to the biological sciences with the recently increased production and more widespread distribution of radioactive isotopes. The growth or reproduction of B. stewartii was not seriously limited by radioactivity concentrations permitting assimilation of easily detectable amounts of radioactive phosphorus. The rapidity of the distribution of B. stewartii within inoculated corn plants was correlated with the rate of transpiration of the plant. The use of radioactive bacteria showed that there was no appreciable difference in the rate or extent of distribution of B. stewartii within susceptible and resistant inbreds. The feasibility and practicality of using radioactive tracer elements in phytopathological studies was demonstrated. (Phytopath. 41: 794).

Darluca filum, hyperparasite of corn rust (Puccinia sorghi). George Semeniuk and Edgar Vestal reported that one probable reason why corn rust was less severe in Iowa in 1951 than in 1950 was the presence of Darluca filum in the early formed uredosori. High percentages of parasitized uredosori occurred in areas where corn rust was severe in 1950, suggesting that the abundance of Darluca filum increased during that year. This is the first record of the hyperparasite on corn rust in Iowa and apparently the first record of its probable importance in controlling corn rust epiphytotics in the United States. (PDR 36: 173).

Helminthosporium turcicum, leaf blight, has become a disease of particular concern in many of the corn growing areas, according to Alice L. Robert and William R. Findley, Jr., who state that seed producers and corn breeders are well aware of the need for testing inbred lines and selecting for resistance to the disease. They reported diseased corn leaves to be a source of infection in artificial and natural epidemics of H. turcicum. The effect of natural outside environment on the life of the fungus in leaf tissue is not known. (PDR 36: 9). F. V. Stevenson and others reported a Florida breeding program for sweet corn resistance to H. turcicum. (PDR 35: 488). G. R. Townsend reported results of experiments to control sweet corn leaf blight (H. turcicum) and rust (Puccinia sorghi) in the Belle Glade region of Florida. Both diseases were well controlled by the application of Dithane dusts in a suitable schedule. The control of the two diseases by these treatments increased the yield of No. 1 corn by about 60 boxes per acre, and the total yield was increased by about 40 boxes per acre. (PDR 35: 368).

Rodent repellent effect of seed treatment. Welch and Graham reported definite indications of protection against rodents afforded by corn seed treatment with Arasan. (PDR 36: 57).

DISEASES OF FORAGE AND COVER CROPS

BROMUS MARGINATUS. MOUNTAIN BROMEGRASS: Ustilago bullata, head smut. Jack P. Meiners reported a new race of head smut on the Bromar variety of mountain brome. Although Bromar is highly susceptible to this new race, it is still superior to the common strains of mountain bromegrass because of its resistance to the other four races of head smut that attack B. marginatus and related grasses. To hold the incidence of this new race to a minimum it was recommended that the seed of this variety be treated. (PDR 36: 166).

PISUM ARVENSE. AUSTRIAN WINTER PEA: Meloidogyne sp., root knot, according to J. G. Atkins, Jr. has been found to be more severe than expected on winter peas and vetch in Louisiana. (PDR 35: 323).

SOJA MAX. SOYBEAN: Bacterial diseases. In North Carolina, J. H. Graham reported on new wildfire (Pseudomonas tabaci) symptoms on soybean and on the preservation of the three bacterial pathogens (Xanthomonas phaseoli sojense, P. glycinea, and P. tabaci) of soybean in culture. Of the three methods tried storage under mineral oil was the most successful. (PDR 36: 22).

Cephalosporium gregatum, brown stem rot. Infection with the brown stem rot organism hampers water flow through soybean stems, according to preliminary experiments by McAlister and Chamberlain. (PDR 35: 318).

Phyllosticta sojaecola, canker and leaf spot. R. A. Jehle and others reported a very local outbreak on soybeans in Maryland. (PDR 36: 155).

Rhizoctonia microsclerotia, aerial blight. Atkins and Lewis reported that Rhizoctonia aerial blight was observed in variety plots at Baton Rouge, Louisiana in 1950 and 1951. In 1951, it was more severe on certain varieties than the other common foliage diseases. Varieties differed considerably in susceptibility, Dortchsoy 31 and Ogden having been conspicuously more susceptible than others in the field. The authors point out that in areas where favorable environmental conditions may prevail, this blight should be considered a potentially destructive disease. (Phytopath. 42: 1).

TRIFOLIUM PRATENSE. RED CLOVER: Black patch has been shown to be largely responsible for red clover failures in certain sections of West Virginia. The disease is caused by a fungus that produces no spores and is as yet undetermined. It is very destructive, affecting all parts of the plants and causing great reduction in seed yield in fields with excellent stands. The fungus infects the seed and is seed-transmitted. It spreads from the infected seedling to other plants by means of aerial mycelium. The disease seems to be very prevalent in the eastern part of the State. Abundant moisture obviously favors it, and the heavy dews that are common even in dry weather may account for the prevalence of the disease in the mountain valleys. Experiments showed that seed treatment will decrease seedling infection and increase stands. (Leach and Elliott, PDR 35: 335).

VIGNA SINENSIS. COWPEA: Pathogenicity of Xanthomonas vignicola and reaction of cowpea varieties and related plants to the organism are discussed and tabulated by Helen S. Sherwin and C. L. Lefebvre. (PDR 35: 303).

DISEASES OF FRUIT CROPS

ANANAS SATIVUS. PINEAPPLE: Phytophthora cinnamomi, root and heart rotting. E. J. Anderson described a simple method for detecting this fungus in the soil. It had been used successfully in Hawaii for some 10 years and has been reported successful in Georgia by W. A. Campbell. (Phytopath. 41: 187-189).

CITRUS spp. J. M. Wallace, in reporting recent developments in studies of quick decline and related diseases, stated that it has been generally accepted for a number of years that quick decline in California and tristeza in South America are caused by the same virus or by closely related virus strains. Recent independent investigations in South Africa, West Africa, Brazil, and California seem to demonstrate conclusively that the stem-pitting disease of grapefruit in South Africa and the lime disease in West Africa are caused by the same virus that is responsible for tristeza and quick decline. The strains of the virus may vary in different localities. The species of aphis that transmits the viruses of the diseases in Africa and South America is not known to be present in California. Aphis gossypii, which at present is the only known vector of the virus of quick decline in California, has probably not been tested sufficiently to determine whether or not it will transmit the viruses that cause the similar diseases. The developments summarized in his paper clearly emphasize that the preventive control of this type of disease is much more complicated than it was formerly believed to be. (Phytopath. 41: 785).

Leprosis (scaly bark). Knorr and DuCharme described the resemblance between Argentina's lepra explosiva and Florida's scaly bark and demonstrated their probable identity. Investigation in both Florida and Argentina indicates that the trouble is associated in some way with a mite of the genus Brevipalpus. The disease has almost disappeared in Florida since the regular spraying and dusting program with sulfur has practically eliminated the mite there. The authors emphasized the importance of continued care to prevent the return of former serious incidence of the disease. They urged the adoption of the name "leprosis" in both locations. (PDR 35: 70-75).

CITRUS LIMON. LEMON: Lemon tree collapse and decline. According to E. C. Calavan and others the cause of this malady is known but the situation is becoming increasingly serious annually. During the first half of 1951 decline and collapse of trees were especially prevalent in Santa Barbara and Ventura Counties. In the first four months of 1951 in Santa Barbara county, 360 trees with the collapse symptom were examined. In this same County it was reported that orchards in which lemon trees had collapsed totaled 2, 256 acres from 1940 to February 1951. More lemon trees have collapsed on grapefruit and sweet orange than on other rootstocks. (Citrus Leaves 31: 6-8, 16, 18, 38). Calavan and Wallace presented evidence to indicate that lemon tree collapse in California is not due to the quick decline virus. (PDR 36: 101).

FRAGARIA spp. STRAWBERRY: Botrytis cinerea, gray mold rot, of strawberry in Illinois was controlled with early spring fungicides such as Ferbam and Orthocide 406. (Dwight Powell, PDR 36: 97).

Phytophthora fragariae, red stele, according to E. M. Stoddard has been controlled by soil applications of disodium ethylene bisdithiocarbamate (Dithane D-14) in Connecticut. It seemed probable that the material was acting both as a therapeutant and as a soil sterilant. (Phytopath. 41: 858).

Virus diseases. Cooperative experiments on strawberry virus diseases carried out by the United States Department of Agriculture and the Oregon Agricultural Experiment Station, Corvallis, are reported by P. W. Miller. A wingless individual of the strawberry aphid, Capitophorus fragaefolii, may, under greenhouse conditions, acquire strawberry yellows virus and transmit it to the wild strawberry, Fragaria vesca, after feeding for only one to three hours on an infected strawberry plant. It appears essential to control the insect vector absolutely in areas where certified plants are propagated and where isolation is not complete, to prevent the spread of yellows. (PDR 35: 262). The efficiency of the aphid in transmitting the crinkles virus is increased by a fasting period before feeding on a viruliferous plant. (PDR 36: 92). Sensitivity of some species of Fragaria to the strawberry yellows and crinkles virus diseases was determined. (PDR 35: 259). D. H. Scott and others discussed virus as a hazard in strawberry breeding in the eastern part of the country, and described methods of maintaining breeding stock virus-free. (PDR 36: 89).

MALUS spp. APPLE: Venturia inaequalis, scab. McCrory and Shay reported an apple scab resistance survey in South Dakota. Weather favored the development of an epidemic and provided an opportunity for field evaluation of scab resistance of hundreds of hybrid seedlings, varieties, and foreign introductions. The freedom from scab of Elk River, a selection from M. ioensis, and certain of its hybrids was of interest. (PDR 35: 433).

MALUS SYLVESTRIS. APPLE: Botrytis cinerea, blossom end rot. In no previous year had this blossom end rot been so general or so abundant throughout the Hudson Valley of New York, as in 1951, according to D. H. Palmiter. The ferbam fungicides showed the most promise for control. This disease had not been very prevalent in the past. (PDR 35: 435).

Stereum purpureum, silver leaf. In Washington, in the fall of 1950, scattered trees developed sporophores of S. purpureum; by the fall of 1951 the fruiting bodies were relatively common in the upper portions of the Okanogan, Methow, Entiat, and Wenatchee Valleys. The chance for survival of old trees invaded by Stereum was poor. (Sprague and Hord. PDR 36: 30).

OLEA EUROPAEA. OLIVE: Baines and Thorne reported that the nematode occurring on olive roots in California apparently is similar morphologically and pathologically to the citrus-root nematode, Tylenchulus semipenetrans, obtained from orange roots. They pointed out that the olive tree should be recognized as a host in any program planned for control of the citrus-root nematode. (Phytopath. 42: 77).

PRUNUS ANGUSTIFOLIA. WILD PLUM, CHICKASAW PLUM: Phony peach (virus). See under Prunus persica, peach.

PRUNUS CERASUS. SOUR CHERRY: Coccomyces hiemalis, leaf spot. Comparison of Actidione with some other spray chemicals for control of cherry leaf spot in Michigan was made by McClure and Cation. They stated that these experiments confirm previous observations that Actidione has exceptional qualifications as a foliage spray for sour cherries, with further indications that it has similar qualities for sweet cherry foliage. Its value as a lasting protectant was not determined. (PDR 35: 393).

PRUNUS PERSICA. PEACH: Glomerella cingulata, anthracnose. According to G. B. Ramsey and others, peach anthracnose was recognized as an important disease of Georgia grown peaches on the market in 1947. Since that time the disease has been found in increasing amounts in orchards in Georgia and South Carolina and in shipments from these States. Isolations from typical lesions yielded pure cultures of G. cingulata. Most cultures were of the gray type, but many of the pink type were also obtained. The gray isolates grew more rapidly in culture above 50° F. and caused more rapid decay of peaches above 60° F. than did the pink isolates. The pink isolates grew more rapidly in culture below 50° F. and produced more decay in peaches below 60° F. than did the gray isolates. The optimum temperature for both types of isolates was 80° F. as indicated by growth in culture and in inoculated fruit. All transportation tests indicated that there is danger of serious development of anthracnose in peaches through wounds made during harvesting and packing, and by contamination with spores in seasons when there is an abundance of inoculum in the orchards. (Phytopath. 41: 447).

Monilinia fructicola, brown rot. Poulos and Heuberger reported evidence from Delaware experiments showing that the use of effective insecticides, in conjunction with the regular fungicide schedule, aided significantly in controlling the fruit rot phase of the brown rot disease of peach. (PDR 36: 198).

Taphrina deformans, leaf curl. Foster and Petersen reported a leaf curl epidemic in the peach areas of northern South Carolina during the 1951 season, the first since the early 1940's. Cool, wet weather during late March and early April favored spread and development. The reaction of 73 peach varieties to leaf curl was listed. (PDR 36: 140).

Black tip (? chemical injury). McCornack and others reported an unusual dead tip condition observed in peach fruits in the Cucamonga area of California in June 1950 and again in 1951. In support of the hypothesis of air pollution as a cause of black tip, one grower appeared to have reduced the amount of injury in his orchard by installation of overhead irrigation, thereby probably washing off part of the material settling out of the air. Investigations were under way to determine, by chemical analysis, whether fluorine is the cause of black tip. (PDR 36: 99).

Virus diseases. Phony peach. According to G. KenKnight and others, incidence of phony peach in Spartanburg County, South Carolina suggested the wild plum, Prunus angustifolia as the source of infection. Wild plums more than a mile away from any recorded phony infected peach orchard, past or present, were indexed by Hutchins' root-grafting method. The results indicated that the virus is endemic or naturalized in the wild plum in this county. (PDR 35: 183-185). Similarly Cochran and others reported that root grafting tests in four counties in Georgia indicated that wild P. angustifolia trees adjacent to peach orchards where phony peach virus is present are commonly naturally infected and probably serve as a hold-over reservoir from which new orchards may acquire the virus. (PDR 35: 181-182).

Rosette (virus) was found in a small home orchard near Harrison, Arkansas in June 1951. This is the first report of peach rosette in this part of Arkansas, although two isolated cases have been found in other sections of the State. The infected trees were destroyed. (Curtis L. Mason, PDR 35: 510).

In January and February 1951, at Logan, Utah, two cases of Western X-disease developed in potted Lovell seedling peach trees after inoculation by Calladonus geminatus (leafhopper) that had been feed on infected chokecherry (Prunus virginiana var. demissa). Retention of the virus for at least 47 days was indicated. (G. H. Kaloostian. PDR 35: 347). In February 1951, in tests carried out at Logan, Utah, leafhoppers (Calladonus geminatus) produced western X-disease in three potted Lovell peach seedlings after feeding on sour and sweet cherry trees infected with western X-little cherry virus. The insects retained the virus for at least 72 days. (G. H. Kaloostian. PDR 35: 348).

Nyland and Schlocker reported a new disease of clingstone peaches, tentatively called yellow leaf roll, from California, where it occurred in about 20 orchards in Yuba County and 10 orchards in the adjoining Sutter County. The disease has spread rapidly during the last three years. (PDR 35: 33). They also reported (Calif. Dept. Agr. Bull. Apr.-May-June, pp. 39-42 with illus. in color, 1951) that transmission tests have demonstrated that yellow leaf roll is caused by a virus, and that the symptom picture does not fit any previously known virus disease or other disorder of peach trees. There is some resemblance to western X-disease which also occurs in the area but in their typical forms the two diseases can be distinguished readily. There appeared to be no varietal resistance and apparently trees of any age may be affected. Only clingstone varieties have been found affected, but results of experimental inoculations of freestone varieties indicated that freestones are susceptible.

RUBUS FLAGELLARIS var. RORIBACCUS. LUCRETIA DEWBERRY: Sphaerotheca humuli, powdery mildew. A field test of several fungicides for the control of this mildew on Lucretia dewberry as reported by Young and Fulton showed that Actidione gave the best control of any of the materials tested but that mildew reappeared after treatments were discontinued. (PDR 35: 540).

RUBUS IDAEUS. LATHAM RED RASPBERRY: Erwinia amylovora f. sp. rubi. M. P. Starr and others reported that from an outbreak of a disease on this raspberry variety in Maine, a bacterial pathogen was isolated in pure culture and proven to be the cause of the infection. The characteristics of the pathogen suggested its close relationship with the apple fire blight organism; however, cross inoculation tests between apple and raspberry showed pathogenic differences and the raspberry bacterium was separated as a special form. (Phytopath. 41: 915).

VACCINIUM spp. BLUEBERRY: Demaree and Smith reported blueberry galls caused by a strain of Agrobacterium tumefaciens. For the study galls were collected from New Jersey, New York, Michigan, Washington, and British Columbia. (Phytopath. 42: 88).

VITIS spp. GRAPE: Field and laboratory investigations indicated that grape degeneration in Florida is due to Pierce's disease virus infection, according to Stoner, Stover and Parris. (PDR 35: 341).

J. H. Freitag reported that the Pierce's disease virus of grape was experimentally transmitted to 75 species of plants belonging to 23 plant families. Inoculations were made by means of three species of leafhoppers. Proof of infection depended on recovery of the virus by previously noninfective leafhoppers and its transfer to alfalfa and grape test plants. (Phytopath. 41: 920).

DISEASES OF NUT CROPS

CARYA ILLINOENSIS. PECAN: Cladosporium effusum, scab. According to R. J. Higdon, in spraying experiments near Batesburg, South Carolina, bordeaux mixture, Orthocide 406, and bordeaux mixture-ziram controlled the pecan scab fungus on the susceptible Schley variety to the extent that good quality nuts were produced. Ninety-three percent of the unsprayed trees were severely scabbed. (PDR 35: 272).

JUGLANS REGIA. PERSIAN WALNUT: P. W. Miller reported on diseases of filberts and walnuts in Oregon in 1951. Most outstanding was the black-line (girdle) of grafted walnuts (nonparasitic), which was responsible for the death of more grafted Franquette walnut trees in 1951 than any other cause. Its importance in Oregon was shown by the results of a tree by tree survey made in 1951 in 23 widely scattered walnut orchards in which a total of 8507 trees were examined. Out of these trees, 6405 were of the Franquette variety grafted on Northern California black walnut (Juglans hindsii) roots or its hybrid, and 1403 or 21.9 percent were in a declining condition. Sixty-nine percent or 968 of these declining trees had black-line or graft union failure. (PDR 36: 142).

DISEASES OF ORNAMENTALS

CENTAUREA CYANUS. CORNFLOWER: An unusual occurrence of sclerotia of Sclerotinia spp. with seed of Centaurea cyanus was reported in California by Baker and Davis. The development of the fungi was favored by the moist conditions of the coastal districts where most of the seed is grown. (PDR 35: 39).

BEGONIA sp. TUBEROUS BEGONIA: Pratylenchus sp., root-lesion nematode. Soil fumigation with certain nematocides to control the root-lesion nematode in tuberous begonias resulted in reduced injury to plants from nematode attack but reduction in numbers of nematodes was not adequate from the quarantine standpoint. In situations where nursery beds are fumigated for the control of nematodes, the degree of control must necessarily approach 100 percent before it can be considered practical from a quarantine standpoint. (Allen and Raski, PDR 36: 201).

ELAEAGNUS PUNGENS. THORNY ELAEAGNUS: Weber and Roberts reported that the hitherto undescribed silky threadblight of foliage of E. pungens in Gainesville, Florida is caused by the fungus Rhizoctonia ramicola n. sp. The diagnostic symptoms and signs of the disease are cortical necrosis of petioles, necrotic leaf lesions, and superficial mycelial strands. The causal organism is characterized by its aerial habitat, failure to live in the soil, absence of spores and sclerotia and lavender color of mature mycelium on potato-dextrose agar. (Phytopath. 41: 615).

GARDENIA JASMINOIDES. CAPE-JASMINE: According to D. L. Gill control of the root knot nematode (Meloidogyne spp.) in the South by the use of tung-nut meal as a fertilizer has been claimed by nurserymen for several years. Results of tests showed that tung-nut meal is of no value as a soil treatment for the control of these nematodes. The benefit some growers reported was probably due to the fertilizing effect of the meal. Parathion thoroughly mixed with the soil was of considerable value in root-knot nematode control. (PDR 36: 18).

GLADIOLUS spp. GLADIOLUS: E. T. Palm and Roy A. Young reported that in the course of disease investigations in Oregon during the summer of 1951 observations were made on gladiolus abnormalities. Plants with green flowers and dying leaves were observed in two localities. At Corvallis 5 out of approximately 12,000 Picardy plants in an experimental planting, and at Grants Pass approximately 2 percent of the plants in a commercial planting of Pandora showed this condition. The flowers remained small and failed to develop normal coloration. Symptoms resemble those described for aster yellows on gladiolus in the East except that in the East leaves turn uniformly straw yellow. The authors stated that this condition has not been reported previously from the Pacific coast area. Another unreported abnormality occurred on gladiolus plants in experimental plantings at Corvallis. The petals had spur or cone-like protuberances, which were hollow and of the same color as the petals. The importance of gladiolus plants as a source of inoculum of the yellow bean mosaic and of the cucumber mosaic viruses was demonstrated in a test showing severe consequences of planting pole beans and cucumbers adjacent to gladiolus. (PDR 36: 108).

Urocystis gladioli, smut, has recently been observed on gladiolus seedlings in the bay area of California, causing blistering, shredding and necrosis of the stem and leaf tissues. Severe infection resulted in the death of the seedlings. (Phytopath. 41: 941).

ILEX spp. HOLLY: Phacidium curtisii, tar spot. According to John R. Cole tar spot was responsible for considerable damage to holly in southern Georgia during years of excessive rainfall. Both foliage and berries are attacked by this fungus. He conducted tests over a two-year period, including both sanitation and spraying for control of the disease. Phygon XL proved the most satisfactory for spraying. (PDR 35: 408).

NARCISSUS sp. NARCISSUS: A root-lesion nematode disease of narcissus associated with a species of Pratylenchus has recently appeared in Oregon, according to Harold J. Jensen and others. The disease has been observed in two of the major bulb producing areas of Oregon. (PDR 35: 522).

ORCHIDACEAE: W. A. Feder reported that flowering spikes of Vanda Miss Joaquim orchid plants grown for the export flower market were attacked by a foliar nematode, probably Aphelenchoides ritzema-bosi. Affected flower buds turn yellow, then brown; they shrivel and fail to open. As high as 50 percent of the flowering spikes in some fields were affected. The nematode was apparently distributed by splashing wind-borne rain drops. Excellent control was effected by spraying at weekly intervals with parathion at the rate of 2-4 lb. of 25 percent wettable powder per 100 gal. of water plus B-1956. A high degree of control was also obtained by the use of selenium as sodium selenate. (Phytopath. 41: 938).

ROSA spp. ROSE: Peronospora sparsa, downy mildew, was reported by Yarwood and Wilhelm in one greenhouse range in Alameda County and one in Contra Costa County, California. It probably had not been seen in the State since 1929. (PDR 35: 56).

DISEASES OF SPECIAL CROPS

ARACHIS HYPOGAEA. PEANUT: Meloidogyne hapla, root knot, according to W. E. Cooper, is widespread in the peanut growing area of North Carolina and is very destructive in heavily infested soils. The effect of crop rotation and soil fumigation on root knot control was evident in root knot indices and peanut yields in 1951. Preceding crops, other than peanuts, reduced root knot and increased yields in both fumigated and non-fumigated blocks. Within rotation treatments root knot indices were lower and yields were higher in the fumigated than in the non-fumigated blocks. (Phytopath. 42: 282).

BETA VULGARIS. SUGAR BEET: Heterodera schachtii, sugar-beet nematode. Dewey J. Raski reported greenhouse studies on the host range of the sugar-beet nematode. Results, he says, add to the evidence indicating that as yet the true host plant relationships of the sugar-beet nematode are not fully understood, and show the need of more fundamental work with this and other species of Heterodera. (PDR 36: 5).

CARTHAMUS TINCTORIUS. SAFFLOWER: C. A. Thomas reported experiments showing that resistance in safflower to root rot caused by Phytophthora drechsleri may be evaluated in the greenhouse. High soil moisture favored disease development. The reactions of several varieties and selections in the greenhouse tests were similar to those observed under field conditions. (Phytopath. 42: 219).

Puccinia carthami, rust, causing a foot and root disease, was first noted in two commercial fields and in a disease nursery in western Nebraska in 1950 and resulted in an almost total loss due to the infection of the underground parts of the plants. In 1951 it was again observed in a disease nursery at the Scotts Bluff Field Station, Mitchell, Nebraska. These fields were in safflower the previous season. Of 257 plants collected from the disease nursery on June 7, 1951, 98 percent showed rust pustules on the underground parts. Infection and production of pustules on roots by a non-systemic rust rarely occurs. No previous report of such a case could be found. Seed treatment was ineffective for control of the foot and root phases of the rust when infection took place from infested soil. Data indicated that the rust inoculum may definitely overwinter in the soil and thereby be economically important. (Schuster and Christiansen, Phytopath. 36: 211).

DIPSACUS FULLONUM. FULLER'S TEASEL AND PINCUSHION FLOWER: W. N. Stoner described a virus transmitted by the aphids Microsiphum rosae and Myzus persicae. This teasel mosaic disease is believed to be caused by a hitherto undescribed virus, for which the name Marmor dipsacum was proposed. (Phytopath. 41: 191).

ELEOCHARIS DULCIA. CHINESE WATERCHESTNUT: Dolichodorus heterocephalus, awl nematode. According to A. C. Tarjan, an extensive planting of Chinese waterchestnuts in Southeastern United States developed symptoms of decline. Examination of roots and soil from affected plants revealed the presence of awl nematodes. (Phytopath. 42: 114).

GOSSYPIUM spp. COTTON: Ascochyta gossypii, Ascochyta blight, occurred in 1951 on cotton plants grown in greenhouses at College Station, Texas. In 1950 it was observed in Navarro, Burleson, and Lubbock Counties. (L. S. Bird. PDR 35: 557).

Xanthomonas malvacearum, bacterial blight, occurs wherever cotton is grown, according to L. S. Bird. In 1951 a test designed to evaluate losses in cotton yields caused by bacterial blight infection showed that a highly significant reduction in yield of seed cotton was caused by the disease. Susceptible strains suffered an average loss of 18.6 percent, while Stoneville 20, a highly resistant strain, had no loss. The average monetary loss per acre for the susceptible strains was $5.05. (PDR 36: 3).

HIBISCUS CANNABINUS. KENAF: Various agricultural workers reported disease and insect problems accompanying attempted commercial production of the fiber plant, kenaf, in southern Florida. (PDR 36: 121).

NICOTIANA spp. TOBACCO: In April 1951, a tobacco leaf spot was found at two locations in South Carolina in plant beds, from which an Ascochyta was isolated. The organism was tentatively identified as Ascochyta gossypii. (Holdeman and Graham, PDR 36: 8).

Meloidogyne spp., root knot nematodes. Investigations on the susceptibility to the various root-knot nematode species in the genus Nicotiana, reported by T. W. Graham, disclosed no indication of specialized pathogenicity that might complicate breeding for resistance in tobacco. (PDR 36: 75).

A. L. Taylor reported experimental infection of tomato roots with a Heterodera indistinguishable from the potato golden-nematode (H. rostochiensis), obtained from tobacco roots and from soil from a tobacco field in Connecticut. (PDR 36: 54).

Peronospora tabacina, blue mold (downy mildew). A field outbreak of tobacco blue mold occurred in Connecticut, where shade growers sustained a loss of 10 percent of the crop value. Seed-bed damage in the State was low;as a result growers relaxed their control efforts. Though spread in the field is unusual a cool, wet, early summer afforded ideal conditions for an epidemic.

In some areas despite the above-normal January temperatures, the disease was kept at a low level by light rainfall, above average spring temperatures, and control measures. (Miller and O'Brien, plant disease warning service in 1951, summary, PDR Supp. 208. Distribution map p. 239).

Phytophthora parasitica var. nicotianae, black shank. Harry R. Powers, Jr. reported that recent experiments indicated that wilting in black shank-infected tobacco plants is due to local obstruction of water movement through the vascular elements rather than to systemic effects of toxic metabolic products of the pathogen. However, this does not preclude the possibility that toxic substances are produced and are in some way responsible for the obstruction. (PDR 36: 127). W. D. Valleau pointed out that there is probably little accurate information on the persistence of P. parasitica var. nicotianae in the soil in the absence of tobacco. He recorded instances indicating that the fungus may disappear completely from the soil in three years, after which a black-shank-free crop may be grown, provided there is no recontamination. The extremely rapid spread of the disease in Kentucky during the past two years, sometimes over tenfold in a county, has made measures to stop spread of the disease and to eradicate it at once in new localities an immediate necessity. He concludes "Perhaps no other pathogenic fungus lends itself so well to an eradication program." (PDR 35: 453).

ZOSTERA MARINA. EELGRASS: In the summer of 1951, Ralph W. Dexter reported the continuance of eelgrass recovery on the Massachusetts shore line. (PDR 35: 507).

DISEASES OF TREES

In the Southeast, according to G. H. Hepting and others, woody plants suffered severe damage from a warm fall followed by a sudden drop to extremely cold weather. (PDR 35: 502). Frederick H. Berry summarized and described the effects of this cold wave on Asiatic chestnut trees. Trees of all sizes and age classes were injured. (PDR 35: 504).

L. W. R. Jackson reported that 2, 000 one-year-old Monterey pine seedlings were planted on the Georgia Forestry School forest at Whitehall, Georgia. The planting survival was 85 percent. The entire planting was killed during the 1950-51 winter season. The loss of the planting is attributed to the unusually low temperatures of 8° F. on November 25, 1950 and 9° F. on February 3, 1951. (PDR 36: 166).

CORNUS FLORIDA. DOGWOOD: Elsinoë corni, spot anthracnose. In Maryland, during the summer of 1951 the known northerly distribution of the disease was extended. (Jehle and Jenkins. PDR 36: 110). Jehle and Jenkins also reported slight infection present on bracts of pink dogwood in two locations in Maryland. This appears to be the first record of the disease on bracts of pink dogwood. (PDR 35: 277).

PINUS spp. PINE: Hamilton and Jackson summarized effects of fungicidal dust treatment of shortleaf pine (P. echinata) and loblolly pine (P. taeda) seed on percentage of germination and amount of damping-off. (PDR 35: 274).

Phytophthora cinnamomi, root disease. W. A. Campbell reported the occurrence of P. cinnamomi in the soil under pine stands in the Southeast. He stated "In summary, the development of a method of detecting Phytophthora cinnamomi in the soil regardless of its relationship to a diseased host made it possible to obtain information on its distribution in the soil under pine stands in the Southeast. This information was considered desirable because the fungus has been found associated with littleleaf-diseased shortleaf pine and is more abundant in the soil under diseased than under healthy trees. Furthermore, soil assays for P. cinnamomi in connection with a study of the relation of soil characteristics to the presence of littleleaf in South Carolina disclosed that the fungus was present in 91 percent of the plots from which samples were taken. There appeared, however, to be no correlation between the relative amount of P. cinnamomi in these plots and the severity of littleleaf. When the study was extended to pine stands outside the littleleaf area the fungus was found in the soil under 48 percent of all stands in which plots were located and under 52 percent of these stands having shortleaf and lobolly pine, the species also present on plots in the littleleaf area. P. cinnamomi was found to occur in practically all areas tested in the Southeast and in places remote from any known connection with a recognized disease." (Phytopath. 41: 742).

QUERCUS spp. OAK: The perithecial stage of Chalara quercina, the oak wilt fungus, has been obtained in culture by T. W. Bretz. As far as is known, this is the first report of this stage of oak wilt fungus. (PDR 35: 298). In North Carolina, George H. Hepting and others reported that isolates of the oak wilt fungus from one tree produced perithecia without being paired. They also noted that this tree may be highly significant from the control standpoint. (PDR 35: 555). H. L. Barnett reported a new method for quick determination of the oak wilt. C. quercina can be positively identified in less than one week using a technique based on a special agar medium, the characteristic appearance of the mycelium, and the quick sporulating habit of the fungus. The composition of the medium is given. (Phytopath. 42: 2).

According to Marvin E. Fowler, oak wilt was discovered in many new localities and in seven additional States in the summer of 1951. Surveys initiated in 1950 were continued on a larger scale in 1951. Scouting from low-flying airplanes has proved to be highly satisfactory because of the pronounced leaf symptoms on affected trees. (PDR 36: 162).

In western Maryland, Weaver and Jeffers reported oak wilt found in Garrett County on July 19, 1951. (PDR 36: 28). Oak wilt was reported by Lancaster and Rumph in Allegheny County, Pennsylvania, on Q. palustris. Collections from these oaks were made May 31, 1951. It is believed that this is the first report of the occurrence of oak wilt in western Pennsylvania. (PDR 35: 383). Forrest C. Strong reported the known distribution of oak wilt in Michigan. Thirty-two locations of oak wilt had been found, and confirmed by laboratory isolation of the causal fungus. These locations are scattered through 12 counties, with the greatest concentration in the south central part of the State. (PDR 35: 557). In 1951, J. C. Carter reported oak wilt in three additional counties (Sangamon, Madison, and Cumberland) in Illinois. Most of the 53 counties in which the disease has not been found are located mainly in the central part of the State where the land is utilized extensively for growing grain crops and where oak timber is not abundant. In the northwestern part of the State the disease has become seriously destructive in many localities, but in eastern and southern counties it occurs only occasionally. (PDR 36: 26). Oak wilt infection in Kansas was found two miles east of Bonner Springs, in Wyandotte County. The organism was isolated from several Quercus velutina trees. Thirty to forty trees appeared to be involved in the area. Although no aerial surveys were made, the eastern 35 counties, which contain the majority of the Kansas oaks, were visited during the late summer by automobile. (I. J. Shields. PDR 36: 68).

Taphrina caerulescens, leaf blister, severely defoliated Q. nigra, and affected Q. phellos, Q. laurifolia, and Q. virginiana in southern Mississippi in May 1951. In individual cases approximately 50 to 60 percent of the foliage was shed by the end of May. Cool, wet weather in April probably favored the disease, while hot dry weather in May probably encouraged defoliation of the diseased leaves while retarding the development of new ones. (Berch W. Henry. PDR 35: 384).

ULMUS spp. ELM: Ceratostomella ulmi, Dutch elm disease. Caroselli and Feldman, reporting on Dutch elm disease in seedlings, stated that inability to inoculate elm seedlings successfully with the fungus has impeded studies on control and chemotherapy. Inoculation by neither the agar-disc nor the spore-suspension method was successful in producing a high incidence of the disease in seedlings, although disease in field trees was severe when either of these methods was employed. A high incidence of disease was obtained by subjecting elm seedlings, in full leaf, to darkness for 5 days prior to inoculation, after which they were kept in 9-hour day-light. This method had been used successfully on over 2400 elm seedlings. (Phytopath. 41: 46). J. C. Carter reported that during 1951 eleven additional trees infected with Dutch elm disease were found in four counties in Illinois. No explanation for the occurrence or distribution of the diseased trees could be given. (PDR 36: 24).

DISEASES OF VEGETABLE CROPS

ALLIUM CEPA. ONION: The control of blast (cause indefinite) and downy mildew (Peronospora destructor) by carbamates was reported by Newhall and Rawlins. It appears now that we have a combination fungicide-insecticide program recommendable for mildew, blast, and thrips control. (Phytopath. 42: 212).

APIUM GRAVEOLENS. CELERY: George W. Swank, Jr. reported Florida experiments indicating that trans 1, 4-dibromobutene-2 is an economically good soil fungicidal fumigant that will control damping-off in celery seedbeds. (PDR 35: 492).

CUCURBITS. CUCUMBER, MELON, SQUASH: Paul D. Keener reported that some of the factors involved in the severe virus infections affecting cantaloupe (Cucumis melo) and honey dew melon (C. melo var. inodorus) in Arizona in 1950-51 were seed transmission and proximity to aphid-breeding areas. (PDR 36: 128).

Alternaria cucumerina, leaf blight. In the lower Rio Grande Valley of Texas in 1951, the program of breeding for disease resistance was set back severely by a severe outbreak of leaf blight. According to G. H. Godfrey, this was the first occurrence of such an epidemic in the last 14 years. Some of the cantaloupe strains resistant to downy mildew became heavily infected with Alternaria. (PDR 36: 69).

George F. Weber and John H. Owen reported the following significant watermelon diseases in the Gainesville area of Florida in the 1951 season: Alternaria cucumerina, leaf spot, appeared in scattered local areas in the fields, killing the foliage and vines. Infection ranged from 1 to 75 percent. This disease ranked second to wilt in amount of damage. Fusarium oxysporum f. niveum, Fusarium wilt, was the most prevalent and destructive disease in the Gainesville area in the 1951 season. The dry season, becoming more acute as the crop matured, combined with high temperatures contributed to the large losses due to wilt. Infection ranged from 1 to 5 percent on new land to 10 to 50 percent of the plants killed on old cultivated land. (PDR 35: 355).

Pseudoperonospora cubensis, downy mildew. In South Carolina, increased susceptibility of the Palmetto cucumber to downy mildew, which is presumably due to the appearance of a new race of the pathogen, according to Epps and Barnes, has made necessary a fungicide program as intensive as that which was used before Palmetto was developed. This program, which has never given adequate disease control on the susceptible Marketer, has proved satisfactory on the resistant Palmetto. (PDR 36: 14). According to the final report of the Plant Disease Warning Service losses from cucurbit downy mildew were at a minimum. The disease occurred along the Atlantic Coast as far north as Pennsylvania; however, it was not reported in Maryland and Delaware. (PDR Supp. 208).

IPOMOEA BATATAS. SWEETPOTATO: Internal cork (virus). L. W. Nielsen described a core-grafting technique that reduces the time required for obtaining disease readings. The method may prove to be an essential step in appraising internal cork resistance in various sweetpotato stocks and selections. (PDR 36: 132). According to Marguerite S. Wilcox and B. D. Ezell the effect of storage temperature on the development of internal cork of sweetpotato apparently had not been reported previously. They give a table showing percentages developing internal cork when stored at different temperatures. Their results indicated that 70° F. is better for appraising internal cork susceptibility and latent infection than the lower temperatures usually recommended for sweetpotato storage. (Phytopath. 41: 477). Struble, Cordner and Morrison reported that during the 1951 survey in Oklahoma cork was found in all areas surveyed, but as before was not found in all varieties at all locations. Increase or decrease was not consistently associated with any one variety. Apparently the situation was not materially worse in 1951 than it had been in 1950, and from the two years' observations the authors conclude that internal cork is of relatively minor importance in Oklahoma. (PDR 35: 227).

LACTUCA SATIVA. LETUCE: Mosaic (virus). Grogan and others reported on the use of mosaic-free seed in controlling lettuce mosaic. All of the commercial lettuce seed lots tested in California harbored 1 to 3 percent lettuce mosaic virus. Growing seedlings in an insect-free greenhouse and roguing out all infected plants before transplanting to a mosaic-free locality yielded several pounds of mosaic-free seed. Test plots, surrounded by commercial lettuce, were sown with samples of the mosaic-free seed in the Salinas Valley region in the spring of 1951. The percentage of infection in these areas was substantially reduced, indicating the practicability of combating the disease by this method. (Phytopath. 41: 939).

LYCOPERSICON ESCULENTUM. TOMATO: Fred A. Blanchard reported on aureomycin chemotherapy of crown gall (Agrobacterium tumefaciens) in tomatoes. Fewer and smaller galls developed on tomato plants grown in a solution of aureomycin hydrochloride in mineral nutrient solution following needle inoculation with A. tumefaciens than on similar plants grown in mineral solution alone. (Phytopath. 41: 954).

Phytophthora capsici, stem rot extending from soil level up to 15 cm. above, caused the death of isolated tomato plants near Stockton, California, according to P. D. Critopoulos. (Phytopath. 41: 937).

Phytophthora infestans, late blight, in 1951 continued its northwestward movement across the northern States. Reductions in yield were low, in spite of the widespread acreage. Fungicides were effective in controlling the disease. (PDR Supp. 208, distribution maps page 238.)

Stemphylium solani, gray leaf spot. Younkin and others reported that gray leaf spot of tomatoes occurred in epidemic proportions in New Jersey, Pennsylvania, and the Eastern Shore of Maryland and Virginia in 1949, 1950, and 1951. For two years tests were conducted to determine efficacy of different fungicides on control of gray leaf spot and anthracnose. In one typical test defoliation averaged 15, 34, 41, 56, and 75 percent in replicated plots sprayed seven times with manganese ethylene bisdithiocarbamate, zineb, ziram, tribasic copper sulfate, and no fungicide, respectively. (Phytopath. 42: 114).

Tricothecium roseum, fruit rot. According to R. E. Deems (Phytopath. 41: 633) specimens were collected from five different glasshouses in Ohio from April through June 1950. For other reports see Plant Disease Reporter 31: 260, 1947.

PHASEOLUS spp. BEAN: A leaf spot disease of snap bean (P. vulgaris) and lima bean (P. lunatus) with which a species of Ascochyta was consistently associated has been repeatedly observed and collected in the commercial bean producing areas of western North Carolina since 1948. Characteristics of the fungus resemble those of A. phaseolorum described on bean and A. abelmoschi from okra, and cross-inoculation tests gave results indicating that one species of Ascochyta may be responsible for the disease in both beans and okra. In June 1951, the disease was also found in eastern North Carolina, Duplin County (D. E. Ellis. PDR 36: 12).

Corynebacterium flaccumfaciens, bacterial wilt, was first recorded in central Washington in 1951. From the record of seed sources it seems probable that some seed fields were infected in 1950. In furrow-irrigated fields where this disease was seen, only single isolated plants were involved. (J. D. Menzies, PDR 36: 44).

Fusarium spp., root rots. R. D. Watson described equipment and methods used in applying soil fumigant fungicides for controlling root rot and seed decay in peas and beans in Idaho. Fusarium was the chief offender. (PDR 35: 324).

Pseudomonas medicaginis var. phaseolicola, bacterial halo blight. Mitchell, Zaumeyer and Anderson reported translocation of streptomycin in bean plants and its effect on bacterial blights. Primary leaves of bean inoculated with the halo blight organism failed to develop symptoms of halo blight when a minute amount of streptomycin sulfate was placed on the stems of the plants prior to inoculation. Similar plants inoculated in a like manner developed very mild symptoms of the disease when dihydrostreptomycin sulfate was applied to their stems prior to inoculation. These antibiotics were apparently absorbed by the stems and translocated upward into the primary leaves in sufficient amounts to prevent growth and development of the organism. Of 12 antibiotics tested, streptomycin sulfate and dihydrostreptomycin sulfate were highly effective against this organism. Streptomycin sulfate did not affect growth of the plants a detectable amount, but dihydrostreptomycin sulfate checked their growth very slightly at the dosage level used. Terramycin hydrochloride and aureomycin hydrochloride reduced the severity of symptoms but injured the plants and suppressed growth. Other antibiotics did not reduce severity of symptoms appreciably. (Science 115: 114-115). Results of Montana tests on the use of fungicides to control bacterial halo blight were reported by M. M. Afanasiev and others. Bordeaux mixture produced complete control, sulfur only slight control, and Fermate none. Even after severe hail damage bordeaux continued to protect the beans from infection. (PDR 36: 135).

Pythium spp. Stem rot. Charles Drechsler reported bean stem rot in Maryland and Delaware caused by several species of Pythium. (PDR 36: 13).

Uromyces phaseoli var. typica, rust. In 1951, a single case of rust infection was found in sprinkled beans on the Pasco project, the newly irrigated area of the Columbia Basin. This is the first record of bean rust in central Washington. The entire farm was plowed out of sage brush in late spring of 1951. Circumstances suggested that infected plant parts may have come in with the seed. It was generally assumed that bean rust would never be a problem in the Columbia Basin area prior to this observation. (J. D. Menzies, PDR 36: 44). H. H. Fisher reported differentiation and distribution of the ten different new physiological races of bean rust collected in several States in 1941-51. (PDR 36: 103).

New York 15 mosaic (virus) is very widely distributed in the bean crops throughout the Columbia Basin area in Central Washington, being more than usually prevalent in 1951. Since this virus is seed-borne and no other hosts are known, the seed used was believed to be the primary source of infection. (J. D. Menzies, PDR 36: 44).

PISUM SATIVUM. PEA: Hagedorn and Hanson reported a comparative study of the viruses causing Wisconsin pea stunt and red clover vein mosaic. The study brought out strong similarities between the Wisconsin pea stunt virus and isolate 101 of the red clover vein-mosaic virus indicating their probable identity. (Phytopath. 41: 813).

SOLANUM TUBEROSUM. POTATO: W. F. Mai and others reported the ineffectiveness of methyl bromide for killing the causal organisms of ring rot (Corynebacterium sepedonicum) and potato seed piece decay (Fusarium sambucinum). (PDR 35: 356).

Ditylenchus destructor, potato rot nematode. In the United States, according to Dallimore and Thorne, D. destructor has been reported infecting potatoes on a few farms near Aberdeen, Idaho, but rarely have the infections been severe enough to cause significant losses. Potatoes and sugar beets are the most commonly cultivated crops in this locality and the cropping system most generally followed consists of planting alfalfa with a grain nurse crop. The alfalfa remains three or four years, is then plowed under and is followed by potatoes for one or two years, after which sugar beets are planted a year or two. Thus the rotation includes from two to four years of host crops for D. destructor. Dandelions invariably were present in the old alfalfa stands and doubtless aided in carrying over the nematodes between potato crops. (Phytopath. 41: 872).

Heterodera rostochiensis, golden nematode. See under Nicotiana.

Phytophthora infestans, late blight. Miller and O'Brien in their summary of the crop plant disease forecasting program, stated that late blight continued its northwestward advance as noted in last year's summary. (Map p. 238 of PDR Supp. 208). Estimated reduction in yield varied from 2 percent to as high as 50 percent tuber loss. Lack of spread in many instances was attributed to good disease control.

According to Hyre and Horsfall, an analysis of data obtained from Connecticut records, on the incidence of late blight for the period 1902-50 indicates that it is possible to predict the occurrence of the disease with about 80 percent accuracy by means of a critical cumulative rainfall line and weekly mean temperatures. In only one year out of 49 was blight severe when the forecast would have been for no blight. (PDR 35: 423).

Synchytrium endobioticum, wart. Russell Hyre described and illustrated the potato wart eradication program in Pennsylvania. (PDR 35: 326). A new severe case of potato wart was reported near Freeland, Pennsylvania by Russell Hyre. One warted potato was reported in Allegany County, Maryland by R. A. Jehle. (PDR 35: 432).

According to W. G. Keyworth in a special study, tests showed that strains of Verticillium albo-atrum pathogenic to potatoes were present in all reported cases of premature wilting in potato fields in Connecticut. (PDR 36: 16).

Rugose mosaic (virus). According to Darby and Larson it has been an accepted fact for some time that "Rugose Mosaic" of potato was caused by a virus complex, the components of which are potato viruses X and Y. In studies at Wisconsin it has been shown that each of the components of the rugose complex exist as strains, and that these strains vary in virulence. Rugose type symptoms may be produced by inoculating with only the potato virus Y component of the complex, evidenced by the fact that the potato virus X-immune USDA seedling #41956, and virus X-free potato varieties, when inoculated with any isolate of virus Y produced typical rugose type symptoms, the severity of which is governed by the strain used and the temperature at which the plants are held after inoculation.

It can no longer be said that rugose mosaic type symptoms are the result of a virus complex, potato viruses X and Y in combination, but are also caused by strains of potato virus Y alone on virus-free potatoes. (Amer. Potato Jour. 28: 561-562. 1951).

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AGRICULTURAL RESEARCH ADMINISTRATION

UNITED STATES DEPARTMENT OF AGRICULTURE

HOST INDEX TO NON-FUNGUS DISEASES OF PLANTS IN CHINA

Supplement 215 August 15, 1952

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

PLANT DISEASE REPORTER SUPPLEMENT

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Plant Industry Station Beltsville, Maryland

HOST INDEX TO NON-FUNGUS DISEASES OF PLANTS IN CHINA

W. N. Siang[1]

Plant Disease Reporter
Supplement 215 August 15, 1952

The list by Tai[2] and the index by Ling[3], as well as the monograph by Teng[4], adequately cover the parasitic fungi of plants known to occur in China. Darker's list[5], which covers Eastern Asia, is apparently the only list of a similar nature that attempts to cover the occurrence of non-fungus diseases in China.

For the most part reports on the occurrence of plant diseases in China are published either in Chinese or in periodicals of limited circulation, and are therefore frequently overlooked by workers outside of that country. The purpose of this index is to provide ready access to known information concerning the occurrence and distribution of such non-fungus diseases as those incited by malnutrition, bacteria, parasitic phanerogams, nematodes, viruses, and other agents.

In the preparation of this index an effort has been made to make the list as complete and current as possible. The diseases of Taiwan (Formosa) have not been included because of inadequate library facilities. It is hoped that a supplementary list covering that area can be published in the near future. The compiler would appreciate having brought to his attention any omissions or errors in this index.

ABUTILON
A. avicennae Gaertn., Indian mallow
Mosaic, virus unidentified. Manchuria (18)

ACER
A. buergerianum Miq.
Dodder (Cuscuta japonica Choisy). Chekiang[6] (40)
Acer sp.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

ACTINOSTEMMA
A. lobatum Max. var. racemosum Max.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

ACHYRANTHES
A. bidentata Bl.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

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[2]Tai, F. L. 1936-37. A list of fungi hitherto known from China, Parts I, II, III and IV. Sci. Rept. Tsing Hua Univ. Ser. B 2: 137-165, 191-639.
[3]Ling, L. 1948. Host index of the parasitic fungi of Szechwan, China. Plant Dis. Reptr. Suppl. 173: 1-38.
[4]Teng, S. C. 1939. A contribution to our knowledge of the higher fungi of China, 614 pp. Nat. Inst. Zool. and Bot., Academia Sinica, Nanking, China.
[5]Darker, G. D. 1940. A brief host index of some plant pathogens and virus diseases in Eastern Asia. Plant Dis. Reptr. Suppl. 122:93-123.
[6]Name of province.

AGERATUM
A. conyzoides L.
Root knot (Heterodera marioni (Cornu) Goodey) [Meloidogyne sp.]. Kwangtung (22)

AGROPYRON
A. semicostatum (Steud.) Nees
Dodder (Cuscuta japonica Choisy). Chekiang (40)

AKEBIA
A. quinata Decne., five-leaf akebia
Dodder (Cuscuta japonica Choisy). Chekiang (40)

ALANGIUM
A. platanifolium Harms.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

ALBIZZIA
A. julibrissin Durazz., silk tree
Dodder (Cuscuta japonica Choisy). Chekiang (40)

ALEURITES
Aleurites sp., tung oil tree
Bacterial leaf spot, unidentified. Kwangsi (48)
Mistletoe (Phoradendron sp.). Kwangsi (48)
Witches' broom, virus unidentified. Shansi (29)

ALLIUM
A. cepa L., onion
Bacterial soft rot (Erwinia aroideae (Town.) Holland). Kiangsu (53)
Root-knot (Heterodera marioni (Cornu) Goodey). Kwangtung (22)
A. nipponicum Fr. & Sav.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

AMARANTHUS
A. caudatus L.
Dodder (Cuscuta japonica Choisy). Chekiang (40)
A. spinosus L.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

AMORPHOPHALLUS
A. konjac K. Koch
Bacterial soft rot (Erwinia carotovora (L. R. Jones) Holland). Sikang (8)

AMPELOPSIS
A. heterophylla S. & Z.
Dodder (Cuscuta japonica Choisy). Chekiang (40)
A. sp.
Dodder (Cuscuta japonica Choisy). Chekaing (40)

APHANANTHE
A. aspera Planch.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

APIUM
A. graveolens L., celery
Bacterial leaf spot (Pseudomonas apii Jagger). Honan (42)
Bacterial soft rot (Erwinia aroideae (Town.) Holland). Kiangsu (53), Manchuria (18)
Mosaic, virus unidentified. Shantung (52), Szechuan (52)
Root-knot (Heterodera marioni (Cornu) Goodey). [Meloidogyne sp.] Kwangtung (22)
Yellows (Chlorogenus callistephi Holmes var. californicus Holmes, Callistephus virus 1 A). Sikang (8)

ARACHIS

A. hypogaea L., peanut

Bacterial wilt (Xanthomonas solanacearum (E. F. Sm.) Dowson). Kwangsi (38)
Mosaic, virus unidentified. Fukien (23), Shantung (52)
Rosette (Marmor arachidis Holmes, Arachis virus 1). Sikang (8)
Virus, unidentified. Kiangsu (53)

ARCTIUM

A. lappa L., burdock

Bacterial black spot (Xanthomonas nigromaculans (Takimoto) Dowson). Hopeh (30), Jehol (18), Manchuria (18)

ARTEMISIA

A. capillaris Thunb., tarragon

Dodder (Cuscuta japonica Choisy). Chekiang (40)

A. japonica Thunb.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

A. vulgaris L., mugwort

Dodder (Cuscuta japonica Choisy). Chekiang (40)

A. vulgaris L. var. parviflora Max.

Dodder (Cuscuta japonica Choisy). Chekaing (40)

ASTER

A. trinervius Roxb. var. adustus Max.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

ASTEROMOEA

Asteromoea sp.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

BENINCASA

B. hispida (Thunb.) Cogn., white gourd

Bacterial wilt (Erwinia tracheiphila (E. F. Sm.) Holland, or Xanthomonas solanacearum (E. F. Sm.) Dowson). Southern China (33)

BEGONIA

B. evansiana Andr.

Bacterial leaf spot (Xanthomonas begoniae (Takimoto) Dowson). Honan (42)

BETA

B. vulgaris L., beet

Bacterial leaf spot (Pseudomonas aptata (Brown & Jamieson) F. L. Stevens). Manchuria (18)
Bacterial soft rot (Erwinia carotovora (L. R. Jones) Holland). Honan (42)
Crown gall (Agrobacterium tumefaciens (E. F. Sm. & Town.) Conn). Manchuria (18)
Root-knot (Heterodera marioni (Cornu) Goodey) [Meloidogyne sp.] Kwangtung (22)

BLUMEA

B. hieracifolia DC.

Root-knot (Heterodera marioni (Cornu) Goodey) [Meloidogyne sp.] Kwangtung (22)

BOEHMERIA

B. nivea Gaud., ramie

Dodder (Cuscuta japonica Choisy). Chekiang (40)

B. platanifolia Fr. & Sav.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

BRASSICA

B. alboglabra Bailey

Bacterial black spot (Pseudomonas maculicola (McCul.) F. L. Stevens). Kwangtung (26)

(Brassica continued)

B. campestris L. Field mustard
- Mosaic (may be a strain of Marmor brassicae Holmes, Turnip virus 1). "Widespread in different districts in China." (27)
- Mosaic, virus unidentified. Chekiang (52), Kiangsu (52)
- Virus, unidentified. Kiangsu (53)

B. caulorapa Pasq., kohlrabi
- Bacterial black spot (Pseudomonas maculicola (McCul.) F. L. Stevens). Jehol (18)
- Bacterial soft rot (Erwinia aroideae (Town.) Holland). Hopeh (2)

B. cernua Thunb.
- Bacterial soft rot (Erwinia aroideae (Town.) Holland). Fukien (23)

B. chinensis L., pak choi
- Bacterial black spot (Pseudomonas maculicola (McCul.) F. L. Stevens). Hunan (26), Kwangtung (26)
- Bacterial soft rot (Erwinia aroideae (Town.) Holland). Hunan (26), Kiangsu (53)
- Mosaic (may be a strain of Marmor brassicae Holmes, Turnip virus 1). "Widespread in different districts in China." (27)
- Stem-rot, nonpar. Kweichow (39)
- Virus, unidentified. Kiangsu (53)

B. juncea Coss., leaf-mustard
- Bacterial black spot (Pseudomonas maculicola (McCul.) F. L. Stevens). Hunan (26), Kwangtung (26)
- Bacterial soft rot (Erwinia aroideae (Town.) Holland). Fukien (23), Hunan (26)
- Mosaic (may be a strain of Marmor brassicae Holmes, Turnip virus 1). "Widespread in different districts in China." (27)
- Mosaic, virus unidentified. Fukien (5)

B. napus L., rape
- Bacterial black spot (Pseudomonas maculicola (McCul.) F. L. Stevens). Yunnan (26)

B. oleracea L. var. acephala DC., common kale
- Bacterial black spot (Pseudomonas maculicola (McCul.) F. L. Stevens). Sikang (8)
- Bacterial soft rot (Erwinia aroideae (Town.) Holland). Fukien (23), Kiangsu (53)
- Bacterial soft rot (Erwinia carotovora (L. R. Jones) Holland). Honan (42)
- Black rot (Xanthomonas campestris (Pam.) Dowson). Manchuria (18)
- Virus, unidentified. Kiangsu (53)

B. oleracea L. var. capitata L., cabbage
- Bacterial soft rot (Erwinia aroideae (Town.) Holland). East China (32), Hopeh (2), Suiyuan (30)
- Bacterial soft rot (Erwinia carotovora (L. R. Jones) Holland). Szechuan (31)
- Black rot (Xanthomonas campestris (Pam.) Dowson). Suiyuan (30), Szechuan (31)

B. pekinensis Rupr., chinese cabbage
- Bacterial soft rot (Erwinia aroideae (Town.) Holland). Fukien (23), Kiangsu (16, 53), Manchuria (18)
- Bacterial soft rot (Erwinia carotovora (L. R. Jones) Holland). Honan (42), Kiangsu (16)
- Black rot (Xanthomonas campestris (Pam.) Dowson). Manchuria (18)
- Mosaic, virus unidentified. Manchuria (18)
- Virus, unidentified. Kiangsu (53)

B. rapa L., turnip
- Bacterial black spot (Pseudomonas maculicola (McCul.) F. L. Stevens). Sikang (8)
- Mosaic (may be a strain of Marmor brassicae Holmes, Turnip virus 1). "Widespread in different districts in China." (27)

Brassica sp.
- Bacterial soft rot (Erwinia aroideae (Town.) Holland). Sikang (8)
- Mosaic, virus unidentified. Anhwei (52), Chekiang (52), Kiangsu (52)
- Root-knot (Heterodera marioni (Cornu) Goodey) [Meloidogyne sp.] Kwangtung (22)

BROMUS

B. japonicus Thunb., Japanese chess
- Dodder (Cuscuta japonica Choisy). Chekiang (40)

BROUSSONETIA

B. kaempferi Sieb., paper mulberry

(Broussonetia continued)
Dodder (Cuscuta japonica Choisy). Chekiang (40)

BUPLEURUM
B. falcatum L.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

CALLICARPA
C. japonica Thunb.
Dodder (Cuscuta japonica Choisy). Chekiang (40)
Callicarpa sp.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

CANARIUM
C. album (l.) Raeusch., Chinese olive
Crown gall (Agrobacterium tumefaciens (E. F. Sm. & Town.) Conn). Kwangtung (41)
Algal leaf spot (Cephaleuros virescens Kunze). Kwangtung (13)

CANAVALIA
C. gladiata DC., sword bean
Root-knot (Heterodera marioni (Cornu) Goodey). [Meloidogyne sp.] Kwangtung (22)

CAPSICUM
C. frutescens L., red pepper
Bacterial soft rot (Erwinia aroideae (Town.) Holland). Hunan (26), Jehol (18), Kiangsu (53), Kwangsi (26), Manchuria (18), Sikang (8), Yunnan (26)
Bacterial spot (Xanthomonas vesicatoria (Doidge) Dowson). Hunan (26), Manchuria (18), Shansi (29), Sikang (8), Yunnan (26, 36)
Brown rot (Xanthomonas solanacearum (E. F. Sm.) Dowson). Kiangsu (53)
Leaf curl, virus unidentified. Kwangtung (41)
Mosaic, virus unidentified. Chahar (30), Honan (42), Manchuria (18), Shansi (29), "widespread" (52)
Virus, unidentified. Kiangsu (53)
Witches' broom, virus unidentified. Honan (42)
C. frutescens L. var. grossum Bailey, bell pepper
Bacterial leaf spot (Pseudomonas sp.) Hopeh (2)
Capsicum sp.
Virus, unidentified. Kwangtung (15)

CARICA
C. papaya L., papaya
Mosaic, virus unidentified. Kwangtung (15, 41)
Root-knot (Heterodera marioni (Cornu) Goodey). [Meloidogyne sp.] Kwangtung (22)

CARPESIUM
C. abrotaniodes L.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

CASTANEA
C. mollissima Bl., Chinese or oriental chestnut
Algal leaf spot (Cephaleuros virescens Kunze). Kwangtung (13)
Mistletoe (Loranthus yadoriki Sieb.). Fukien (5)
Mistletoe (Viscum japonicum Thunb.). Fukien (5)
Castanea sp.
Bacterial spot (Pseudomonas sp.). Honan (42)

CATALPA
Catalpa sp.
Root-knot (Heterodera marioni (Cornu) Goodey). [Meloidogyne sp.]. Szechuan (31)

CELTIS
C. sinensis Pers., Chinese hackberry

(Celtis continued)
Dodder (Cuscuta japonica Choisy). Chekiang (40)

CHIONANTHUS
C. retusa Lindl., fringe tree
Dodder (Cuscuta japonica Choisy). Chekiang (40)

CHRYSANTHEMUM
Chrysanthemum sp.
Spotted wilt (Lethum australiense Holmes, Lycopersicon virus 3). Sikang (8)

CICHORIUM
C. endivia L., endive
Bacterial soft rot (Erwinia carotovora (L. R. Jones) Holland). Honan (42)

CINNAMOMUM
C. camphora Nees & Eberm., camphor-tree
Mistletoe (Loranthus yadoridi Sieb.). Fukien (5)
Mistletoe (Phoradendron sp.) Kwangsi (48)
C. cassia Bl., cassia-bark tree
Algal leaf spot (Cephaleuros virescens Kunze). Kwangtung (13)

CIRSIUM
C. japonicum DC.
Dodder (Cuscuta japonica Choisy). Chekiang (40)
Cirsium sp.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

CITRULLUS
C. vulgaris Schrad., watermelon
Mosaic, virus unidentified. Honan (42)

CITRUS
C. aurantifolia Swingle, persian lime
Canker (Xanthomonas citri (Hasse) Dowson). Kwangsi (17)
Greasy spot, nonpar. Kwangsi (17)
C. aurantium L., sour orange
Canker (Xanthomonas citri (Hasse) Dowson). Fukien (23), Kwangtung (41)
C. erythrosa Tanaka
Canker (Xanthomonas citri (Hasse) Dowson). Kwangsi (17)
Foliocellosis, nonpar. Kwangsi (17)
Root-knot (Tylenchulus semi-penetrans Cobb). Kwangtung (21)
C. grandis Osbeck, shaddock
Canker (Xanthomonas citri (Hasse) Dowson). Kiangsi (25), Kwangsi (17, 26), Kwangtung (41), Southern China (33, 34)
Foliocellosis, nonpar. Kwangsi (17)
Greasy spot, nonpar. Fukien (25), Kiangsi (25), Kwangsi (17)
Mistletoe (Loranthus parasiticus (L.) Merr.). Southern China (33, 34)
Mistletoe (L. yadoriki Sieb.). Fukien (5)
Mistletoe (Loranthus sp.). Kwangsi (17)
Mottling, virus unidentified. Kwangsi (17)
Root-nematode (Tylenchulus semi-penetrans Cobb). Kwangtung (21)
Pitting, nonpar. Kwangsi (17)
Psorosis (Rimocortius psorosis (Fawcett) Holmes). Kwangsi (17, 38)
C. hotokan Hayata
Canker (Xanthomonas citri (Hasse) Dowson). Fukien (23)
C. limon Burm., lemon
Canker (Xanthomonas citri (Hasse) Dowson). Fukien (25), Kiangsi (17, 25), Southern China (33, 34)
Decline, nonpar. Fukien (25), Kwangtung (25)
Greasy spot, nonpar. Kwangsi (17)

(Citrus continued)

Oleocellosis, nonpar. Fukien (25), Szechuan (25)
Root-nematode (Tylenchulus semi-penetrans Cobb). Kwangtung (21)

C. medica L., citron
Canker (Xanthomonas citri (Hasse) Dowson). Kwangsi (17), Kwangtung (41)

C. medioglobosa Hort. ex Tanaka
Canker (Xanthomonas citri (Hasse) Dowson). Kwangsi (17)

C. microcarpa Bge., Calamondin orange
Canker (Xanthomonas citri (Hasse) Dowson). Kwangsi (17)
Root nematode (Tylenchulus semi-penetrans Cobb). Kwangtung (21)

C. nobilis Lour.
Canker (Xanthomonas citri (Hasse) Dowson). Kwangsi (17), Kwangtung (41), Sikang (8), Southern China (33, 34).
Foliocellosis, nonpar. Kwangsi (17)
Greasy spot, nonpar. Kwangsi (17), Yunnan (36)
Mottle leaf, nonpar. Kwangtung (41)
Psorosis (Rimorcortius psorosis (Fawcett) Holmes). Kwangsi (17, 38)
Root-nematode (Tylenchulus semi-penetrans Cobb). Kwangtung (21)
Rosette, nonpar. Southern China (34)
Yellowing, nonpar. Kwangtung (41)
Witches' broom, nonpar. Southern China (34)

C. nobilis var. deliciosa Swingle, mandarin and tangerine orange
Canker (Xanthomonas citri (Hasse) Dowson). Kwangsi (17)
Foliocellosis, nonpar. Kwangsi (17)
Greasy spot, nonpar. Kwangsi (17)

C. oleocarpa Hort. ex Tanaka
Foliocellosis, nonpar. Kwangsi (17)

C. poonensis Tanaka
Canker (Xanthomonas citri (Hasse) Dowson). Kwangsi (17)
Decline, nonpar. Fukien (25), Kwangtung (25)
Foliocellosis, nonpar. Kwangsi (17)
Greasy spot, nonpar. Fukien (25), Kiangsi (25), Kwangsi (17)
Mistletoe (Loranthus sp.). Fukien (25)

C. sinensis Osbeck, sweet orange
Canker (Xanthomonas citri (Hasse) Dowson). Fukien (5, 23, 25), Hunan (26), Kwangsi (17, 26, 38), Kwangtung (41), Sikang (8), Southern China (33, 34).
Convex gum, virus ? Fukien (24, 25)
Foliocellosis, nonpar. Kwangsi (17)
Greasy spot, nonpar. Fukien (25), Kiangsi (25), Kwangsi (17)
Magnesium deficiency, nonpar. Fukien (25), Kiangsi (25)
Mesophyll collapse, nonpar. Fukien (25), Kiangsi (25), Szechuan (25)
Mottle leaf, nonpar. Kwangtung (41), Southern China (33, 34)
Oleocellosis, nonpar. Fukien (25), Szechuan (25)
Psorosis (Rimocortius psorosis (Fawcett) Holmes). Kwangsi (38)
Root-nematode (Tylenchulus semi-penetrans Cobb). Kwangtung (21)
Rosette, nonpar. Southern China (33, 34)
Yellowing, nonpar. Kwangtung (41), Southern China (33, 34)

C. suhoiensis Tanaka
Canker (Xanthomonas citri (Hasse) Dowson). Kwangsi (17)
Greasy spot, nonpar. Kwangsi (17)

C. tankan Hayata
Canker (Xanthomonas citri (Hasse) Dowson). Fukien (23, 25), Kwangsi (17)
Decline, nonpar. Fukien (25), Kwangtung (25)
Greasy spot, nonpar. Fukien (25), Kiangsi (25), Kwangsi (17)

C. tangerina Hort. ex Tanaka
Bark rot, virus ? Fukien (25)
Fruit splitting, nonpar. Fukien (25)
Mistletoe (Loranthus sp.). Fukien (25)

C. webberi
Canker (Xanthomonas citri (Hasse) Dowson). Kwangtung (41)

Citrus sp.
Canker (Xanthomonas citri (Hasse) Dowson). Fukien (23), Kwangsi (48), Kwangtung (14)

(Citrus continued)
Chlorosis, nonpar. Kwangsi (38)
Dodder (Cuscuta sp.) Kwangsi (48)
Foliocellosis, nonpar. Szechuan (31)
Greasy spot, nonpar. Kwangtung (14)
Mistletoe (Loranthus sp.). Kwangsi (38)
Mottle leaf, nonpar. Kwangsi (38), Kwangtung (14)

CLAUSENA
C. lansium Skeels, wampi
Mistletoe (Loranthus parasiticus (L.) Merr.). Southern China (33, 34)

COCCULUS
C. trilobus DC.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

COLOCASIA
C. esculenta (L.) Schott, taro
Bacterial leaf spot (? Bacterium colocasiae Takimoto). Manchuria (18), Sikang (8)
Bacterial soft rot (Erwinia aroideae (Town.) Holland). Sikang (8)

COLUMELLA
C. japonica (Willd.) Merr
Dodder (Cuscuta japonica Choisy). Chekiang (40)

COMMELINA
C. communis L.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

CORCHORUS
C. capsularis L., jute
Bacterial leaf spot (Xanthomonas nakatae (Okabe) Dowson). Hopeh (20), Shantung (20), Sikang (8)

CROTALARIA
C. saltiana Andr., rattle-box
Virus, unidentified Kwangtung (15)

CRYPTOTAENIA
C. canadensis DC., honewort
Dodder (Cuscuta japonica Choisy). Chekiang (40)

CUCUMIS
C. melo L., muskmelon
Bacterial spot (Pseudomonas lachrymans (E. F. Sm. & Bryan) Carsner). Honan (42)
Mosaic, virus unidentified. Honan (42), Manchuria (18)
C. sativus L., cucumber
Bacterial soft rot (Erwinia aroideae (Town.) Holland). Kiangsu (53)
Bacterial spot (Pseudomonas lachrymans (E. F. Sm. & Bryan) Carsner). Honan (42), Manchuria (18), Sikang (8)
Bacterial wilt (Erwinia tracheiphila (E. F. Sm.) Holland). Honan (42), Szechuan (31)
Mosaic (Delphinium virus 1). Sikang (8)
Mosaic (Marmor cucumeris Holmes, Cucumis virus 1). Hopeh (6), Sikang (8)
Mosaic, virus unidentified. Chekiang (52), East China (32), Honan (42), Kiangsi (52), Kiangsu (52), Kwangtung (15), Manchuria (18)
Root-knot (Heterodera marioni (Cornu) Goodey). [Meloidogyne sp.]. Kwangtung (22)
Cucumis sp.
Root knot (Heterodera marioni (Cornu) Goodey). [Meloidogyne sp.] Kwangtung (22)

CUCURBITA
C. maxima Duchesne, squash

(Cucurbita continued)

Mosaic, virus unidentified. Honan (42)

Root knot (Heterodera marioni (Cornu) Goodey). [Meloidogyne sp.]. Kwangtung (22)

C. moschata Duchesne, squash

Bacterial spot (Pseudomonas lachrymans (E. F. Sm. & Bryan) Carsner). Manchuria (18)

Mosaic, virus unidentified. East China (32), Manchuria (18), Shansi (30)

C. pepo L., pumpkin

Bacterial spot (Pseudomonas lachrymans (E. F. Sm. & Bryan) Carsner). Sikang (8)

Mosaic (Marmor cucumeris Holmes, Cucumis virus 1). Sikang (8)

Mosaic, virus unidentified. Kiangsu (52)

Cucurbita sp.

Mosaic, virus unidentified. Kiangsu (52)

CUDRANIA

C. tricuspidata Hce.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

DAHLIA

Dahlia sp., dahlia

Mosaic, virus unidentified. Kiangsu (52)

DALBERGIA

D. hupenana Hce.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

DATURA

D. metel L., datura

Mosaic, virus unidentified. Kiangsu (52)

DAUCUS

D. carota L., carrot

Bacterial soft rot (Erwinia aroideae (Town.) Holland). Kiangsu (53), Sikang (8)

Bacterial soft rot (Erwinia carotovora (L. R. Jones) Holland). Honan (42), Manchuria (18)

Root-knot (Heterodera marioni (Cornu) Goodey). [Meloidogyne sp.]. Kwangtung (22)

DESMODIUM

D. laburnifolium DC.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

DIOSPYROS

D. kaki L., persimmon

Algal leaf spot (Cephaleuros virescens Kunze). Kwangtung (13)

D. kaki L. var. silvestris Mak.

Mistletoe (Loranthus yadoridi Sieb.). Fukien (5)

DOLICHOS

D. lablab L., hyacinth bean

Mosaic, virus unidentified. Chekiang (52), Honan (42), Kiangsu (52)

ECHINOCHLOA

E. crusgalli (L.) Beauv., barnyard grass

Dodder (Cuscuta japonica Choisy). Chekiang (40)

ERIOBOTRYA

E. japonica Lindl., loquat

Bacterial canker (Pseudomonas eriobotryae (Takimoto) Dowson). Sikang (8)

EUPATORIUM

E. chinensis L.

(Eupatorium continued)
Dodder (Cuscuta japonica Choisy). Chekiang (40)
E. japonica Thunb.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

EUPHORBIA
E. longan Lam., longan
Algal leaf spot (Cephaleuros virescens Kunze). Kwangtung (13), Southern China (33)
Erinose (Eriophyes sp.). Kwangtung (13)

EVONYMUS
E. alata Reg., winged spindle-tree
Dodder (Cuscuta japonica Choisy). Chekiang (40)
E. hamiltoniana Wall.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

FICUS
F. carica L., fig
Mosaic, virus unidentified. Kiangsu (52), Kwangtung (15)
Virus, unidentified. Kiangsu (53)

FLUEGGEA
F. capillipes Pax
Dodder (Cuscuta japonica Choisy). Chekiang (40)

FORTUNELLA
F. crassifolia Swingle, Meiwa kumquat
Blast, (Pseudomonas syringae Van Hall). Kwangsi (17)
Canker (Xanthomonas citri (Hasse) Dowson). Kwangsi (17)
Fruit splitting, nonpar. Kwangsi (17)
Fortunella sp.
Root nematode (Tylenchulus semi-penetrans Cobb). Kwangtung (22)

FRAXINUS
F. bungeana DC.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

GARDENIA
G. jasminoides Ellis, Cape-jasmine
Dodder (Cuscuta japonica Choisy). Chekiang (40)

GLYCINE
G. max (L.) Merr., soybean
Bacterial leaf blight (Xanthomonas phaseoli (E. F. Sm.) Dowson var. sojense (Hedges) Starr & Burkh.). Anhwei (9), Honan (42), Hopeh (9, 30), Jehol (18), Kiangsu (9), Kwangtung (26), Manchuria (18), Shansi (29, 30), Shantung (9, 30), Suiyuan (30), Yunnan (26)
Bacterial leaf spot (Pseudomonas glycinea Coerper). Honan (42), Sikang (8)
Bacterial leaf spot (Pseudomonas glycinea var. japonica (Takimoto) Savulescu). Jehol (18), Manchuria (18)
Dodder (Cuscuta chinensis Lam.). Honan (42), Jehol (18), Manchuria (18)
Mosaic (Soja virus 1). Sikang (8)
Mosaic, virus unidentified. Anhwei (52), East China (32), Honan (42), Hopeh (30), Kiangsu (52), Manchuria (18), Shantung (52)
Virus, unidentified. Kiangsu (53)

GOSSYPIUM
G. barbadense L., sea-island cotton
Angular leaf spot (Xanthomonas malvacearum (E. F. Sm.) Dowson). Yunnan (36)
G. herbaceum L., G. hirsutum L., cotton
Albasty, nonpar. Anhwei (9), Hopeh (9), Kiangsu (9), Shantung (9)
Angular leaf spot (Xanthomonas malvacearum (E. F. Sm.) Dowson). Anhwei (9, 35),

(Gossypium continued)

Chekiang (35), Fukien (5), Honan (35, 42), Hopeh (2, 9, 30, 35), Hunan (26, 35), Hupeh (35), Jehol (18), Kiangsi (35), Kiangsu (9, 35, 53), Kwangsi (35, 38, 48), Kweichow (39), Manchuria (18), Shansi (29, 30), Shantung (9, 30, 35), Shensi (35), Sikang (8), Szechuan (47), Yunnan (36)

Cyrtosis (Chlorita biguttula Mats.). Anhwei (7, 35), Chekiang (7, 35), East China (32), Honan (7, 35, 42), Hopeh (35), Hunan (7, 35), Hupeh (7, 35), Kiangsi (7, 35), Kiangsu (7, 35, 53), Kweichow (39), Kwangsi (35), Shantung (35), Szechuan (47)

"Rust" or potash hunger, nonpar. Honan (35, 42), Hopeh (35), Kiangsu (35), Shantung (35)

Tomosis (Lygus lucorum Fieb. var. Adelphocoris suturalis Jak.). Anhwei (35), Chekiang (35), Honan (35, 42), Hopeh (35), Hunan (35), Hupeh (35), Kiangsi (35), Kiangsu (35, 53), Shantung (35), Szechuan (47)

HELIANTHUS

H. annuus L., sunflower

Bacterial leaf spot (Pseudomonas helianthi (Kawamura) Savulescu). Manchuria (18)

Mosaic, virus unidentified. Manchuria (18)

HEMIPTELEA

H. davidi Planch.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

HIBISCUS

H. esculentus L., okra

Root knot (Heterodera marioni (Cornu) Goodey). [Meloidogyne sp.]. Kwangtung (22)

Hibiscus sp.

Bacterial spot (Pseudomonas syringae Van Hall). Sikang (8)

HORDEUM

H. vulgare L., barley

Bacterial blight (Xanthomonas translucens (L. R. Jones et al.) Dowson). Manchuria (18)

HUMULUS

H. scandens Merr., Japanese hop

Dodder (Cuscuta japonica Choisy). Chekiang (40)

IMPERATA

I. cylindrica (L.) Beauv.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

IPOMOEA

I. batatas Lam., sweetpotato

Mosaic, virus unidentified. Chekiang (52)

Virus, unidentified. Kiangsu (53)

I. reptans (L.) Poir.

Root-knot (Heterodera marioni (Cornu) Goodey). [Meloidogyne sp.]. Kwangtung (22)

JUGLANS

J. regia L. Persian walnut

Bacterial blight (Xanthomonas juglandis (Pierce) Dowson). Honan (42), Hopeh (30)

KOELREUTERIA

K. integrifoliola Merr.

Dodder (Cuscuta japonica Choisy) Chekiang (40)

LACTUCA

L. sativa L., lettuce

Bacterial marginal rot (Pseudomonas marginalis (N. A. Brown) F. L. Stevens). Manchuria (18), Szechuan (31)

Bacterial soft rot (Erwinia aroideae (Town.) Holland). Kiangsu (53)

Bacterial spot (Xanthomonas vitians (N. A. Brown) Starr & Weiss). Hunan (26)

(Lactuca continued)
Mosaic, virus unidentified. Chekiang (52), Hupeh (52), Kiangsu (52), Szechuan (52)
Root-knot (_Heterodera marioni_ (Cornu) Goodey). [_Meloidogyne_ sp.]. Kwangtung (22)
Virus, unidentified. Kiangsu (53)

LAGENARIA
L. siceraria Standl., white-flowered gourd
Bacterial spot (_Pseudomonas lachrymans_ (E. F. Sm. & Bryan) Carsner). Sikang (8)
Mosaic (_Marmor cucumeris_ Holmes, _Cucumis_ virus 1). Sikang (8)

LATHYRUS
L. odoratus L., sweetpea
Virus, unidentified. Kiangsu (53)

LINUM
L. usitatissimum L., flax
Dodder (_Cuscuta epilinum_ Weihe). Manchuria (18)

LIGUSTRUM
L. lucidum Ait., glossy privet
Dodder (_Cuscuta japonica_ Choisy). Chekiang (40)
L. compactum Hook
Dodder (_Cuscuta japonica_ Choisy). Chekiang (40)
L. robustum Bl.
Dodder (_Cuscuta japonica_ Choisy). Chekiang (40)

LIQUIDAMBAR
L. formosana Hance
Dodder (_Cuscuta japonica_ Choisy). Chekiang (40)
Mistletoe (_Loranthus yadoriki_ Sieb.). Fukien (5)
Mistletoe (_Phoradendron_ sp.). Kwangsi (48)

LITCHI
L. chinensis Soon., litchi
Algal leaf spot (_Cephaleuros virescens_ Kunze). Kwangtung (13)
Erinose (_Eriophyes_ sp.). Kwangtung (13)

LITHOCARPUS
L. uvariifolia (Hance) Rehder
Algal leaf spot (_Cephaleuros virescens_ Kunze). Kwangtung (13)

LUFFA
L. acutangula Roxb., acute-angled cucumber
Bacterial spot (_Pseudomonas lachrymans_ (E. F. Sm. & Bryan) Carsner). Sikang (8)

LYCOPERSICON
L. esculentum Mill., tomato
Bacterial spot (_Pseudomonas vesicatoria_ (Doidge) Dowson). Honan (42), Hunan (26)
Bacterial soft rot (_Erwinia carotovora_ (L. R. Jones) Holland). Szechuan (45)
Bacterial wilt (_Xanthomonas solanacearum_ (E. F. Sm.) Dowson). Hunan (26), Fukien (5, 23), Kiangsu (53), Kwangtung (26), Southern China (33)
Blossom end rot, nonpar. Fukien (5), Kweichow (39), Manchuria (18)
Bottom rot, nonpar. Szechuan (45)
Bunchy top (_Lycopersicon_ virus 6). Szechuan (45)
Common mosaic (_Marmor tabaci_ Holmes, _Nicotiana_ virus 1). Fukien (23), Chekiang (52), Honan (52), Kiangsu (32, 52), Kwangtung (41), Shansi (29), Shantung (52), Szechuan (45)
Fern leaf (_Marmor cucumeris_ Holmes, _Cucumis_ virus 1). Szechuan (45)
Leaf curl, virus unidentified. Chekiang (52), Honan (52), Kiangsu (52), Shantung (52)
Leaf roll, virus unidentified. Kiangsu (52)
Root-knot (_Heterodera marioni_ (Cornu) Goodey). [_Meloidogyne_ sp.]. Kwangtung (22)

(Lycopersicon continued)

Rugose mosaic, virus unidentified. Kiangsu (52)
Spotted wilt (Lethum australiense Holmes, Lycopersicon virus 3). Szechuan (45)
Streak (Complex of Marmor dubium (Holmes) Holmes and M. tabaci Holmes; Solanum virus 1 and Nicotiana virus 1). Kiangsu (52), Szechuan (45)
Virus, unidentified. Jehol (18), Kiangsu (53), Manchuria (18), Kwangtung (15)
Yellow mosaic (Marmor tabaci Holmes, Nicotiana virus 1). Szechuan (45)
Witches' broom, virus unidentified. Honan (42)

LYCORIS

L. radiata Herb.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

MALLOTUS

M. repandus Muell-Arg.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

MALUS

M. sylvestris Mill., apple
Crown gall (Agrobacterium tumefaciens (E. F. Smith & Town.) Conn). Kiangsu (53), Manchuria (18)
Mosaic, virus unidentified. Hopeh (2, 30), Manchuria (18)

MALVA

M. sylvestris L., cheese flower
Dodder (Cuscuta japonica Choisy). Chekiang (40)

MAGNOLIA

M. grandiflora L.
Algal leaf spot (Cephaleuros virescens Kunze). Kwangtung (13)

MANGIFERA

M. indica L., mango
Algal leaf spot (Cephaleuros virescens Kunze). Kwangtung (13)
Pleurococcus blotch (Pleurococcus sp.). Kwangtung (13)

MEDICAGO

M. sativa L., alfalfa
Mosaic, virus unidentified. Kiangsu (52)

MELILOTUS

M. alba Desr., white sweetclover
Mosaic, virus unidentified. Kiangsu (52)
M. indica All.
Bacterial leaf spot (Pseudomonas syringae Van Hall). Yunnan (26)

MICHELIA

M. fuscata Bl.
Algal leaf spot (Cephaleuros virescens Kunze). Kwangtung (13)

MISCANTHUS

M. sinensis Anderss., eulalia
Dodder (Cuscuta japonica Choisy). Chekiang (40)
Miscanthus sp.
Broom rape (Orobanche sp.). Honan (42)

MORUS

M. alba L., white-fruited mulberry
Bacterial blight (Pseudomonas mori (Boyer & Lambert) F. L. Stevens). Kiangsu (53), Kwangtung (41), Sikang (8), Szechuan (31)
Mosaic, virus unidentified. Kwangtung (15)

(Morus continued)

Root-knot (Heterodera marioni (Cornu) Goodey) [Meloidogyne sp.]. Kwangtung (22)

NELUMBO

N. nucifera Gaertn., East Indian lotus

Dodder (Cuscuta japonica Choisy). Chekiang (40)

NICOTIANA

N. tabacum L., tobacco

Angular leaf spot (Pseudomonas angulata (Fromme & Murray) Holland). Sikang (8), Yunnan (26)

Black leg (Erwinia aroideae (Town.) Holland). Honan (42), Hopeh (30), Kiangsu (53), Manchuria (18), Sikang (8)

Chlorosis, nonpar. Southern China (33)

Common mosaic (Marmor tabaci Holmes, Nicotiana virus 1). Chahar (30), Fukien (5), Honan (42), Hopeh (9, 30), Hupeh (52), Jehol (18), Kwangtung (13), Manchuria (18), Shansi (29), Shantung (9, 30, 52), Sikang (8), Southern China (33), Szechuan (49)

Granville wilt (Xanthomonas solanacearum (E. F. Sm.) Dowson). Honan (42), Hopeh (30), Kiangsu (53), Shantung (9, 30), Sikang (8), Southern China (33)

Leaf curl, virus unidentified. Hupeh (52)

Latent mosaic (Annulus dubius Holmes, Solanum virus 1). Sikang (8)

Mosaic (Marmor upsilon Holmes, Solanum virus 2). Sikang (8)

Ring spot (Annulus tabaci Holmes, Nicotiana virus 12). Honan (42), Hupeh (52), Manchuria (18), Shansi (29), Shantung (9), Sikang (8), Szechuan (49, 52)

Spot necrosis, virus unidentified. Hupeh (52)

Wild fire (Pseudomonas tabaci (Wolf & Foster) F. L. Stevens). Honan (42), Hopeh (30), Hunan (26), Jehol (18), Kiangsu (53), Kweichow (39), Manchuria (18), Shantung (30), Szechuan (49), Yunnan (26)

Virus, unidentified. Kweichow (39)

ORYZA

O. sativa L., rice

Bacterial leaf blight (Xanthomonas oryzae (Uyeda & Ishiyama) Dowson). Kiangsu (44), Sikang (8), Yunnan (36)

Dwarf disease (Fractillinea oryzae (Holmes) Holmes, Oryza virus 1). Sikang (8)

Straighthead, nonpar. Kiangsu (44)

OXALIS

O. martiana Zucc.

Root nematode (Tylenchulus semi-penetrans Cobb). Kwangtung (21)

PANICUM

P. miliaceum L., broom-corn millet

Bacterial stripe (Pseudomonas panici-miliacei (Ikata & Yamauchi) Savulescu). Manchuria (18)

PERILLA

P. ocimoides L.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

PERSEA

P. americana Mill., avocado

Algal leaf spot (Cephaleuros virescens Kunze). Kwangtung (13)

PETROSELINUM

P. crispum Nym.

Root-nematode (Tylenchulus semi-penetrans Cobb). Kwangtung (21)

PETUNIA

P. violacea Lindl., petunia

Mosaic, virus unidentified. Kiangsu (52)

PEUCEDANUM

P. decursivum Max.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

PHASEOLUS

P. limensis Macf., lima bean

Mosaic, virus unidentified. Kiangsu (52)

P. lunatus L., sieva bean

Mosaic, virus unidentified. Kwangtung (15)

P. mungo L.

Bacterial blight (Xanthomonas phaseoli (E. F. Sm.) Dowson). Manchuria (18), Sikang (8)

Common mosaic (Marmor phaseoli Holmes, Phaseolus virus 1). Honan (42), Sikang (8)

Virus, unidentified. Manchuria (18)

P. radiatus L.

Bacterial blight (Xanthomonas phaseoli (E. F. Sm.) Dowson). Manchuria (18)

Mosaic, virus unidentified. Hopeh (30)

Virus, unidentified. Manchuria (18)

P. vulgaris L., kidney bean

Bacterial leaf spot (Xanthomonas phaseoli (E. F. Sm.) Dowson var. sojense (Hedges) Starr & Burkh.). Sikang (8)

Bacterial blight (Xanthomonas phaseoli (E. F. Sm.) Dowson). Honan (42), Kiangsu (53), Southern China (33), Szechuan (31), Yunnan (26)

Common mosaic (Marmor phaseoli Holmes, Phaseolus virus 1). Hopeh (6), Sikang (8)

Mosaic, virus unidentified. Chekiang (52), Honan (42), Kiangsu (52), Kwangtung (15), Manchuria (18)

Root-knot (Heterodera marioni (Cornu) Goodey) [Meloidogyne sp.]. Kwangtung (22)

Virus, unidentified. East China (33), Kiangsu (53)

Yellow mosaic (Phaseolus virus 2). Sikang (8)

PHYLLOSTACHYS

P. bambusoides Sieb. & Zucc.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

PISUM

P. sativum L., garden pea

Mosaic, virus unidentified. Kiangsu (52), Shantung (52)

Root knot (Heterodera marioni) (Cornu) Goodey). [Meloidogyne sp.]. Kwangtung (22)

Streak (Marmor iners Holmes). Kiangsu (52)

Virus, unidentified. Kiangsu (53)

POLYGONUM

P. alatum Ham.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

P. cuspidatum Sieb. & Zucc.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

P. flaccidium Roxb.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

P. hastano-sagittatum Mak.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

POPULUS

P. alba L., white poplar

Dodder (Cuscuta japonica Choisy). Chekiang (40)

Populus sp.

Mistletoe (Viscum album L.). Honan (42)

PRIMULA

P. sinensis Lindl., Chinese primrose

Mosaic, virus unidentified. Kiangsu (52)

PRUNUS

P. armeniaca L., apricot
Bacterial spot (Xanthomonas pruni (E. F. Sm.) Dowson). Hopeh (30), Shantung (30)
Crown gall (Agrobacterium tumefaciens (E. F. Sm. & Town.) Conn). Kiangsu (53)

P. cerasus L., sour cherry
Bacterial spot (Xanthomonas pruni (E. F. Sm.) Dowson). Manchuria (18)

P. domestica L., common or European plum
Bacterial spot (Xanthomonas pruni (E. F. Sm.) Dowson). Hunan (26)

P. manshurica Kochine
Bacterial spot (Xanthomonas pruni (E. F. Sm.) Dowson). Manchuria (18)

P. persica Sieb. & Zucc., peach
Bacterial spot (Xanthomonas pruni (E. F. Sm.) Dowson). Hopeh (30), Hunan (26), Kiangsu (53), Shansi (30), Shantung (30), Sikang (8), Yunnan (26)
Crown gall (Agrobacterium tumefaciens (E. F. Sm. & Town.) Conn). Honan (42), Kiangsu (53)
Dodder (Cuscuta japonica Choisy). Chekiang (40)
Rosette, virus unidentified. Hopeh (30)
Yellowing, nonpar. Southern China (33)

P. salicina Lindl., Japanese plum
Bacterial spot (Xanthomonas pruni (E. F. Sm.) Dowson). Honan (42), Manchuria (18)

Prunus sp.
Fire blight (Erwinia amylovora (Burrill) Winslow et al.). Honan (42)

PSIDIUM

P. guajava L., guava
Algal leaf spot (Cephaleuros virescens Kunze). Kwangtung (13)
Mistletoe (Loranthus yadoridi Sieb.). Fukien (5)

PTERIDIUM

P. aquilinum (L.) Kuehn
Dodder (Cuscuta japonica Choisy). Chekiang (40)

PTEROCARYA

P. stenoptera DC., Chinese ash
Dodder (Cuscuta japonica Choisy). Chekiang (40)
Mistletoe (Loranthus yadoriki Sieb.). Sikang (8)
Mistletoe (Viscum album L.). Honan (42)

PUERARIA

P. thunbergiana Benth.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

PYRUS

P. serotina Rehd., oriental pear
Erinose (Eriophyes piri Nal.). Hopeh (30), Manchuria (18)

Pyrus sp.
Fire blight (Erwinia amylovora (Burrill) Winslow et al.). Hopeh (30), Kwangtung (41), Sikang (8)
Mistletoe (Loranthus yadoriki Sieb.). Fukien (5)

QUERCUS

Q. acutissima Carr.
Mistletoe (Loranthus yadoriki Sieb.). Sikang (8)

Q. serrata Thunb.
Mistletoe (Loranthus yadoriki Sieb.). Sikang (8)

Quercus sp.
Balanophora sp. Honan (42)

RAPHANUS

R. sativus L., radish
Bacterial black spot (Pseudomonas maculicola (McCul.) F. L. Stevens). Hunan (26), Kwangsi (26), Manchuria (18), Sikang (8)

(Raphanus continued)

Bacterial soft rot (Erwinia aroideae (Town.) Holland). Honan (42), Hopeh (2)
Bacterial soft rot (Erwinia carotovora (L. R. Jones) Holland). Honan (42)
Black rot (Xanthomonas campestris (Pam.) Dowson). Honan (42), Manchuria (18), Sikang (8)
Mosaic, virus unidentified. Jehol (18), Kiangsu (52), Manchuria (18)
Virus, unidentified. Kiangsu (53)

R. sativus L. var. longipinnatus Bailey, Chinese radish
Mosaic, (may be a strain of Marmor brassicae Holmes, Turnip virus 1). "Widespread in different districts in China." (27)

RHUS

R. chinensis Mill.
Dodder (Cuscuta japonica Choisy). Chekiang (40)
R. sylvestris Sieb. & Zucc.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

RICINUS

R. communis L., castor bean
Bacterial leaf spot (Xanthomonas ricinicola (Elliott) Dowson). Honan (42), Hopeh (19), Jehol (18), Manchuria (18), Shansi (29), Shantung (19), Sikang (8)

ROSA

R. acicularis Lindl.
Dodder (Cuscuta japonica Choisy). Chekiang (40)
R. multiflora Thunb.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

RUBUS

R. lambertianus Ser.
Dodder (Cuscuta japonica Choisy). Chekiang (40)
R. parvifolius L.
Dodder (Cuscuta japonica Choisy). Chekiang (40)
Rubus sp.
Mosaic, virus unidentified. Kiangsu (52)

RUMEX

Rumex sp.
Dodder (Cuscuta chichymum L.). Sikang (8)

SACCHARUM

S. officinarum L., sugarcane
Bacterial red stripe (Xanthomonas rubrilineans (Lee et al.) Starr & Burkh.). Kwangtung (12, 26)
Magnesium chlorosis, nonpar. Kwangtung (12)
Mosaic (Marmor sacchari Holmes, Saccharum virus 1). Fukien (5, 28, 52), Kwangtung (12, 15), Sikang (8), Szechuan (28, 52)
Sectional chlorosis, nonpar. Kwangtung (12)
Yellow stripe, nonpar. Kwangtung (12), Southern China (33)

SALIX

S. babylonica L., weeping willow
Dodder (Cuscuta japonica Choisy). Chekiang (40)
Mistletoe (Loranthus yadoridi Sieb.). Sikang (8)
S. bockii Seem.
Mistletoe (Loranthus yadoridi Sieb.). Sikang (8)
S. wilsonii Seem.
Dodder (Cuscuta japonica Choisy). Chekiang (40)
Salix sp.
Dodder (Cuscuta major DC.). Honan (42)
Dodder (Cuscuta sp.). Kwangsi (48)

SASA

S. albo-marginata Mak. & Shib.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

SAURURUS

S. loureiri Dcne., lizard's tail

Dodder (Cuscuta japonica Choisy). Chekiang (40)

SAUSSUREA

S. affinis Spr.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

SCROPHULARIA

S. patriniana Wydl.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

SESAMUM

S. indicum L., sesame

Bacterial spot (Pseudomonas sesami Malkoff). Honan (42), Hopeh (30), Hunan (26), Jehol (18), Kweichow (39), Manchuria (18), Shansi (30), Sikang (8)

Bacterial wilt (Xanthomonas solanacearum (E. F. Sm.) Dowson). Honan (42), Sikang (8)

Virus, unidentified. Kiangsu (53)

Witches' broom, virus unidentified. Honan (42)

SETARIA

S. italica (L.) Beauv., foxtail millet

Bacterial brown stripe (Pseudomonas setariae (Okabe) Savulescu). Manchuria (18)

Nematode disease (Anguillulina sp.). Hopeh (1)

SOLANUM

S. melongena L., eggplant

Bacterial wilt (Xanthomonas solanacearum (E. F. Sm.) Dowson). Manchuria (18), Sikang (8), Southern China (33)

Mosaic (Marmor tabaci Holmes, Nicotiana virus 1). Sikang (8)

Mosaic, virus unidentified. Kwangtung (15)

Root-knot (Heterodera marioni (Cornu) Goodey). [Meloidogyne sp.]. Kwangtung (22)

Virus, unidentified. Kiangsu (53)

S. tuberosum L., potato

Aucuba mosaic (Marmor aucuba Holmes, Solanum virus 9). Sikang (8)

Bacterial soft rot (Erwinia aroideae (Town.) Holland). Manchuria (18), Sikang (8)

Black leg (Erwinia carotovora (L. R. Jones) Holland). Honan (42)

Brown rot (Xanthomonas solanacearum (E. F. Sm.) Dowson). Kiangsu (53), Sikang (8)

Latent mosaic (Annulus dubius (Holmes) Holmes, Solanum virus 1). Sikang (8)

Leaf roll (Corium solani Holmes, Solanum virus 14). Chinghai (11), Honan (11, 42), Hupeh (11), Kansu (11), Kiangsu (52), Kweichow (11), Shensi (11), Szechuan (11), Yunnan (11)

Mild mosaic (Marmor solani Holmes, Solanum virus 3). Kweichow (11), Sikang (8)

Mosaic, virus unidentified. East China (32), Honan (42), Kwangtung (13, 41), Shantung (4), Shansi (30), "General" (52)

Rugose mosaic (Complex of Marmor upsilon Holmes and M. dubium (H.) Holmes; Solanum virus 2 and Solanum virus 1). Chinghai (11), Kansu (11), Kweichow (11), Shensi (11), Sikang (8), Szechuan (11)

Scab (Streptomyces scabies (Thaxter) Waksman & Henrici). Anhwei (9), East China (32), Honan (42), Hopeh (9), Kiangsu (9), Kwangtung (41), Manchuria (18), Shantung (9), Szechuan (37)

Spindle sprout, viruses unidentified. Chinghai (11), Kansu (11), Shensi (11)

Spindle tuber (Acrogenus solani Holmes, Solanum virus 12). Kiangsu (52)

Virus, unidentified. Jehol (18), Kiangsu (53), Manchuria (18)

Witches' broom (Chlorogenus solani Holmes, Solanum virus 15). Kiangsu (52), Kweichow (11)

SOPHORA

S. flavescens Ait. var. galegonides Hemsl.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

SORGHUM

S. vulgare Pers., sorghum
Bacterial spot (? Bacillus sorghi Burr.). Yunnan (26)
Bacterial spot (Pseudomonas syringae Van Hall). Hunan (26), Yunnan (26)
Bacterial stripe (Pseudomonas andropogoni (E. F. Sm.) Stapp). Honan (42), Shansi (29)
Stripe (Fractilinea zeae (Holmes) Holmes, Zea virus 1). Sikang (8)

SPINACIA

S. oleracea L., spinach
Mosaic (Marmor cucumeris Holmes, Cucumis virus 1). Sikang (8)
Mosaic, virus unidentified. Anhwei (52), Chekiang (52), Hunan (52), Hupeh (52), Kiangsi (52)
Root-knot (Heterodera marioni (Cornu) Goodey). [Meloidogyne sp.]. Kwangtung (22)
Virus, unidentified. Kiangsu (53)

SYZYGIUM

S. jambos (L.) Alston, rose-apple
Algal leaf spot (Cephaleuros virescens Kunze). Kwangtung (13)

THEA

T. sinensis L., tea
Algal leaf spot (Cephaleuros virescens Kunze). Fukien (43), Kwangtung (14)
Bacterial leaf spot (Bacillus theae Hori & Bokura). Fukien (43), Yunnan (26)
Black speck, nonpar. Fukien (43)
Dodder (Cuscuta japonica Choisy). Chekiang (46)
Silver leaf, nonpar. Fukien (43)

TORILIS

T. anthriscus Bernh.
Dodder (Cuscuta japonica Choisy). Chekiang (40)

TRIFOLIUM

T. repens L., white clover
Mosaic, virus unidentified. Kiangsu (52)
Trifolium spp.
Mosaic, virus unidentified. Kiangsu (52)

TRITICUM

T. aestivum L., wheat
Bacterial blight (Xanthomonas translucens (L. R. Jones, A. G. Johns., & Reddy) Dowson). Honan (42), Manchuria (18)
Bacterial disease (Corynebacterium tritici (Hutchinson) Burkh.). Hopeh (2, 3), Kweichow (3)
Nematode (Anguillulina tritici (Steinbuch) Gervais & v. Beneden) [Anguina tritici (Steinbuch) Filip.]. Anhwei (9, 10), Chahar (10), Chekiang (10), Chinghai (10), Fukien (10), Honan (10, 42), Hopeh (1, 2, 3, 9, 10), Hunan (10), Hupeh (10), Kansu (10), Kiangsi (10), Kiangsu (9, 10, 32, 53), Kwangsi (10), Kwangtung (10), Kweichow (3, 10), Manchuria (18), Ningsia (10), Shansi (10), Shantung (4, 9, 10), Shensi (10), Sikang (10), Sinkiang (10), Suiyuan (10), Szechuan (10), Yunnan (10)

TROPAEOLUM

T. majus L., garden nasturtium
Mosaic, virus unidentified. Szechuan (52)

VICIA

V. faba L., broad bean
Bacterial blight (Pseudomonas viciae Uyeda). Manchuria (18)

(Vicia continued)

Bacterial stem blight (Pseudomonas fabae (Yu) Burkh.). Kiangsu (50, 53)
Enation mosaic (Marmor pisi Holmes, Pisum virus 1). South-east part of China (54)
Mild mosaic, (mild mosaic virus). Chekiang (51, 52), Kiangsu (51)
Mosaic, virus unidentified. Anhwei (52), East China (32), Hunan (52), Hupeh (52), Chekiang (52), Kiangsi (52), Kiangsu (52), Szechuan (52)
Rosette, virus unidentified. Kiangsu (52)
Spotted wilt (Lethum australiense Holmes, Lycopersicon virus 3). Szechuan (56)
Virus, unidentified. Kiangsu (53)

VIGNA

V. sinensis Savi, cowpea

Mosaic (Marmor cucumeris Holmes, Cucumis virus 1). "Very prevalent along the Yangtze valley." (55)
Mosaic, virus unidentified. Anhwei (52), Honan (42), Chekiang (52), Kiangsi (52), Kiangsu (52)
Root-knot (Heterodera marioni (Cornu) Goodey) [Meloidogyne sp.]. Kwangtung (23)
Virus, unidentified. East China (32), Kiangsu (53), Szechuan (37)
Witches' broom, virus unidentified. Honan (42)

VITEX

V. trifolia L.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

VIOLA

Viola sp.

Mosaic, virus unidentified. Honan (42)
Root-nematode (Tylenchulus semi-penetrans Cobb). Kwangtung (21)

VITIS

V. vinifera L., grape

Erinose (Eriophyes vitis Nal.). Hopeh (9, 30), Manchuria (18), Shantung (9, 30)

XYLOSMA

X. congestum (Lour.) Merr.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

ZANTHOXYLUM

Z. alatum Roxb., Japanese pepper

Dodder (Cuscuta japonica Choisy). Chekiang (40)

Zanthoxylum sp.

Dodder (Cuscuta japonica Choisy). Chekiang (40)

ZEA

Z. mays L., corn

Bacterial wilt (Bacterium stewarti E. F. Sm.). Honan (42)
Mosaic, virus unidentified. Hunan (52), Kwangtung (15)
Streak (Fractilinea maidis (Holmes) McKinney, Zea virus 2). Hunan (52), Sikang (8)
Stripe (Fractilinea zeae (Holmes) Holmes, Zea virus 1). Sikang (8)

ZIZYPHUS

Z. jujuba Mill, jujube

Witches' broom, virus unidentified. Honan (42), Shansi (29)

Z. spinosus Hu

Virus, unidentified. Honan (42), Hupeh (2)

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BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

AGRICULTURAL RESEARCH ADMINISTRATION

UNITED STATES DEPARTMENT OF AGRICULTURE

BIBLIOGRAPHY OF THE FUNGI AND BACTERIA ASSOCIATED WITH TUNG (ALEURITES SPP.)

Supplement 216 September 15, 1952

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

PLANT DISEASE REPORTER SUPPLEMENT

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THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station Beltsville, Maryland

BIBLIOGRAPHY OF THE FUNGI AND BACTERIA ASSOCIATED WITH TUNG[1] (ALEURITES SPP.)

P. O. Wiehe[2]

Plant Disease Reporter
Supplement 216 September 15, 1952

The euphorbiaceous trees yielding tung oil of commerce are indigenous to tropical Asia. Of these, the more important are *Aleurites fordii* Hemsl., a native of subtropical China, and *A. montana* (Lour.) E. H. Wils., which occurs naturally from Burma to China. In addition, *A. cordata* (Thunb.) Muell. Arg., native to Japan, *A. moluccana* (L.) Willd. from the Malayan Archipelago, and *A. trisperma* Blanco from the Philippine Islands, all yield oil possessing industrial properties, but nowhere are these species under intensive cultivation.

Until about 25 years ago the world requirement of tung oil was derived almost exclusively from China. During the last three decades, however, plantations have been established in the southern United States, on the Russian coast of the Black Sea, in Brazil, Argentina, Nyasaland, India, Burma, Indonesia, and Indochina. The crop is also grown on a smaller scale in Peru, Queensland, South Africa, the Belgian Congo, Madagascar, and several other subtropical regions.

In view of the expansion of the tung oil industry in many countries it was thought that an annotated bibliography of the fungi associated with species of *Aleurites* would be of value to plant pathologists studying diseases affecting this crop. An attempt has therefore been made to compile, from various sources, all available records relating to the occurrence of fungi on this genus. In this connection much information was obtained from the reference files of the Commonwealth Mycological Institute, Kew, England, and that of the Division of Mycology and Disease Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, Beltsville, Maryland, U.S.A.

The following arrangement has been adopted in the bibliography. Fungi are listed in alphabetical order. The more common synonymy found in current literature is given next, followed by short notes on the pathogenic status of the organism and its world distribution; and references conclude each entry.

Of the 90 species listed, some 20 or so are probably saprophytes, and the remainder are pathogenic, but it will be observed that apart from several foliicolous species the others are mostly facultative parasites having a wide host range throughout tropical and subtropical areas. Two bacteria pathogenic to *A. fordii* and *A. montana* are included in the bibliography, but diseases of physiological, virus, or obscure origin have been omitted.

Finally, in order to simplify reference, two appendices have been prepared. In the first, organisms have been grouped according to the organ of the plant attacked, while the geographical distribution of fungi recorded as pathogenic to *Aleurites* spp. is shown in the second.

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[2]Plant Pathologist, Department of Agriculture, Nyasaland.

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On dead branches of A. moluccana in the Philippine Islands.

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Botryodiplodia theobromae Pat.: See Physalospora rhodina

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Dothiorella ribis (Fckl.) Sacc.

This fungus is widely distributed on a large number of hosts in the tropics. It has been reported on Aleurites spp. in the Hawaiian Islands, Nyasaland, and the United States, causing crown girdle, dieback, stem canker, stump rot following sunscorch injury, twig blight, and nut rot.

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Differs from species in size of spores and hairs. Leaf spot, sometimes severe, of living leaves of A. fordii and A. montana in French Equatorial Africa. See also Glomerella cingulata var. aleuritidis.

Saccas, A. M., and R. Drouillon. Agron. Trop. 6: 239-264. 1951 (abs. R.A.M. 30: 551. 1951).

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PESTALOTIOPSIS VERSICOLOR (Speg.) Steyaert
Twig blight, stump rot following sunscorch injury in Nyasaland.
Wiehe, P. O. Mycol. Paper Commonw. Mycol. Inst. In press, 1952.

PEZIOTRICHUM SACCARDIUM Rangel
On A. fordii in Brazil
Bitancourt, A. A. Arch. Inst. Bio. 8: 320. 1937.

PHOMA SP.
Associated with die-back of A. fordii in Bermuda.
Bermuda Dept. Agric. Report 1929: 26-31. 1930.

PHOMOPSIS SP.
Canker of Aleurites sp. in Brazil.
Goncalves, S. S. O Biologico 7: 328-329. 1941.

PHYLLOSTICTA ALEURITIDIS Saccas & Drouillon
Serious leaf spot of Aleurites fordii in French Equatorial Africa.
Saccas, A. M. and R. Drouillon. Agron. Trop. 6: 239-264. 1951. (abs. R.A.M. 30: 551. 1951).

PHYLLOSTICTA MICROSPORA Saccas & Drouillon
Leaf spot of Aleurites spp. in French Equatorial Africa.
Saccas, A. M. and R. Drouillon. Agron. Trop. 6: 239-264. 1951.

PHYLLOSTICTA SP.
Perhaps spermatial stage of Mycosphaerella aleuritidis. Leaf spot of Aleurites spp. in United States.
Weiss, F. U. S. Dept. Agr. Plant Dis. Survey Special Publ. 1 (II): 328. 1950.

PHYMATOTRICHUM OMNIVORUM (Shear) Duggar

Texas root rot on A. fordii in Texas.
Taubenhaus, J. J., and D. T. Killough. Texas Agric. Exp. Sta. Bull. 307: 22. 1923.

PHYSALOSPORA RHODINA (Berk. & Curt.) Cke.

Conidial stage variously known as Botryodiplodia theobromae Pat., Diplodia natalensis P. Evans, D. theobromae (Pat.) Nowell

Under normal conditions a weak parasite of pan-tropical distribution on many hosts; on Aleurites spp. however, this fungus has been reported to be the cause of the following diseases: canker and crown canker (United States), stump rot (Brazil, Burma, Java, India, Indo-China, Nyasaland, Southern Rhodesia), twig blight (Nyasaland).

Altstatt, G. E. Plant Dis. Reptr. Supp. 135: 37. 1942; Bugnicourt, F. Bull. Écon. Indochine 38: 471-477. 1935. (abs. R.A.M. 15: 271. 1935); Galloway, L. D. Inter. Bull. Plant Prot. 9: 176-178. 1935 (abs. R.A.M. 15: 2. 1935); Hopkins, J.F.C. Mem. Dept. Agric. South. Rhodesia 2 (rev. ed.) 1950; Large, J. R. Phytopath. 38: 359-363. 1948 (abs. R.A.M. 28: 37. 1949); Large, J. R. Plant Dis. Reptr. 33: 25-26. 1949; Muller, H.R.A. Landbouw Nederl.-Ind. 15: 62. 1939; U. Thet. U. Inter. Bull. Plant Prot. 9: 178. 1935; Viégas, A. P. Bragantia 5: 717-779. 1945 (abs. R.A.M. 26: 130. 1947); Voorhees, R. K. Fla. Agric. Exp. Sta. Tech. Bull. 371: 73. 1942; Wiehe, P. O. Mycol. Paper Commonw. Mycol. Inst. In press, 1952; Wiehe, P. O. Phytopath. 42. In press, 1952.

PHYTOPHTHORA CINNAMOMI Rands

Root rot of A. fordii in United States.

Large, J. R. Plant Dis. Reptr. 33: 28. 1949; Plakidas, A. G. Bienn. Report La. Fruit and Truck Exp. Sta. 1937/38: 27. 1939.

PHYTOPHTHORA PALMIVORA Butl.

Leaf spot, blight and foot rot of A. fordii and A. montana in Java and India.

Muller, H.R.A. Landbouw Nederl.-Ind. 15: 61. 1939; Tucker, C.M. Mo. Agric. Exp. Sta. Res. Bull. 184: 14. 1933; Venkatarayan, S. V. Phytopath. 32: 217-227. 1932 (abs. R.A.M. 11: 509. 1932).

PLEONECTRIA PSEUDOTRICHIA (Schw.) Wr.

On A. moluccana.

Wollenweber, H. W. Zeitschr. Parasitenkunde 3: 471. 1931.

POLYPORUS ALEURITIDIS Reich.

On Aleurites sp. in the Hawaiian Islands.

Reichardt, H. W. Sitzber. K. Akad. Wiss. Math-Nat. Kl. 75: 560. 1877; Saccardo, P.A. Syll. Fung. 6: 270. 1888 (as Polystictus).

POLYPORUS ASPERULUS Har. & Pat.

On dying trunk of Aleurites sp. in New Caledonia.

Hariot, P., and N. Patouillard. Jour. de Bot. 17: 7. 1903; Saccardo, P. A. Syll. Fung. 17: 112. 1905.

POLYPORUS GILVUS (Schw.) Fr.

Wood rot, in Hawaii.

Weiss, F. U.S. Dept. Agric. Plant Dis. Survey Special Publ. 1 (II): 328. 1950.

POLYPORUS MEYENII Klotzsch

On dead wood of A. moluccana in the Philippine Islands.

Reinking, O. A. Phil. Jour. Sci. 19: 91-114. 1921.

POLYPORUS VELLEREUS Berk.

On dead wood of A. moluccana in the Philippine Islands.

Reinking, O. A. Phil Jour. Sci. 16: 527-537. 1920.

Poria hypolateritia Berk.: See Fomes lignosus.

PSEUDOMONAS ALEURITIDIS (McCulloch & Demaree) Stapp

Leaf spot of Aleurites fordii in United States, U.S.S.R., and ? New South Wales.

Boyd, O. C. Phytopath. 20: 756-758. 1930 (abs. R.A.M. 10: 140. 1931); Elliott, C. Manual Bact. Plant Path., pp. 52-53. 1951; Large, J. R. Plant Dis. Reptr. 33: 22-23. 1949; McCulloch, L., and J. B. Demaree. Jour. Agr. Res. 45: 339-346. 1932 (abs. R.A.M. 12: 129. 1933); Noblé, R. S. Inter. Bull. Plant Protect. 9: 270-273. 1935; Plakidas, A. G. La. Agric. Exp. Sta. Bull. 282. 1937 (abs. R.A.M. 16: 426. 1937); Stapp, C. Bot. Rev. 1: 408. 1935; Vzoroff, V. I. [Summary of the Scientific Research Work of the Institute of Plant Protection] 1936, part III: 40-45. Leningrad 1938 (abs. R.A.M. 18: 378. 1939).

PYTHIUM APHANIDERMATUM (Edson) Fitzpatrick

Root rot of _A. fordii_ in China

Yu, T. F., _et al._ Lingnan Sci. Jour. 21: 45-62. 1945 (abs. R.A.M. 24: 488. 1945).

PYTHIUM SP.

Root rot of _A. fordii_ in Ceylon.

Ceylon Dept. Agric. Techn. Report 1929: 1-10. 1930.

Rhizoctonia bataticola (Taub.) Butl.: See _Sclerotium bataticola_.

RHIZOCTONIA LAMELLIFERA Small

Root disease of _A. montana_ in Nyasaland.

Wiehe, P. O. Myc. Paper Commonw. Mycol. Inst. In press, 1952.

RHIZOCTONIA SOLANI Kuehn

Collar rot of seedling and damping-off of _A. fordii_ and _A. montana_ in Argentina, Java, Nyasaland.

Muller, H.R.A. Landbouw Nederl.-Ind. 15: 54-68. 1939; Prezzi, M. J. Argentina Min. Agric. Publ. (Ser. A) 30: 20. 1947; Wiehe, P. O. Mycol. Paper Commonw. Mycol. Inst. In press, 1952.

Rigidiporus microporus (Swartz) Overeem: See _Fomes lignosus_.

ROSELLINIA SP.

Root rot of _A. fordii_ in Brazil.

Costa Neto, J. P. Rio Grande do Sul (Brasil) Negóc Agric., Indus., e Com. Bol. 99: 2. 1943.

SCHIZOPHYLLUM COMMUNE Fr.

Wood rot of _A. moluccana_ and _A. trisperma_ in the Philippine Islands and stump rot following sunscorch injury in Nyasaland.

Ramirez, I. Phil. Jour. For. 2: 135. 1939; Reinking, O. A. Phil. Jour. Sci. 19: 19-114. 1921; Wiehe, P. O. Mycol. Paper Commonw. Mycol. Inst. In press, 1952.

SCLEROTIUM BATATICOLA Taub.

Root disease of _A. montana_ in Java.

Muller, H.R.A. Landbouw Nederl.-Ind. 15: 53-68. 1939.

SCLEROTIUM ROLFSII Sacc.

Blight of foliage of _A. fordii_ and _A. montana_ in Ceylon and United States.

Altstatt, G. E. Plant Dis. Reptr. Supp. 125: 37. 1942; Large, J. R. Plant Dis. Reptr. 33: 28. 1949; Park, M. Admin. Rept. Dir. Agric. Ceylon. 1932: D116. 1933.

SEPTOBASIDIUM ALEURITIDIS Heim & Bouriquet

Parasitizing _Hemiberlesia lataniae_ and _Aonidiella aurantii_, scale insects associated with canker of _A. fordii_ in Madagascar.

Heim, R., and G. Bouriquet. Rev. Path. Vég and Ent. France 27: 3-13. 1948 (abs. R.A.M. 29: 588. 1950).

SEPTOBASIDIUM BOGORIENSE Pat.

On living branch of _A. fordii_ in Indochina.

Patouillard, N. T. Bul. Soc. Myc. France 26: 47. 1910.

SEPTOBASIDIUM PSEUDOPEDICELLATUM Burt

Canker on A. fordii resulting from detrimental effect of fungus-insect relationship. Brazil and United States.

Large, J. R. Plant Dis. Reptr. 33: 22-30. 1949; Viégas, A. P. Bragantia 5: 197-212. 1945 (abs. R.A.M. 25: 234. 1946).

SEPTOBASIDIUM SACCARDINUM (Rangel) Marchionato

On A. fordii in Brazil.

Viégas, A. P. Bol. Tec. Inst. Agron. Campinas 60: 3. 1939; Viégas, A. P. Bragantia 5: 197-212. 1945 (abs. R.A.M. 25: 234. 1946).

SPHAERONAEMA REINKINGII Sacc.

On A. moluccana in China and the Philippine Islands.

Saccardo, P. A. Phil. Jour. Sci. 18: 595-605. 1921; Tai, F. L. Nanking Jour. 1: 542. 1932.

SPHAEROSTILBE REPENS Berk. & Br.

Root rot and collar rot of A. montana, causing also root disease of tea and rubber in Indochina and Java.

Bugnicourt, F. Bull. Écon. Indochine 37: 1321-1322. 1934 (abs. R.A.M. 14: 480. 1935); Bugnicourt, F. Ibid. 38: 471. 1935 (abs. R.A.M. 15: 271. 1936); Muller, H.R.A. Landbouw Nederl.-Ind. 15: 57. 1939.

THYRIDARIA SP.

On stems and young shoots of A. montana in French Equatorial Africa.

Saccas, A. M., and R. Drouillon. Agron. Trop. 6: 239-264. 1951 (abs. R.A.M. 30: 551. 1951).

THYRSIDIUM BOTRYOSPERMUM Mont. f. VERRUCOSA Keissl.

On bark of A. moluccana in the Hawaiian Islands.

Keissler, K. Ann. Nat. Mus. Wien 35: 2-3. 1922.

TRAMETES CORRUGATA (Pers.) Bres.

Wood rot in Hawaii.

Weiss, F. U.S. Dept. Agr. Plant Dis. Survey Special Publ. 1 (II): 329. 1950.

TRAMETES OCCIDENTALIS (Klotzsch) Steyaert

Stump rot of A. montana following sunscorch in Nyasaland.

Wiehe, P. O. Mycol. Paper Commonw. Mycol. Inst. In press, 1952.

TRAMETES PERSOONII Mont.

On dead wood of A. moluccana in the Philippine Islands.

Reinking, O. A. Phil. Jour. Sci. 15: 479-490. 1920.

TRAMETES SERPENS Fr.

On Aleurites sp. in the Philippine Islands.

Reinking, O. A. Phil. Journ. Sci. 19: 91-114. 1921.

UNCINULA MIYABEI (Salm.) Sacc. var. ALEURITES Wei

Powdery mildew on A. fordii in China.

Wei, C. I. Nanking Jour. Sci. 11: 109. 1942 (abs. R.A.M. 22: 456. 1943).

USTULINA DEUSTA (Hoffm. ex Fr.) Petr.

Wood rot in Hawaii.

Weiss, F. U.S. Dept. Agr. Plant Dis. Survey Special Publ. 1 (II): 329. 1950.

USTULINA MAXIMA (Web.) Wetts.

Collar rot of A. montana in Java.

Muller, H.R.A. Landbouw Nederl.-Ind. 15: 60. 1939.

USTULINA ZONATA (Lév.) Sacc.

Collar rot and root rot of A. montana in Ceylon and Nyasaland.

Forbes, A.P.S. Nyasaland Tea Assoc. Quart. Jour. 4 (4): 9. 1940 (abs. R.A.M. 19: 626.

1940); Park, M. Admin. Report Dir. Agric. Ceylon, 1932: D-116. 1933; Wiehe, P. O. Mycol. Paper Commonw. Mycol. Inst. In press, 1952.

XANTHOMONAS SOLANACEARUM (E. F. Sm.) Dowson

This widespread plant pathogen is reported to be the cause of wilt of A. moluccana in Sumatra.

D'Angremond, A. Meded. Alg. Proefsta. Avros, Alg. Ser., 60. 1948 (abs. R.A.M. 28: 163. 1949); Palm, B. T., and S. C. Jochems. Bull. Deli Proefsta. te Medan-Sumatra 20: 1-64. 1924.

APPENDIX I

FUNGI PARASITIC ON THE VARIOUS ORGANS OF ALEURITES SPP.

A. Leaf Diseases

Acremoniella sp., Alternaria sp., Ascochyta aleuritidis, Cercosporella theae, Colletotrichum gloeosporioides var. aleuritidis, Colletotrichum sp., Corticium microsclerotia, C. stevensii, Fusarium heterosporum forma aleuritidis, Gloeosporium aleuriticum, Gloeosporium sp., Glomerella cingulata, G. cingulata var. aleuritidis, Melampsora aleuritidis, Mycosphaerella aleuritidis, Pestalotia dichaeta, P. japonica, Pestalotia spp., Phyllosticta aleuritidis, P. microspora, Phyllosticta sp., Phytophthora palmivora, Pseudomonas aleuritidis, Sclerotium rolfsii, Uncinula miyabei.

B. Stem Diseases

Botryosphaeria ribis, Corticium microsclerotia, C. salmonicolor, C. stevensii, Diplodia sp., Fomes hawaiensis, Fusarium lateritium, Glomerella cingulata, Macrophoma sp., Pestalotia conigena, Pestalotiopsis disseminata, P. versicolor, Phoma sp., Phomopsis sp., Physalospora rhodina, Schizophyllum commune, Sclerotium rolfsii, Thyridaria sp., Trametes corrugata, T. occidentalis, Ustulina deusta, Xanthomonas solanacearum.

C. Root Diseases

Armillaria mellea, Clitocybe tabescens, Fomes lignosus, F. noxius, Ganoderma lucidum, G. pseudoferreum, Phymatotrichum omnivorum, Phytophthora cinnamoni, P. palmivora, Pythium aphanidermatum, Pythium sp., Rhizoctonia lamellifera, R. solani, Rosellinia sp., Sclerotium bataticola, Sphaerostilbe repens, Ustulina maxima, U. zonata.

D. Flower and Fruit Diseases

Botryosphaeria ribis, Botrytis cinerea, Diplodia sp., Kretzschmaria scruposa.

APPENDIX II

GEOGRAPHIC DISTRIBUTION OF FUNGI RECORDED AS PATHOGENIC TO ALEURITES SPP.

ASIA:

Burma:	Gloeosporium sp., Physalospora rhodina
Ceylon:	Fomes lignosus, F. noxius, Pestalotia sp., Pythium sp., Sclerotium rolfsii, Ustulina zonata.
China:	Melampsora aleuritidis, Mycosphaerella aleuritidis, Pythium aphanidermatum, Uncinula miyabei.
India:	Alternaria sp., Cercosporella theae, Clitocybe tabescens, Corticium salmonicolor, Pestalotia sp., Physalospora rhodina, Phytophthora palmivora.

Indochina:	Physalospora rhodina, Sphaerostilbe repens.
Indonesia:	Corticium salmonicolor, Diplodia sp., Fomes lignosus, Ganoderma pseudoferreum, Gloeosporium aleuriticum, Physalospora rhodina, Phytophthora palmivora, Rhizoctonia solani, Sclerotium bataticola, Sphaerostilbe repens, Ustulina maxima, Xanthomonas solanacearum.
Japan:	Mycosphaerella aleuritidis.
Malaya:	Acremoniella sp., Colletotrichum sp., Diplodia sp.
Philippine Islands:	Diplodia sp., Ganoderma lucidum, Gloeosporium aleuriticum.
U.S.S.R. (In Asia):	Botrytis cinerea, Macrophoma sp., Pestalotia conigena, Pseudomonas aleuritidis.
AFRICA:	
Belgian Congo:	Fomes lignosus
French Equatorial Africa:	Ascochyta aleuritidis, Colletotrichum gloeosporioides var. aleuritidis, Corticium salmonicolor, C. stevensii, Fusarium heterosporum f. aleuritidis, Glomerella cingulata, G. cingulata var. aleuritidis, Mycosphaerella aleuritidis, Pestalotia dichaeta, Phyllosticta aleuritidis, P. microspora, Thyridaria sp.
Gold Coast:	Pestalotia spp.
Nyasaland:	Armillaria mellea, Botryosphaeria ribis, Fusarium lateritium, Glomerella cingulata, Pestalotia japonica, Pestalotiopsis disseminata, P. versicolor, Physalospora rhodina, Rhizoctonia lamellifera, R. solani, Schizophyllum commune, Trametes occidentalis, Ustulina zonata.
Southern Rhodesia:	Physalospora rhodina.
NORTH AND SOUTH AMERICA:	
United States:	Botryosphaeria ribis, Cephalosporium sp., Clitocybe tabescens, Corticium microsclerotia, C. stevensii, Gloeosporium aleuriticum, Glomerella cingulata, Mycosphaerella aleuritidis, Phyllosticta sp., Phymatotrichum omnivorum, Physalospora rhodina, Phytophthora cinnamomi, Pseudomonas aleuritidis, Sclerotium rolfsii.
(Including Hawaii):	Botryosphaeria ribis, Fomes hawaiensis, Polyporus gilvus, Trametes corrugata, Ustulina deusta.
Bermuda:	Pestalotia spp., Phoma sp.
Argentina:	Rhizoctonia solani
Brazil:	Mycosphaerella aleuritidis, Peziotrichum saccardium, Phomopsis sp., Physalospora rhodina, Rosellinia sp.
AUSTRALASIA:	
Australia:	Pseudomonas aleuritidis.
New Caledonia:	Kretzchmaria scruposa

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THE PLANT DISEASE REPORTER

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THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
AGRICULTURAL RESEARCH ADMINISTRATION
UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE WARNING SERVICE IN 1952

Supplement 217 December 15, 1952

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

PLANT DISEASE REPORTER SUPPLEMENT

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THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station   Beltsville, Maryland

THE PLANT DISEASE WARNING SERVICE IN 1952

Paul R. Miller and Muriel O'Brien

Plant Disease Reporter
Supplement 217   December 15, 1952

Introduction

Insofar as disease occurrence is concerned, the 1952 summary of the Warning Service is mostly negative. Nevertheless, absence or insignificance of a disease is as much a part of the record as are severe outbreaks, and proper evaluation of factors connected with occurrence and importance must take both high and low extremes as well as normals into account.

Weather is discussed in this report only in very general terms. The usual weather charts, as well as the disease distribution maps for the growing season, are omitted. A more detailed progressive analysis would be necessary to bring out specific correlations between weather and disease incidence this season.

There is no question but that in 1952 the downy mildew diseases under consideration by the Crop Plant Disease Forecasting Program, namely, late blight of potato and tomato (*Phytophthora infestans* (Mont.) D By.), blue mold of tobacco (*Peronospora tabacina* Adam), and cucurbit downy mildew (*Pseudoperonospora cubensis* (Berk. & Curt.) Rostow.), were less widely distributed and caused less damage than in any year since the initiation of the Warning Service in 1946. The 1952 season was characterized by either the absence of these diseases or by light or moderate incidence or sporadic development. Interest in spraying and dusting was consistent and sustained. Control measures were used on perhaps a larger scale than heretofore, and good results were obtained with correct timing and application. Rainfall over most of the eastern part of the country during a large part of the growing season was light to moderate, with drought conditions prevailing in some regions. This hot dry weather inhibited disease development and spread. An exception was in the Great Lakes States area and in the northern Middle West tier of States, where heavy rainfall occurred during July and August and where late blight was prevalent.

Late blight of potato and tomato was sparsely present over the eastern portion of the country but occurred in the north central States to about the same extent as during the past several years. In the country as a whole, late blight was less widely distributed and caused less damage than during any of the preceding six years.

Blue mold of tobacco appeared later than usual except in North Carolina, where one of the earliest appearances for the State was recorded. Field development of blue mold was observed in Tennessee. A large percentage of the growers used control treatments and this factor, plus timeliness and proper application, did much to control the disease.

Downy mildew of cucurbits was not a problem this year, mainly because of dry weather, the effective use of control measures, and the planting of resistant varieties.

There follows a digest of local disease conditions this year, listed alphabetically by State or Province. The individual reports are based upon brief summaries submitted by the collaborators and also upon items abstracted from the warning letters issued throughout the year.

Late Blight of Potato:

Arkansas: Late blight was observed on potatoes at Monte Ne.

Canada:

Manitoba: Late blight appeared moderately early in 1952 and in each case reported it had already done considerable damage so that it appeared it would soon become widespread and severe. However, subnormal rainfall in autumn apparently prevented this and the potato crop was, for the most part, in very good condition at harvest.

As in previous years, the provincial authorities were kept informed of the blight situation. They in turn notified potato-grower cooperatives, the members of which took appropriate action. In most cases none but insecticidal dusts were used. Dusting the crop is still preferred to spraying and Bordeaux mixture dust appeared to be the most popular fungicidal dust.

New Brunswick: Late blight was most difficult to find in the potato crop this year owing to the extremely dry weather from the latter part of June until the end of September.

Nova Scotia: Favorable weather for blight development occurred this season in Nova Scotia. Blight was reported in Kings County but was more severe in Colchester and Pictou Counties.

Ontario (Eastern): Late blight was first reported on Green Mountain potatoes in a spray experiment plot at Ottawa. The first report in a commercial field was on Canus potatoes at Metcalfe, Carleton County, on August 11. After this date it gradually spread and increased until it became general, infection being slight to moderate in well-sprayed or dusted fields, and severe (killing the plants) in poorly or unsprayed or undusted fields.

The weather during all of the growing season was moist, one or two sunny days alternating with one or two rainy days. The early part of the season was hot, the high temperatures limiting the development of late blight. The week of July 27 was wet and cool and favorable for the development and spread of the fungus. Thereafter, the weather continued to be more or less favorable for the spread of late blight, the nights being cool with heavy dews when it did not rain.

All potato fields were sprayed two or three times for the control of insect pests and fungus diseases. Only about 25 percent of fields received four or more applications. The fungicides used were Bordeaux mixture, Dithane D-14, Dithane Z-78, and fixed coppers (in decreasing order). Tuber rot was general in all potato crops, varying from a trace to 30 percent, averaging around 3 to 4 percent.

Ontario (Western): There were no outbreaks of potato blight of any consequence in southwestern Ontario.

Quebec: Late blight of potato was reported in Quebec in the following counties: Chateauguay, Papineau, Labelle, Joliette, Berthier, Champlain, Nicolet, Chicoutimi, Temiscouata, Portneuf, Quebec, and Bonaventure.

Prince Edward Island: The potato crop in all varieties was relatively free from blight, especially in Kings County, owing to the low rainfall in certain areas. In Queens and Prince Counties the unsprayed and poorly sprayed fields of the older commercial varieties were severely affected. On farms where the spray schedule was properly conducted little or no disease occurred. Some new varieties developed for late blight resistance were heavily attacked.

Fungicides used in 1952 were Bordeaux mixture, Dithane D-14, Parzate, copper oxychloride sulfate, and tribasic copper sulfate. In our screening test for new fungicides, Manzate gave outstanding results both in disease control and yield.

The Advisory Service, inaugurated in 1947 to assist potato growers in Nova Scotia and Prince Edward Island to protect their crops against diseases and insects, was expanded in 1952 at the request of the industry to cover not only the disease and insect season but also the planting and harvesting seasons. Material for the weekly bulletins was contributed by pathologists, entomologists, inspectors, field men, and others. The bulletins were prepared and edited at the Charlottetown Laboratory. These bulletins were sent to all contributors, agricultural officials, nine newspapers, six privately owned radio stations, and the Canadian Broadcasting Corporation Network.

Colorado: Late blight was found in several locations in the San Luis Valley near La Jara and Monte Vista. The variety planted in the infected fields was Red McClure. This constitutes the first report of late blight in this area since 1947.

Potato blight was also reported in the Julesburg area, where it made a sudden appearance. Growers attempted to get coverage of copper by air.

Connecticut: Although late blight was found in Connecticut on both potatoes and tomatoes this year, there was only sparse general infection. An occasional field of potatoes or tomatoes was badly affected late in the season. Most of these cases of severe late blight infection occurred in fields that had been sprayed carelessly or not at all.

Delaware: Incidence of blight on potatoes was light. No spread to other fields occurred because of unfavorable weather conditions. The disease was not found in late-planted potatoes.

All commercial growers spray or dust. About 70 percent use copper and the rest zineb. The preference for sprays or dusts was about equally divided.

Florida: Late blight of potato was found in fields scattered throughout the Hastings area but did not spread very much.

Illinois: Late blight ranged from ten to 100 percent in potato fields examined. Infection and rot in tubers was not present in more than trace amounts.

Spraying was done with conventional high-pressure, high gallonage ground equipment. Materials used included: fixed coppers (4/100) and Bordeaux mixture (after late blight had appeared). In general the fungicides held blight in check.

Iowa: Late blight was serious this year in the peat fields that were not regularly sprayed.

Louisiana: Late blight was reported on potato in two locations in Louisiana this year. Where it occurred, the disease was kept in fairly good check by persistent spray applications of Dithane D-14, although rainfall was rather heavy during certain periods between the outbreak and harvest time. Losses were experienced from tuber infections in a few small areas but were probably not over 1 percent.

Maine: Late blight was observed fruiting on potato cull piles on June 2, the earliest date recorded in Maine.

Michigan: Late blight was present on potatoes in the Upper Peninsula and the northern portion of the Lower Peninsula.

Minnesota: Late blight was first observed in the peatland area near Hollandale in Freeborn County. It became widespread in this area, with 100 percent of the plants infected in some fields. In general, however, adequate spraying prevented significant loss. Blight was also heavy in another peat bog in Isanti County, northeast of Princeton. It was probably severe enough here to reduce yields somewhat. In both locations the new variety Cherokee was heavily infected. Kennebec was infected but less heavily.

In the vicinity of Minneapolis and St. Paul blight was general, but losses were small, probably because of adequate spraying.

Potato fields are small and widely scattered in north central Minnesota. Only a few fields were examined here and in most of these no blight was found. Tubers were infected at harvest time at the Grand Rapids Experiment Station.

In a fairly extensive survey about mid-August in the Red River Valley from Clay County to Kittson County it was impossible to find blight in most fields. Only occasional traces were observed. There were two exceptions to this rule. At Oklee, in eastern Red Lake County, the varieties Pontiac, Cobbler, and White Rose were grown side by side in a rather small field. A trace of blight was observed on Pontiac, but Cobbler was about 40 percent and White Rose 100 percent infected. The same reaction was evident in a variety trial plot near Fisher, where White Cloud was completely killed and Pontiac only lightly infected. This plot had not been sprayed or dusted.

It appears that weather in the Red River Valley favored blight, but that the area escaped heavy infection during the summer probably because of the combined effect of the relative resistance of the variety Pontiac, which is widely grown, and extensive use of fungicides.

The harvest season was dry in most areas in the State and there have been very few reports of tuber infection. Blight probably caused very little loss in the State this year.

Practically all commercial growers use fungicides. In the Hollandale area sprayers are used exclusively, but in the Red River Valley dusters are largely used because of the relative scarcity of water. A considerable amount of airplane dusting is done in the Red River Valley.

Mississippi: No late blight was found on potatoes or tomatoes in the truck crop area this year. There was no late blight, identified as such by a pathologist, elsewhere in the State. In general, the season has been unusually dry and, therefore, not favorable for development and spread of the fungus.

Nebraska: Late blight appeared about the middle of August in the western potato-producing area. After that the weather was not conducive to late blight development in the North Platte Valley and, consequently, tubers were not affected. In the Mirage Flats area, however, timely rains occurred and the disease reached epidemic proportions.

New Hampshire: Potato and tomato late blight were of minor importance in New Hampshire in 1952. Potato late blight was observed in Coos County in mid-summer but did not cause appreciable damage owing to the hot, dry weather. During September both potato and tomato late blight were observed in Strafford, Rockingham, and Hillsborough Counties. Most outbreaks were in home gardens that were not protected by fungicides. In a few instances potato tubers became inoculated during harvest operations, and appreciable losses resulted in storage.

In general, it is believed fungicides were used on a larger scale than was necessary considering the weather conditions, especially on such varieties as Kennebec. Neutral copper sprays and dusts were most popular in the State this past year. Many growers followed a regular program of spraying and dusting with DDT and copper at intervals of seven to ten days throughout the season.

New York: Late blight of potato was reported in the Orient section of Suffolk County, at Cutchogue on the Island, and in Herkimer County.

North Carolina: Blight first appeared in early June in the coastal area. Hot, dry weather followed the initial outbreak and the disease caused no appreciable loss in this area. No control measures were used, as the weather became unfavorable for spread.

In the mountain area blight appeared around mid-July but was held in check by hot, dry weather and did not cause serious loss. Most of the commercial acreage was treated. Bordeaux mixture and copper lime dust were the most widely used of the fungicides.

North Dakota: There was a deficiency of rainfall in the Red River Valley until July and then some areas received above-normal precipitation. The area around Grand Forks had an abundance of rain during July and August, and late blight was present here the latter part of August. Foliage infection was light in all but one field observed. A warning was given to the growers and most farmers killed the vines to prevent further damage. Very little tuber late blight has been reported. Early blight (Alternaria solani) was of little importance.

Since potato support prices have been discontinued, there has been a decided reduction in the use of potato fungicides. Most growers also realize it is useless to use fungicides when early and late blights seldom cause an appreciable loss.

Pennsylvania: Late blight of potato was observed in September and October in five counties and appeared early enough to cause widespread tuber infection despite the prevention of an outbreak of late blight by hot summer weather. The average loss for the State is estimated at about 0.5 percent.

Nearly 100 percent of the commercial potato acreage is sprayed. Parzate and Dithane are the most commonly used fungicides. Many growers change to 8-4-100 Bordeaux in late July or early August since they report less storage rot where this plan is followed.

South Carolina: Late blight was not observed on the 1952 potato crop. The variety Sebago, which is partially resistant to late blight, was used almost exclusively in 1952.

Virginia: Late blight was not observed or reported on potatoes this year.

Wisconsin: Late blight of potato was found near Hancock, in the muck area near Delavan, and in the Antigo area.

Late Blight of Tomato:

Alabama: No late blight was observed in the field in southeastern, central or northern Alabama. The only late blight observed in 1952 was on tomato transplants from Florida.

Tomato plants in southeastern and central Alabama were free of foliar diseases. However, early blight (Alternaria solani) was prevalent on the late crop of tomatoes in northern Alabama.

Arkansas: Late blight on tomatoes was observed at Monte Ne, Arkansas.

Canada:

New Brunswick: There was only one report of late blight of tomato and this was confined to a small field. The tomato plants were not sprayed in the tomato-growing area, but blight failed to become established on vines or fruit.

Ontario (Eastern): Late blight from natural infections on tomato foliage and fruits was first observed at Ottawa, Carleton County, about September 1. Thereafter it continued to spread and increase and by the end of September it was present in every garden and commercial field, varying from a trace to about 25 percent fruit infection, averaging about 5 percent. Most tomato fields were unsprayed.

Ontario (Western): In southwestern Ontario this year there have been no outbreaks of tomato late blight.

Colorado: On September 12 a severe outbreak of late blight on tomatoes was noticed near Fort Lupton. The disease was well disseminated about the 40-acre field and had killed the foliage rapidly. The sudden exposure to sunlight caused high losses to the fruit, due to sunscald. Very little loss to the fruit caused by Phytophthora infestans was observed.

Connecticut: Please see section on Late Blight of Potato.

Delaware: Late blight was not found on the commercial canning crop or in home gardens. Practically 90 percent of the commercial growers spray with zineb (1 1/2 lbs. active ingredient to 100 gallons of water) and apply at least six applications, averaging 150 to 175 gallons per acre. This schedule has been effective in controlling all tomato diseases, including Stemphylium.

Florida: (East coast of Florida north of Dade County): Late blight was continuously present in the spring crop of 6, 500 acres, but it did not become serious during the season except in isolated locations. As late as the middle of May, 1952, one 130-acre field showed an estimated 90 percent of the plants infected. The grower had been spraying regularly but was using an excess of lime on a nabam plus zinc sulfate twice-a-week schedule. He was advised to omit the lime, and upon doing so checked the spread of the disease so thoroughly that he lost only the crown hand of fruit.

From 12 to 20 applications of fungicides are regularly used on tomatoes in this area. Nabam plus zinc sulfate-sprayed tomatoes usually begin to show yellowish mottled leaves with an overall stunting about half way through the season. Zineb does not produce these symptoms so soon nor so severely. Phygon XL at 3/4 lb. has hitherto been used as an alternate material to avoid this injury but last spring many of the growers started alternating with nabam plus manganese sulfate. Many farmers now use nabam plus manganese sulfate continuously or alternated with nabam plus zinc sulfate, zineb, or Phygon. One pound of manganese sulfate and 2 quarts of nabam are mixed in the concentrated form for 100 gallons of spray. This fall Manzate has been available to a limited extent and growers are well pleased with the results. Manzate is used at the rate of 1 1/2 to 2 lbs. per 100 gallons but most prefer the latter figure.

Georgia: Although approximately three and one-half million plants were confiscated and destroyed by the Georgia Department of Entomology, some fields set in late February and March with Florida-grown plants were a total loss due to the stem canker stage of late blight.

The amount of blight that appeared in the green-wrap regions of Georgia varied from a trace to 40 percent. Fortunately, owing to unfavorable weather for blight development and spread during this growing period, the disease was not observed in the tomato plant fields.

Illinois: No late blight on tomatoes was reported.

Indiana: Late blight was found on green-wrap tomatoes received from Florida.

Iowa: Late blight of tomatoes was unreported in either home gardens or commercial fields. An extensive spray program was undertaken by a large canning company in southeastern Iowa. Unfortunately, the disease level was too low to assess its merits adequately in 1952.

Kentucky: Late blight of tomatoes was found in Davies County in a field set with Florida-grown plants.

Louisiana: No late blight was observed or reported on tomatoes in Louisiana.

Maryland: Late blight of tomato was found in Washington County in a field set with Florida-grown plants. In the latter part of the season there were two reports of tomato blight on locally-grown tomatoes.

Michigan: There was no tomato blight anywhere in Michigan in 1952. The early part of the season was hot and dry but weather was favorable to late blight in September. It appears that most of the growers have adopted a successful control program.

Mississippi: Please see section on Late Blight of Potato.

New Hampshire: Please see section on Late Blight of Potato.

New Jersey: Late blight of tomatoes was found in early June on one farm at Indian Mills, Burlington County.

North Carolina: Late blight on tomatoes was not a problem in the Piedmont or the eastern Coastal Plain and was much less severe in the mountain areas than usual. The disease did not occur until mid-August and caused damage only on late garden plantings. The long drought and abnormally high temperatures were primarily responsible for the late occurrence and slight damage during this season. Fixed copper sprays (2-100) and dust (7% Cu) were extensively used throughout the mountain area.

Ohio: Late blight of tomatoes was not observed in Ohio in 1952 except for one occurrence in two unsprayed rows in a field located on the Indiana line near Celina, Ohio, which is near the southern edge of Ohio's tomato-producing section. Its non-appearance was probably due to weather conditions, which were definitely not favorable for the occurrence of blight. It was extremely dry and warm in June with few nights cool enough to favor infection. There was slightly more rain in July and August but temperatures remained high.

Pennsylvania: Late blight of tomato appeared late in the season and the average loss was below 0.25 percent. Maximum infection in one field was 75 percent. The disease occurred in Lancaster, Lehigh, Bucks, Philadelphia, and Pike Counties.

More than 90 percent of the commercial tomato fields are being sprayed. Fixed copper 50% (4 lbs.-100) or Bordeaux (6-3-100), are the sprays used by most growers to prevent late blight. A few growers are using Manzate or Parzate or Dithane.

South Carolina: Late blight was brought into Charleston County (Mt. Pleasant community) on tomato plants from Florida in early April. Owing to the dry, hot weather that followed the original introduction, almost no secondary spread occurred and the disease was never found except in the two fields set from this lot of plants. Growers used fixed copper almost entirely; only a few used zineb or nabam. There was no opportunity to observe the relative effectiveness of the various control programs.

Virginia:

Blacksburg: Tomato late blight did not appear until quite late in southwestern Virginia. During most of the summer the weather was very dry and the summer tomato crop came through with practically no late blight until about mid-September. Home gardeners who used zineb or copper were able to control late blight very well.

Norfolk: Late blight was observed only once on tomatoes this year. This was near Cheriton, Virginia, where plants from one small shipment from Florida developed the stem canker stage of this disease. Plants from other shipments set in this and other fields in the same locality did not show late blight. Destruction of all plants from the infected shipment was recommended. The grower reset the field but depended upon the transplanter to destroy the original plants. The destruction was incomplete and some secondary spread occurred to later-set plants in close proximity to diseased plants surviving from the first shipment. However, dry weather this year prevented blight from becoming a problem in eastern Virginia.

Late Blight Forecasting

Late blight forecasts were made again this year from Ames, Iowa for the north-central region, and proved successful with a high degree of accuracy in predictions. In this region blight was a threat to potatoes in northern Iowa, parts of North Dakota, Minnesota, and Wisconsin. It was accurately predicted that no destructive outbreak would occur in Indiana and that the blight would continue to develop in northern Iowa, especially in the Crystal Lake peat beds where potato foliage and weeds were rank. Since this region had the most rainfall during this past season, forecasts were of value to all growers.

Because of the high daily temperatures tomato growers had little to fear from blight in the north central States.

Blue Mold of Tobacco:

Connecticut: Blue mold was reported in the seed beds in Hartford County. Most growers sprayed with ferbam.

Canada:

Ontario: Tobacco blue mold occurred in the majority of hotbeds in the Blenheim burley tobacco district towards the end of the planting season, and was found in a few greenhouses in the Delhi flue-cured tobacco district after planting was completed.

Florida: Blue mold in cigar-wrapper tobacco plant beds in the vicinity of Quincy caused less damage in 1952 than usual. Most of the bed acreage was dusted with 6.5% zineb or 15% ferbam. Zineb dust was slightly the more effective, probably because of superior dusting quality.

Blue mold occurred sporadically in shades set rather early, especially during ten days of cool weather following rain on April 24. Zineb dust, 6.5%, applied twice a week at dosages averaging 11 pounds per acre at each application, gave excellent control. A considerable acreage of commercial shade was dusted twice a week, once with fungicide and insecticide combination and once with fungicide alone.

Georgia: Blue mold was first observed in Georgia in Cook County on January 22 and by the end of February had become widely scattered throughout the flue-cured area. This early outbreak, coupled with severe early damage in many beds, resulted in more growers using blue mold fungicides than ever before. A more thorough job was done and treatments were kept up. Most growers used the regular 15% Fermate dust, applied in the neighborhood of 30 lbs. of dust to 100 square yards.

Kentucky: Blue mold was late in appearing in Kentucky and was found in very few beds. There should be very little carry-over for next year.

Maryland: Blue mold was found in Charles, St. Marys, and Prince Georges Counties. Apparently damage was not extensive. Protective fungicides were used.

North Carolina: Blue mold was first observed on February 20, one of the earliest appearances of the disease in the State. The disease spread very slowly until March 20 when conditions became favorable for development and spread. It became established throughout the tobacco area and caused severe damage in some localized untreated beds. Including the whole tobacco area, blue mold incidence for the 1952 season would be considered as light to moderate.

It is estimated that 75 percent of the growers used control measures, of which 45 percent was spray and 55 percent dust. Approximately 80 percent of the growers treating used ferbam, and 20 percent, zineb. Treatments when timely and properly applied gave satisfactory control of the disease.

Ohio: Blue mold was not very serious during this past season. It was present in some beds in most of the tobacco-raising areas of the State but occurred only where the growers did nothing to control it until late in the season. Ferbam was the material most widely used for control in Ohio.

Pennsylvania: Blue mold was found in Lancaster County.

South Carolina: An early outbreak of blue mold was first reported in Georgia on January 22. One month later it appeared in early-seeded beds in Columbus County, North Carolina, and Florence County, South Carolina. The outbreak in South Carolina was quickly brought under control with ferbam dust with little or no secondary spread.

Surveys made in early March when plants were two-leaf to size of a half-dollar revealed primary infections in four locations with no secondary spread in 37 stops in five counties. Three infections were noted in Horrey County and one in Florence County. Relatively few growers had started treatment.

Surveys made at the end of March in Florence and Williamsburg Counties revealed four infections in 13 stops. Twelve of the 14 locations were being treated with ferbam. In a survey made of Horry, Florence, and Marion Counties in early April blue mold was found in 11 out of 16 sites. At half of these locations plants were of transplanting size, the remainder being one-fourth to one-half transplanting size. There was evidence of effective dusting with ferbam. Severely infected beds were found where growers had stopped treating in order to check the growth of the plants. The intention was to have plants ready for the second week in April. The severity of the disease indicated that the plants would not be ready until the third or fourth week in April.

Atypical symptoms were observed late in the season at the time of general transplanting. Severe necrotic leaf spotting occurred on beds showing nitrogen deficiency where the grower had stopped treating too early. Evidently the beds were hit with a shower of spores just before the weather warmed up enough to kill out the fungus in the infected leaves. Spots were brown, irregular in outline, and varied from flecks to one-fourth inch in diameter.

A second set of atypical symptoms occurred about the same time on a bed that had shown only a trace of leaf spotting earlier. This was in an area that had had an initial outbreak which had been brought under control. Plants in the bed were thick, stems were 4 to 8 inches long and pencil-thick or less in diameter. Midway up the stem and progressing downward the cortex showed a watersoaked brown discoloration encircling the plant. The mycelium of a phycomycete was observed in crushed mounts. Isolations on water agar failed to yield any phycomycete. The farmer reported that the trouble had occurred for several years. The plants showing symptoms do not survive after transplanting.

Spread of blue mold was probably held in check for two reasons. Although there was sufficient volume of precipitation, these rains usually came in heavy showers and were followed by drying winds, thus reducing the humidity and the length of the humid period. With over 90 percent of the farmers treating, the amount of inoculum in the air was probably greatly reduced.

Severity in infection at the end of the season was due to a change into cool rainy weather. Severe infections occurred only on beds where farmers had not treated or had stopped treating in order to allow blue mold to burn back the beds because the plants were ready before the weather had warmed up sufficiently for good transplanting. Farmers are obviously seeding too early. This is brought on by the unpredictable dry weather that sometimes occurs during the middle of the planting season. Often one week delay makes a great difference in obtaining a stand.

The number of farmers treating has increased in the past year. Over 90 percent of the farmers are using the program. Only about 1 percent use a sprayer. The balance use a dust. Most of the dust is ferbam, 11.4%. A few farmers used the Dithane form of zineb dust, 6.5%. Farmers using Dithane report difficulty in getting a smooth flow of the dust through the dust gun during humid or rainy weather. Using the same diluent, this trouble was not observed in the Parzate form of the zineb dust.

Virginia: Blue mold appeared later than usual although it was generally distributed throughout the flue-cured area. About 90 percent of the tobacco growers in the flue-cured area applied control measures, chiefly ferbam, although a few used zineb. These materials were used at the rate of 3 to 4 lbs. ferbam and 2 to 2 1/2 lbs. of zineb to 100 gallons of water. Both of these materials were very effective when used according to recommendations and farmers are highly pleased with the results, whether they used sprays or dusts.

Note

It might be of interest to note that blue mold was found this year in Georgia on two additional hosts, namely, on pepper plants and on tomato seedlings.

Downy Mildew of Cucurbits:

Alabama: No downy mildew was observed in cucumber fields in southeastern Alabama.

Arkansas: A mild sprinkling of downy mildew was observed August 25 in one cucumber planting at Van Buren. This planting had been irrigated. Adjacent cucumbers not irrigated had none of the disease. Appearance of downy mildew in the one isolated case is of interest, since this region suffered from high temperatures and a severe drought this year. The source of inoculum presents an interesting but unanswered question.

Delaware: Downy mildew was not found until the commercial season was over and no damage was done to commercial crops. The acreage has decreased considerably in Delaware. Of the growers left about 60 percent dust and 20 percent spray. Zineb (1 1/2 lbs. active ingredient to 100 gallons of water, or as a 6% to 8% dust) is the preferred material. Usually five to six applications are made, 150 gallons of spray per acre, or 4 lbs. of dust. These schedules are effective in control of the usual diseases.

Florida: (Ft. Pierce). Downy mildew was very serious in the month prior to October 22 on cucumbers and squash. Some fields were abandoned because of the disease, despite a regular spray or dust program. This is attributed to the generally heavy rains in the area this season. Zineb or nabam plus zinc sulfate with a sticker at the rates recommended for late blight of tomato is used. Nabam plus manganese sulfate has also been used with satisfactory results by a few farmers.

Georgia: In early June downy mildew was found on cucumbers in several fields in Cook County about 20 miles south of Tifton. In late September it was found in a 45-acre field of cucumbers in Toombs County about 100 miles northeast of Tifton. In another field 20 miles south of Tifton in Cook County it was also found on the variety Palmetto.

Kentucky: No cucurbit downy mildew was reported or seen in Kentucky this season.

North Carolina: The disease was first observed on June 25 on cucumbers and spread very slowly owing to unfavorable weather conditions. Finally the disease became generally distributed throughout the State wherever cucurbits are grown but caused no appreciable damage except on late cucumbers in the mountain area and on a few scattered plantings of fall cucumbers in the eastern part of the State. It is estimated that only one percent of the acreage was treated. The treatments consisted primarily of tribasic copper dust (5% Cu) and zineb dust (6%).

Pennsylvania: The hot dry weather of late summer almost completely prevented the appearance of cucurbit downy mildew.

South Carolina: Cucurbit downy mildew appeared late in the spring cucumber crop. It became widespread over the area but did not cause any appreciable loss since the normal harvest season ended by the time the disease became established. Most growers used zineb, nabam, or fixed copper for control. Mildew never did become serious in the fall crop. It seems likely that the pathogen failed to survive the extremely hot, dry summer to an extent adequate to get started in the fall, since volunteer plants in the spring crop fields remained almost entirely free of mildew throughout the summer and fall.

Anthracnose (*Colletotrichum lagenarium*) was serious in some fields, causing more damage than it has in any season since fall cucumbers have been grown extensively in this State. Almost all fall crop growers used either zineb or nabam and achieved adequate anthracnose control where a proper dust or spray schedule was followed.

Texas: Downy mildew was observed on cantaloupes in a field near Yoakum about mid-June.

Virginia:

Blacksburg: Downy mildew of cucurbits was not a problem this year because of the dry weather. A small amount of zineb was used.

Norfolk: Normally, if downy mildew does much damage in this area, it appears on cucumbers during the first part of July and on cantaloupes by the middle of July. This year this disease did not appear on cucumbers until the middle of August, and even later on cantaloupes. By that time the spring crop of both had been harvested.

A sizeable acreage of cucumbers was planted this fall on the Eastern Shore of Virginia, and a large part of the acreage was planted to a downy mildew-susceptible variety. The disease became prevalent during the latter half of September and most of the growers used fungicides, either as sprays or dusts. The degree of control varied from none to good, depending on the time and thoroughness of applications. No correlation was noted between the fungicides used and degree of control.

Downy Mildew of Lima Beans (*Phytophthora phaseoli* Thaxt.):

Delaware: Downy mildew of lima beans was found in late August and by September 10 it was present in all parts of the State. As weather conditions thereafter never did become very favorable for any extended period, the disease did not become epidemic. However, it did cause losses in some fields, low-lying or in pockets in the woods. Total loss to the crop is estimated at less than 2 percent.

Growers are loath to spray or dust even when downy mildew is present. Less than 5 percent of the growers use a fungicide. Preferred material is fixed copper dust, 5% to 7% actual Cu at 40 to 50 lbs. per acre.

Pennsylvania: Downy mildew of lima beans appeared about middle of July in Lancaster County and became general over southeastern Pennsylvania. In some fields it was destructive. Many growers sprayed with fixed copper or Bordeaux. The average loss was less than 1 percent.

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BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

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SUPPLEMENT 218

INDEX TO SUPPLEMENTS 210-217, 1952

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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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Compiled by Nellie W. Nance

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ERRATA

On page 53, 4th paragraph, lines 2 and 3, read Diabotrica <u>und</u>ecimpunctata <u>und</u>ecimpunctata instead of Diabotrica unidecimpunctata unidecimpunctata.

On page 84, under M. MORITZIANUM, read Catacauma venezuelensis, instead of Catacauma venezuelansis.

On page 157, 5th paragraph, read ELEOCHARIS DULCI<u>S</u>, instead of ELEOCHARIS DULCIA.

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