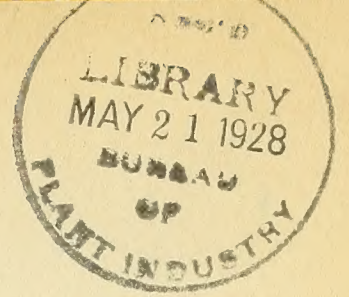


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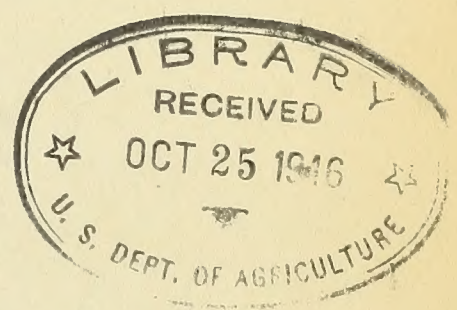
THE PLANT DISEASE REPORTER

ISSUED BY
THE OFFICE OF MYCOLOGY AND DISEASE SURVEY

Supplement 58

Plant Diseases in Iowa in 1927

May 1, 1928.



BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE



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THE
PLANT DISEASE REPORTER
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THE OFFICE OF MYCOLOGY AND DISEASE SURVEY



Supplement 22

Plant Diseases in Iowa in 1937

May 1, 1938.



BUREAU OF
PLANT INDUSTRY
UNITED STATES DEPARTMENT OF AGRICULTURE

PLANT DISEASES IN IOWA IN 1927

A report of the results of a survey for diseases of economic plants made by the Bureau of Plant Industry of the United States Department of Agriculture and the Botany and Plant Pathology Section of Iowa State College.

Prepared by

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Office of Mycology and Disease Survey
Bureau of Plant Industry.

Plant Disease Reporter
Supplement 58

May 1, 1928.

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INTRODUCTION

The survey for plant diseases in Iowa, concerning which the following is a report, was the outcome of a cooperative arrangement between the Office of Mycology and Disease Survey of the U. S. Department of Agriculture, and the Section of Botany and Plant Pathology of the Iowa State College. The writer was assigned to the work and headquartered at Ames, Iowa, from April 15, 1927 to April 15, 1928. The funds and facilities for the survey were apportioned equally between the two institutions.

The purpose of the survey was twofold: first, to gather as much field data as possible concerning diseases of economic plants and to collect specimens of the same; and second, to collect specimens of all available parasitic fungi irrespective of the host. Only the data relating to economic diseases are summarized in this report. It is intended to publish those data pertaining to the mycological survey later.

All specimens of interest have been prepared in duplicate; one set will be incorporated in the herbarium at Ames, and the other has been filed in the mycological herbarium of the Office of Mycology and Disease Survey, in Washington. In this report an asterisk (*) in connection with the name of a disease indicates that a specimen is on file in the Washington office.

It is realized that this report is a very limited one. It does not mention many diseases that undoubtedly occurred, but which were not observed nor reported. Neither are the records of prevalence and severity by any means complete. An adequate survey of the plant diseases of a state should extend over a period of years to be in any sense complete. This report is merely a statement of the diseases observed, reported and collected during the limited, summer, season of 1927.

The weather conditions of 1927 were by no means normal. The season was marked by a late, cold spring, followed by rather extreme drouth conditions which persisted in most sections of the state throughout the greater part of the growing season. These adverse conditions undoubtedly checked the usual severity of many diseases.

The author is indebted to a number of people for assistance in various capacities. Particular credit is due to Dr. J. C. Gilman for constant assistance in collecting specimens, in determining fungi, and in supplying data; to Mr. D. E. Bliss, Mr. D. V. Layton, and Dr. J. H. Muncie for specimens; and to Dr. I. E. Melhus, Mr. D. R. Porter, Mr. H. E. Nichols, Mr. R. H. Porter, Dr. C. S. Reddy, Mr. M. A. Smith, Mr. W. P. Raleigh, and Mr. L. D. Leach for supplying data.

An important result of this survey has been the establishing of proof of the presence of alfalfa wilt and crown rot (pp. 17, 19), and the obtaining of data on the actual severity and prevalence of these diseases by means of two special surveys. From the data accumulated on these surveys the Experiment Station has now begun an extensive research project. In this connection, it is felt that the finding of two apparently winter-hardy strains of alfalfa (p. 20) may prove to be of considerable value to the alfalfa industry of the state.

The following table contains a list of diseases which as far as the writer has been able to ascertain, have not been reported heretofore in the literature nor filed in herbaria, as having been found in Iowa. Most of them it is true, caused but slight losses this year, yet it will be important to keep them under observation and to compare their severity in other years when climatic conditions may be more favorable for their development.

Table 1. List of diseases apparently reported for the first time from Iowa.

| HOST | DISEASE | ORGANISM | PAGE |
|---|-------------------|--|------|
| <u>Diseases of Cereals</u> | | | |
| Corn | Black bundle | Cephalosporium acremonium | 9 |
| Oats | Bacterial stripe | Bacterium striafaciens | 12 |
| Rye | Leaf blotch | Septoria secalis | 14 |
| <u>Diseases of Forage and Field Crops</u> | | | |
| Alfalfa | Bacterial blight | Bacterium medicaginis | 18 |
| | Leaf blotch | Macrosporium sp. | 18 |
| | Yellows | Due to leaf hopper | 20 |
| Sweet clover | Stem spot | Mycosphaerella lethalis | 21 |
| | Leaf spot | Stagonospora meliloti | 21 |
| Cowpea | Powdery mildew | Erysiphe polygoni | 22 |
| | Mosaic | Virus | 22 |
| Blue grass | Leaf blotch | Septoria sp. | 22 |
| Quack grass | Bacterial disease | Bacterium coronafaciens atropurpureum | 22 |
| Soybean | Bacterial pustule | Bacterium phaseoli sojense | 23 |
| Sugar beet | Leaf spot | Phoma betae | 23 |

Fruit Diseases

| | | | |
|--------------|----------------|------------------------|----|
| Apple | Fly speck | Leptothyrium pomi | 24 |
| Pear | Blister canker | Nummularia discreta | 27 |
| Apricot | Bacterial spot | Bacterium pruni | 28 |
| | Powdery mildew | Podosphaera oxycanthae | 28 |
| Cherry | Bacterial spot | Bacterium pruni | 29 |
| Plum | Heart rot | Fomes fulvus | 31 |
| | Shot hole | Phyllosticta prunicola | 31 |
| German prune | Bacterial spot | Bacterium pruni | 32 |
| Grape | Chlorosis | Non-par. | 34 |

Diseases of Vegetables

| | | | |
|--------------|--------------------|--------------------------|----|
| Carrot | Leaf spot | Cercospora apii carotae | 39 |
| Celery | Early blight | Cercospora apii | 39 |
| Dill | Stem and leaf spot | Phoma anethi | 39 |
| Horseradish | Leaf spot | Alternaria brassicae | 40 |
| | Leaf spot | Cercospora armoraciae | 40 |
| Bell pepper | Fruit rot | Alternaria sp. | 41 |
| Red pepper | Wilt | Fusarium sp. | 41 |
| Rhubarb | Leaf spot | Ascochyta rhei | 44 |
| | | Phyllosticta straminella | 44 |
| Spinach | Downy mildew | Peronospora effusa | 44 |
| | Mosaic | Virus | 44 |
| Sweet potato | Mosaic | Virus | 45 |
| Swiss Chard | Leaf spot | Cercospora beticola | 45 |
| Tomato | Streak | Virus | 46 |
| Turnip | Powdery mildew | Erysiphe polygoni | 47 |

Diseases of Trees and Ornamental Plants

| | | | |
|----------|-----------------|--------------------|----|
| Acer sp. | Seedling canker | Phomopsis lediseyi | 48 |
|----------|-----------------|--------------------|----|

New diseases

| | | | |
|-------------------------------|-----------------------------|---|----------|
| <i>Aesculus hippocastanum</i> | Powdery mildew | <i>Uncinula flexuosa</i> | 48 |
| <i>Althaea rosea</i> | Leaf spot | <i>Cercospora kellermanii</i> | 49 |
| <i>Aquilegia</i> spp. | Powdery mildew | <i>Erysiphe polygoni</i> | 50 |
| <i>Berberis vulgaris</i> | (on stems) | <i>Phoma berberina</i> | 50 |
| <i>Betula alba</i> | Canker | <i>Melanconium bicolor</i> | 50 |
| <i>Calycanthus floridus</i> | Leaf spot | <i>Macrosporium calycanthi</i> | 50 |
| <i>Caragana arborescens</i> | Canker | <i>Sphaeropsis</i> sp. | 51 |
| <i>Cosmos</i> sp. | Stem canker | <i>Phomopsis stewartii</i> | 52 |
| <i>Crataegus monogyna</i> | Blight | <i>Bacillus amylovorus</i> | 52 |
| <i>Crataegus oxyacantha</i> | Blight Leaf spot | <i>Bacillus amylovorus</i> <i>Phyllosticta rubra</i> | 52 52 |
| <i>Delphinium</i> spp. | Black spot | <i>Bacterium delphinii</i> | 53 |
| <i>Dianthus barbatus</i> | Rust | <i>Uromyces caryophyllinus</i> | 53 |
| <i>Forsythia</i> sp. | Leaf spot | <i>Alternaria forsythiae</i> | 53 |
| <i>Gaillardia</i> spp. | Leaf spot | <i>Septoria gaillardiae</i> | 54 |
| <i>Helenium hoopesii</i> | Leaf spot | <i>Septoria helenii</i> | 54 |
| <i>Iris</i> spp. | On rhizomes | <i>Leptosphaeria heterospora</i> | 55 |
| <i>Juglans nigra</i> | Powdery mildew | <i>Microsphaera alni</i> | 55 |
| <i>Limonium latifolium</i> | Leaf spot | <i>Ascochyta plumbagicola</i> | 55 |
| <i>Lychnis coronaria</i> | Leaf spot | <i>Phyllosticta lychnidis</i> | 56 |
| <i>Morus</i> spp. | Blight Twig blight | <i>Bacterium mori</i> <i>Gibberella moricola</i> | 56 56 |
| <i>Paeonia</i> sp. | Ring spot | Virus (?) | 57 |
| <i>Populus alba nivea</i> | Canker | <i>Discella populina</i> | 58 |
| <i>Populus</i> sp. | Canker Leaf spot | <i>Discella populina</i> <i>Napicladium tremulae</i> | 58 58 |
| <i>Prunus besseyi</i> | Bacterial spot Brown rot | <i>Bacterium pruni</i> <i>Sclerotinia fructicola</i> | 58 58 |
| <i>Prunus hortulana</i> | Hypertrophy | <i>Exoascus mirabilis</i> | 59 |

New diseases

| | | | |
|--|----------------|------------------------------|----|
| Prunus sp. (Rocky Mountain dwarf cherry) | Bacterial spot | Bacterium pruni | 59 |
| | Brown rot | Sclerotinia fructicola | 59 |
| Salix pentandra } Salix vitellina } Salix spp. } | Leaf spot | Cylindrosporium salicinum | 61 |
| Sorbus aucuparia | Blister canker | Nummularia discreta | 61 |
| | Leaf spot | Phyllosticta sorbi | 61 |
| | Leaf spot | Septoria aucupariae | 61 |
| Spiraea spp. | Leaf spot | Cylindrosporium filipendulae | 62 |
| Syringa spp. | Leaf spot | Cercospora macromaculans | 62 |
| Viburnum opulus } Viburnum opulus } sterile } Viburnum trilobum } | Leaf spot | Cercospora opuli | 62 |

D I S E A S E S O F C E R E A L S

BARLEY

BACTERIAL BLIGHT (Bacterium translucens Jones et al.). Losses in 1927 were negligible. Counts were made in 15 rod rows in three experimental plots in different sections of the state, i. e., at Mason City, in Cerro Gordo County, at Osage in Mitchell County, and at Ames in Story County. The same 20 varieties were planted in each plot. Bacterial blight was found only at Mason City on four varieties, as follows: traces on Minsturdi, Minsturdi (Minn. 439), and Hero, and 15 per cent on Colsess.

It has been observed that whenever a cold spring occurs high infection with corresponding damage follows.

ERGOT (Claviceps purpurea (Fr.) Tul.). In some years a trace is found but none was observed this year.

ANTHRACNOSE (Colletotrichum graminicolum (Ces.) Wils.). In some years slight losses have been reported but frequently it is not prevalent enough to attract attention. None found in 1927.

SCAB (BLIGHT) (Gibberella saubinetii (Mont.) Sacc.). Only scattered slight infections occurred. The damage was too slight to estimate. In an average year the losses vary from a trace to 2 per cent.

***STRIPE** (Helminthosporium gramineum Rab.). Loss 2 per cent. The greater number of the fields in the state had some stripe but it

was generally very slight and occurred only on the lower leaves. However, it was reported to be quite destructive in a number of localities in scattered fields. Dry weather during late spring presumably prevented a severe attack.

Counts made in July in three experimental plots in different sections of the state (See bacterial blight) gave the results shown in table 2.

Table 2. Percentage of infection of barley varieties with stripe, average of experimental plots in three different localities.

| Average : percentage: infection: | Varieties | :: | Average : percentage: infection: | Varieties |
|--|--------------------|----|--|-----------------------|
| None | Hörn | :: | 1.3 | Manchuria (Minn. 184) |
| | | :: | | Velvet (Minn. 477) |
| Trace | Featherston | :: | | |
| | Bónami | :: | 2.0 | Alpha |
| | Sandrel | :: | | Colsess |
| | Trebi (C.I. 936) | :: | | |
| | Oderbrucker (W5-1) | :: | 10.0 | Caucasian |
| 0.6 | Ontario No. 21 | :: | 16.0 | Manchuria (Iowa) |
| | Hero | :: | | |
| | Black Hull-less | :: | 27.0 | Minsturdi (Minn. 439) |
| | Trebi (Colo.) | :: | | |
| | | :: | 46.0 | Minsturdi |

SPOT BLOTCH (Helminthosporium sativum P.K. & B.). The loss in 1927 was too slight to be estimated. Even in an average year it is never more than a trace. Counts made on 19 different varieties (See stripe report) in experimental plots in three sections of the state revealed a rare trace of infection with a few ranging from 1 to 5 per cent.

NET BLOTCH (Helminthosporium teres Sacc.). Loss 2 per cent. The disease was observed generally but as a rule there was only a trace on the lower leaves. In a few localities moderate infection and damage were noticed. The dry season up to time of harvesting evidently prevented the usual 5 per cent loss.

Counts on 19 different varieties (See barley stripe table) in experimental plots in three sections of the state (See under bacterial blight) showed no infection or only a trace on most of the varieties. In one plot (at Ames) four varieties showed extremely high infection in comparison to the others, i. e. Colsess and Trebi (Colo.) 50 per cent, Trebi (C.I. 936) and Sandrel 70 per cent. These same varieties in the other two plots did not show significant infection.

STEM RUST (Puccinia graminis Pers.). Loss a trace. In June, fields over state were unusually free from infection but in general the crop matured with from a trace to 1 per cent infection.

Barley - Leaf Rust

LEAF RUST (Puccinia simplex (Koern.) Erik. & Henn.). Loss negligible. There was an unusually slight infection in the state, appearing as a trace in practically all sections.

LOOSE AND COVERED SMUTS (Ustilago hordei (Pers.) Kell. & Sw. and U. nuda (Jens.) Kell. & Sw.). Loss 1 per cent. In general there was only a trace but in some counties many fields showed infection varying from 10 to 25 per cent.

Table 3. Estimated percentage losses from barley diseases, 1927.

| Disease | Percentage loss | Disease | Percentage loss |
|--------------|-----------------|----------------|-----------------|
| Stripe | 2 | Stem rust | Trace |
| Loose smut | Trace | Other diseases | 2 |
| Covered smut | 1 | All diseases | 5 |
| Leaf rust | 0 | | |

CORN

EAR ROT (Basisporium gallarum Moll.). The total loss from ear rots in 1927 is estimated at about 7 per cent. Of this approximately 4 per cent was due to Basisporium gallarum, 2 per cent to Diplodia zeae, and 1 per cent to Fusarium. The most severe losses from Basisporium occurred in the southeastern part of the state.

Losses were reduced this year because of a drouth which was prolonged into late fall. Ear rot fungi are favored by high moisture content but most of the corn was mature and dry before the rainy season started so that there was small chance for development. On such ears as remained immature, i. e. moist, a great deal of infection occurred. In general the proper development of corn was greatly hampered this year by adverse weather conditions (a cool August and a warm September), in fact, the corn crop was saved only by postponed frost. The Weather Bureau reported the first general killing frosts on October 14 while in a number of counties none occurred until October 31.

At present the station is emphasizing early seed selection, rapid artificial curing after selection, and seed treatment with chemical dusts in the spring. The rapid drying has been demonstrated to be an extremely effective means of inhibiting the development of molds,

Continued experimental treatments with several dusts (Bayer, Merko, Semesan Jr. and others), carried on in plots in sixteen different counties have resulted in increased yields due to the prevention of seedling blight.

Corn - Black bundle

BLACK BUNDLE (Cephalosporium acremonium Cda.). Loss 0.5 per cent. This disease has occurred in the state for an indefinite length of time but this is the first report to the Plant Disease Survey. In a rare year the damage may be quite severe but commonly it is 1 per cent, in the main due to barren stalks. On the whole the loss is small in proportion to the percentage of infection.

EAR ROT (Diplodia zeae Lév.). In the past few years losses from Diplodia have usually out-weighted those of Basisporium but this year it occupied a minor place. (See Basisporium gallarum).

EAR ROT (Fusarium sp.). Ear counts in different sections of the state would indicate that about 1 per cent of the ear rot damage was due to Fusarium. The disease was evidently less prevalent than in 1925 but the infection varied considerably in different fields (See Basisporium gallarum).

SHEATH SPOT (Fusaria and other fungi). Loss undoubtedly insignificant.

ROOT AND STALK ROTS (Gibberella spp. and Fusarium spp.). Probably occurs in Iowa to slight extent. Loss negligible.

HOLCUS SPOT (Pseudomonas holci Kendrick). Loss a trace. In 1927 the disease occurred throughout the state with infection severe enough to be the cause of noticeable damage to the crop. By August 15 infection was well under way.

The development of this disease is quite dependent upon weather conditions. In some years it will be quite prevalent in June and then disappear entirely, only to reappear later in the year.

RUST (Puccinia gorgi Schw.). The first infection was not observed until the first week in August. General infection did not occur until September and even then it was unusually scanty except in the north-central portions where it was plentiful. In many fields rust sori could be found on only a few plants. The drouth, which was prolonged until rather late in the fall, doubtlessly prevented infection. In a year of average conditions rust appears early in the summer and attacks the host moderately during the remainder of the season.

Infection on *Oxalis was first observed May 25, in northern Iowa.

SMUT (Ustilago zeae (Beck.) Ung.). Loss 3 per cent. During September, counts on percentage infection were made in scattered fields throughout the northern half of the state. A total of 3500 plants were examined with the following results:

Corn - Smut

| Part of plant | Average percentage infection |
|-----------------|------------------------------|
| Ear | 3 |
| Stalk above ear | 6 |
| Stalk below ear | 3.7 |
| Tassel | 1 |
| Leaf | Trace |
| Total | 13 |

The occurrence of 6 per cent infection on stalks above the ear in comparison with 3 per cent below would signify that more favorable infection conditions existed later in the season, i. e. during the period of stalk development.

A count of 700 plants in Cass County in the southern part of the state gave the following results:

| Part of plant | Average percentage infection |
|-----------------|------------------------------|
| Ear | 3.3 |
| Stalk above ear | 3.7 |
| Stalk below ear | 8.0 |
| Leaf | 0.1 |
| Total | 15 |

In this case it would appear that conditions were more favorable for infection earlier in the season.

ROOT ROT (Associated with corn root worm). Severe lodging of corn involving 5 to 50 per cent of the stalks occurred in northern and west-central Iowa. Elsewhere the estimates averaged 1 to 5 per cent. In practically all examinations of lodged corn the roots were badly rotted but often traces were found of primary injury due to corn root worm or white grub. The entomology department reports an unusually severe infestation of the corn root worm in southeastern and northwestern sections; and of the white grub in the western part of the state.

Corn - Losses

LOSSES FROM CORN DISEASES.

Table 4. Estimated percentage losses from corn diseases, 1927.

| Disease | : Percentage : loss | : | Disease | : Percentage : loss |
|---|------------------------|----|---|------------------------|
| Smut (<i>Ustilago zeae</i>) | : 3 | :: | Ear rots (<i>Fusarium</i> , <i>Diplodia</i>) | : 7 |
| Leaf rust (<i>Puccinia sorghi</i>) | : 0 | :: | Other diseases | : 0.5 |
| Root rot (<i>Gibberella</i> , <i>Fusarium</i>) | : 0 | :: | All diseases | : 10.5 |

POP CORN

RUST (*Puccinia sorghi* Schw.). Rust infection was extremely slight, even less than on field corn.

SMUT (*Ustilago zeae* (Beck.) Ung.). The loss from smut was about 4 per cent. One field was seen with 9 per cent of the ears infected, but none on leaf, tassel or stalk.

SWEET CORN

BACTERIAL WILT (*Aplanobacter stewartii* (E.F.S.) McC.). None observed in 1927 in fields or in experimental plots.

EAR ROT (*Basisporium gallarum* Moll.). Loss 4 per cent. Ordinarily the losses to sweet corn, caused by ear rots, are more severe on dent corn but the hot, dry weather of September this year interfered with the development of the fungi.

* EAR DRY ROT (*Diplodia zeae* Lév.). (See *Basisporium gallarum*.)

* STALK ROT (*Diplodia zeae* Lév.). In experimental plots (2 acres) at Story City about 12 fully grown plants of Golden Bantam were found which were infected by *Diplodia zeae*. The plants were dead and could be easily detected among the surrounding healthy ones. Discoloration extended up the stalk a short distance from the base, and pycnidia formed above ground for a distance of six inches or more.

RUST (*Puccinia sorghi* Schw.). Loss 2 per cent. Severe infection occurred in the southern half of the state. In many plantings there was a 90 to 100 per cent infection with the older leaves killed.

Sweet Corn - Downy mildew

*DOWNY MILDEW (Sclerospora graminicola (Sacc.) Schroet.). Artificial infection was obtained in experimental plots by the use of infected Setaria material which was placed over the seed at the time of planting. This artificial infection was the only source of the fungus early in the season since an examination of sweet corn fields and Setaria plants over the state revealed none. Later in the fall, however, natural infection was observed occurring abundantly on Setaria and in one instance on Golden Bantam sweet corn.

SMUT (Ustilago zeae (Beck.) Ung.). Loss 7.5 per cent. Sweet corn smut is important in Iowa not only because of actual loss in the field but also because of its relation to the canning industry. Since traces of smut in the product cause considerable loss to canners every year, a resistant strain of sweet corn would be immensely valuable. The actual loss in the field is estimated at 4 per cent while the additional loss to the canning industry would be 3.5 per cent.

OATS

*HALO BLIGHT (Bacterium coronafaciens Elliott). Only a trace was found in several localities, i. e., Fayette County. It was common in experimental plots at Ames (Story County) but the damage was negligible.

*BACTERIAL STRIPE (Bacterium striafaciens Elliott). The organism causing this disease was described recently by Charlotte Elliott (Jour. Agr. Res. 35, p. 811-824). The disease was seen twice in the state this year, and collected once by C. S. Reddy. It occurred on a few plants left standing in a field near Hastings (Oct. 21) and again in a field near Rockwell City (June) where slight damage occurred on lower leaves. The organism was isolated.

ANTHRACNOSE (Colletotrichum graminicolum (Ces.) Wils.). None found in 1927. A trace occurs in an occasional year.

SCAB (BLIGHT) (Gibberella saubinetii (Mont.) Sacc.). None found in 1927. In an average year the disease is of slight importance, in fact it is rarely prevalent enough to warrant an estimation of loss.

*CROWN RUST (Puccinia coronata Cda.). Loss 2 per cent. The first development of pycnia on Rhynchospora lanceolata was observed April 27 in southwestern Iowa and northwestern Missouri. By May 7 aecidiospores were shedding in the same localities.

Oats - Crown Rust

During May and early June infection on oats throughout the state was only a trace although in the northern part about 1 per cent of the plants were affected. By the end of June infection was moderate generally. During early July severe infection occurred extensively in the south and particularly in some localities in the northeast. July was marked by severe drouth which not only checked further rust infection but also damaged the maturing grain. At this time considerable flecking occurred on leaves, indicating that the drouth had prevented the development of sori.

Despite the drouth, however, considerable damage from crown rust was reported in various localities. In general early varieties were harvested with slight loss while late varieties were moderately or severely damaged. In Kossuth County late oats were harvested green because of the severe infection.

STEM RUST (*Puccinia graminis* Pers.). Loss 0.8 per cent. Infection was extremely reduced this year on account of drouth conditions. During early June only a slight infection could be found in a greater part of the state and by early July many of the early oats had matured and were being cut with only a trace to 1 per cent infection; while some of the late oats, particularly in northwestern part of the state, had 1 to 2 per cent infection. The principal damage occurred on late oats which were harvested late.

SMUT (*Ustilago avenae* (Pers.) Jens. and *U. levis* (K. & S.) Mag.). The usual 3 per cent loss occurred this year.

BLAST (STERILITY) (Undet.). The loss this year, 3 per cent, was less than usual.

LOSSES FROM OAT DISEASES.

Table 5. Estimated percentage losses from oat diseases, 1927.

| Disease | Percentage loss | Disease | Percentage loss |
|---|-----------------|----------------|-----------------|
| Loose and covered smuts (<i>Ustilago avenae</i> & <i>U. levis</i>) | 3 | Other diseases | 3 |
| Stem rust (<i>Puccinia graminis</i>) | 0.8 | All diseases | 8.8 |
| Leaf rust (<i>Puccinia coronata</i>) | 2 | | |

RYE

*ERGOT (Claviceps purpurea (Fr.) Tul.). Loss 0.5 per cent. Reported from several parts of the state. In Muscatine County infection was extensive, particularly on rye which was used as a cover crop for vegetables, sweet potatoes and cantaloupes. In general there was about 10 per cent infection toward the end of the season and usually two or three sclerotia were borne on a single head.

ANTHRACNOSE (Colletotrichum graminicolum (Ces.) Wils.). None found since 1924. The occurrence of this disease is inconstant from year to year and when it does occur the damage is rarely more than a trace.

POWDERY MILDEW (Erysiphe graminis DC.). None found in 1927. A trace occurs in an occasional year.

SCAB (SLIGHT) (Gibberella saubinetii (Mont.) Sacc.). None found in 1927. The loss in the past has never been more than a trace.

LEAF RUST (Puccinia dispersa Erik.). In 1927 leaf rust was even less important than usual. Ordinarily the loss is a trace and rarely 1 per cent. This year, development of the rust was checked, no doubt, by severe drouth conditions. Sori were confined to the lower leaves where 5 per cent infection occurred.

STEM RUST* (Puccinia graminis Pers.). Stem rust was scarce on rye throughout the season due to the extremely dry conditions. During June infection was estimated as a trace. In northwestern Iowa in July it was a trace to 1 per cent. The crop finally ripened with less than 1 per cent infection.

*LEAF BLOTCH (Septoria secalis Prill. & Del.). Loss a trace. The disease occurred generally with severe infection. Commonly the leaves on the lower half of the plants were severely attacked and killed, giving the fields a brownish color. This constitutes the first report of the disease in the state.

*STEM BLOT (Urocystis occulta (Wallr.) Rab.). Loss a trace. The occurrence this year is the first observed since 1924. In Muscatine County a 50 per cent infection was seen on rye used as a cover crop for vegetables. In fields 10 per cent infection occurred.

Rye - Losses

LOSSES FROM RYE DISEASES.

Table 6. Estimated percentage losses from rye diseases, 1927.

| Disease | : Percentage : loss | :: | Disease | : Percentage : loss |
|---|------------------------|----|---|------------------------|
| Smut (<i>Urocystis occulta</i>) | : Trace | :: | Stem rust (<i>Puccinia graminis</i>) | : 0 |
| Ergot (<i>Claviceps purpurea</i>) | : 0.5 | :: | Other diseases | : Trace |
| Leaf rust (<i>Puccinia dispersa</i>) | : 0 | :: | All diseases | : 0.5 |

WHEAT

BLACK CHAFF (*Bacterium translucens undulosum* S. J. & R.). This disease was reported to be severe and common in 1919 but in succeeding years it was relatively unimportant, losses being estimated as a trace. In 1927 the disease was even less important, since it occurred generally in extremely scanty infections. In experimental plots in the northern part of the state the usual amount was observed on leaves of durum wheat and on the heads of hard red wheats.

ERGOT (*Claviceps purpurea* (Fr.) Tul.). None observed in 1927. Ergot on wheat has been reported but once, in 1922, when it was said to be rare.

ANTHRACNOSE (*Colletotrichum cereale* Manns.). None observed in 1927. The occurrence and importance of the disease varies from year to year. Often it is absent or not abundant enough to attract attention. Losses are reported ordinarily as a trace; the highest loss, 2 per cent, occurred in 1922.

POWDERY MILDEW (*Erysiphe graminis* DC.). None observed in 1927. Infection has not been known to occur since 1923. Occasionally it is reported in slight scattered infections but is never important.

*SCAB (*Gibberella saubinetii* (Mont.) Sacc.). In 1927 the infection was unusually slight. Only a rare head could be found and this usually with just a few of the kernels infected. In an average year the loss is estimated as a trace; rarely the loss is more, i. e. 4 per cent in 1923, 5 per cent in 1924.

Wheat - Blight

BLIGHT (Helminthosporium spp.). None observed in 1927. Losses from this disease have never been reported to be more than a trace.

STEM RUST (Puccinia graminis Pers.). Loss 0.6 per cent. In general, winter wheat matured and was harvested (July 11) with a trace to 1 per cent infection; although a number of reports were received of severe infection and damage, particularly in Warren County. Here the county agent stated that the yield had been damaged fully 50 per cent in many cases. Spring wheat (July 11) had a trace to 1 per cent infection in northwestern Iowa and suffered more damage than winter wheat because of later maturity which allowed for rust development. On the other hand, spring wheat plantings were not common this year. The reduction in prevalence of the disease and of the loss is due directly to the drouth conditions which existed until near harvest time.

Pycnia were first noted on barberries April 28, in Wayne County and by June 8 a moderate infection on wheat occurred over the greater portion of the state; while in northeastern Iowa the infection apparently was somewhat heavier. Also general infection was noticeable about a week earlier in the south than in the north.

LEAF RUST (Puccinia triticina Erik.). Loss 15 per cent. The epidemic of leaf rust in Iowa this year was the most severe witnessed in many years. An extremely heavy infection occurred over the entire state; in fact some fields were so severely infected early in the season that the heads never formed while in others the heads did not fill properly. Fields commonly had an 80 per cent infection. In northwestern Iowa a 100 per cent infection in some fields caused the plants to be stunted to half the normal size and in southwestern Iowa plants frequently had half of their leaves killed. The main factor influencing the cause of the epidemic probably can be traced to the damp, wet weather of May which was extremely favorable for winter wheat infection.

LEAF SPOT (Septoria sp.). None seen in 1927 or in 1926. In an average year loss is reckoned at a trace to 1 per cent.

BUNT (Tilletia laevis Kühn and T. Tritici (Bjerk.) Wint.). Loss a trace. A slight amount was observed in scattered fields and although a number of reports of severe damage were obtained, yet a large majority of fields were clean.

LOOSE SMUT (Ustilago tritici (Pers.) Rostr.). Loss a trace. In most fields none occurred, while in a considerable number a 1 to 2 per cent infection was reported.

Alfalfa - Bacterial Root-rot

the principal alfalfa producing area, but not all of these counties were visited. An extensive survey early next spring would be desirable.

Extent of loss: Wilt is not particularly noticeable to the untrained eye except in fields over two years old. However, the disease was found frequently in 1 or 2 year old fields, but to a less extent than in older fields. In general, fields more than 3 years old have a greatly reduced stand, varying from one-half to practically complete. The majority of fields visited were less than 4 years old. Since approximately 3 years are required for the effects of the disease to be plainly evident, it is apparent that the large new acreage each year tends, in a relation to obscure, the reduction in stand and yield of older fields. Mr. Westcott, county agent of Pottawattamie County, states that the county at present has only four-fifths of the alfalfa acreage that existed 5 years ago. He considers this reduction to be due to discouragement of farmers who have been unsuccessful in maintaining proper stands of alfalfa. There is good reason to believe that losses from wilt have been masquerading under such general terms as "winter killing", "improper soil conditions", etc.

The condition in Iowa is considered to be fully as serious as reported for Missouri in 1926 (Pl. Dis. Repr. Suppl. 55, p. 195).

Varieties affected: Wilt has been found in fields planted with certified seed of the following varieties: Dakota #12, Canadian Variegated, Grimm, Cossack, and Kansas Common. In the agronomy plots at Ames a few infected plants were found in one year plantings from certified seed of Dakota #12, Canadian Variegated, and Canadian Grimm. Dakota #12 has been planted extensively and in a number of fields where it was possible to secure accurate data this variety was found to be severely attacked. In Winnebago County, where there has been a considerable increase of acreage in the past few years, only certified seed of hardy varieties, Grimm, Cossack, Canadian Variegated has been planted. An inspection of several fields in this county revealed no infection and in addition the county agent reports that no injury has been observed. At Cedar Falls (Blackhawk County), the local commercial club has sponsored an experimental plot of alfalfa on sandy soil for the last four years. In these plots and in fields near by on the same sort of soil no wilt has been found.

***BACTERIAL BLIGHT** (*Bacterium medicaginis* (Sack.) EFC.). This disease was observed only in two localities in two different counties where the infection was general but the damage slight. First report for the state.

***LEAF BLOTCH** (*Macrosporium* sp.). First report for the state. The importance was negligible.

***DOWNY MILDEW** (*Peronospora trifoliorum* DC.). Downy mildew was extremely scarce in 1927; the highest infection found was 1 per cent in a single field in Montgomery County. In other scattered localities only an occasional infection occurred.

In Iowa, this disease does not appear consistently year after year; i. e., none was found during the years 1920-25. In other years the reduction in yield has varied from a trace to 2 per cent.

Apparently infection occurs more frequently on fall seedings.

Alfalfa - Crown Rot

but it will probably be safe to assume that at least half of the loss in alfalfa fields is traceable to crown rot. At any rate the first special survey showed a larger part of the plants to be affected by crown rot. In the second special survey late in the fall, however, more of the plants were affected by wilt. Generally it can be said that early evidences of crown rot are to be found in the great majority of 1 and 2 year old fields and in some of the fields of this age a reduction in stand of 1 to 10 per cent is found. In fields of 3 years or more the reduction in stand was commonly 1/3 to total. No evidence of crown rot was found in Winneshiek County, where only certified seed of hardy varieties are planted. Hardy varieties at Cedar Falls (Blackhawk County) on sandy soil seem to have escaped injury, in fact L. C. Boatman of the Agronomy Department states that fields on sandy soil are less subject to injury.

Varieties affected: Few data have been collected but at Cedar Falls in the experimental plots on sandy soil, sponsored by the local commercial club, it was demonstrated that Kansas Common and Dakota #12 are not hardy while Cossack and Grima do withstand winter conditions. In Winneshiek County where only certified seed of Canadian Variegated, Cossack, and Grimm are used no evidence of crown rot was found; but most of the fields were young. A 3-year old field of Dakota #12 in Sac County was found to be severely affected with only a third of the stand remaining. In Pottawattamie County a strain of alfalfa was located which has withstood winter conditions during the past 20 years. This strain is known locally as "Bobensee" --the name of the man who has propagated the seed for a period of years. However, William Huelle brought the original seed from Germany about 60 years ago where it was secured near the source of the original Grimm strain and it is more properly named after him "Huelle". The Huelle is now grown by a number of farmers near Council Bluffs. From time to time fields have been harvested for seed and in this way the strain has been perpetuated. A quantity of this seed was obtained and has been planted in the experimental plots at Ames. A similar quantity of seed was divided among H. L. Westover at Washington, D. C.; J. L. Weimer at Manhattan, Kansas, and F. R. Jones at Madison, Wis. Another strain, located at Griswold, on the farm of Edgar Daft, has withstood winter conditions during the past 15 years. The seed was purchased at a local market. An invasion of gophers destroyed the original field recently and it was plowed up. A hundred or so of the plants still remained in the head rows and from these there was secured this year a small quantity of seed which will be planted in order to secure enough seed to identify the strain and to investigate its hardiness.

*YELLOW (Leaf Hopper). Yellow appeared during the summer and fall in a group of counties in the southwestern portion of the state. Ordinarily infection was slight, in most fields only a few diseased plants appearing, but in one there was 25 per cent. First report for the state.

CLOVER, ALSIKE

*RUST (Uromyces trifolii (Hedw. f.) Lév.). Rust occurred generally in the state but the damage was rather slight.

CLOVER, RED

*LEAF SPOT (Bacterium trifoliorum Jones et al.). Loss a trace. This bacterial disease is widespread in the state, occurring commonly on volunteer and cultivated plants. In a few northern fields, during September, some loss (5 per cent) occurred through extensive killing of leaves and stalks.

POWDERY MILDEW (Erysiphe polygoni DC.). Loss a trace. General infection was not evident until July. It appeared generally first in the southern section of the state. Thereafter, however, it occurred in severe form in all sections.

ANTHRACNOSE (Gloeosporium caulivorum L. Kirchner). This disease has not been observed in the state since 1923. Previous to that time it had been present in consecutive years since 1916, causing a loss estimated to be a trace each year.

*RUST (Uromyces fallens (Desm.) Korn). This rust was observed but twice. In one case it was severe on stems.

*MOSAIC (Virus). Mosaic was observed but once in 1927 on several plants in Pocahantas County.

CLOVER, WHITE

RUST (Uromyces trifolii (Hedw. f.) Lév.). A moderate infection was observed in several localities.

CLOVER, SWEET

*LEAF SPOT (Cercospora davisii E. & E.). This leaf spot was observed throughout the state on both volunteer and cultivated plants. In many localities conspicuous defoliation occurred.

*STEM SPOT (Mycosphaerella lethalis Stone). First report for the state, occasioned slight damage in one field at Adel (Dallas County).

COWPEA

POWDERY MILDEW (Probably Erysiphe polygoni DC.). First report for the state. A moderate amount was found in Muscatine County, where the damage was slight.

*MOSAIC (Undet.). First report for the state. One field was seen with 1 per cent.

FLAX

WILT (Fusarium lini Colley). Loss 5 per cent. Twenty years ago flax production was an important industry in the state but the severity of losses from wilt brought about general discouragement so that the acreage shrank to practically nothing. In recent years, however, the universal use of wilt resistant varieties has reduced wilt losses and the acreage is increasing.

GRASS, BLUE

POWDERY MILDEW (Erysiphe graminis DC.). A moderate infection was found in one locality near Ames.

*RUST (Puccinia epiphrasia Wotter.). A moderate infection occurred over the state.

*LEAF BLOTCH (Sclerotinia sp.). First report for the state. In the single case observed the damage was moderate.

SMILT (Ustilago strigiformis (West.) Niessl.). Infected plants occurred scatteringly in the state.

GRASS, QUACK

BACTERIAL BLIGHT (Bacterium coronafasicis atro-rugosum Reddy & Godkin). This disease is reported for the first time in this state by Dr. C. S. Reddy, who found infected plants near Osage (Mitchell County).

RUST (Puccinia graminis Pers.). Near Spencer, plants growing in a barberry hedge were heavily infected.

GRASS, SUDAN

*HOLCUS SPOT (Pseudomonas holci Kendrick). Occurred commonly in the state, with slight importance.

GRASS, TIMOTHY

STEM RUST (Puccinia graminis Pers.). This rust occurred commonly, to a slight extent, on volunteer plants and but rarely in cultivated fields except when mixed with clover.

*LEAF SPOT (Scolecotrichum graminis Fuck.). Widespread and frequently caused extensive killing of leaves.

*SMUT (Ustilago striaeformis (West) Niessl.). Roadside and uncultivated plants were commonly affected over the state but evidently cultivated plants were free from infection.

SORGHEUM

HOLCUS SPOT (Pseudomonas holci Kendrick). General. One planting showed 50 per cent of the plants with a slight infection.

SOYBEAN

*BACTERIAL PUSTULE (Bacterium phaseoli sojense Hodges). First report for the state, being found in two localities, one southern and one northern. In both cases the infection was slight.

SUGAR BEET

*LEAF SPOT (Cercospora beticola Sacc.). This disease was widespread with the host and caused a loss of about 1 per cent. A slight infection occurred also on the mangel.

ROOT-ROT & LEAF SPOT (Phoma betae (Oud.) Frank). First report for the state. Loss a trace. General with the host.

DISEASES OF POME FRUITS

APPLE

BLIGHT (Dothidea arborescens (Lurr.) Trev.). Loss a trace. After 3 consecutive years of severe damage, blight in 1927 occupied a position of less than the usual importance. The loss this year is estimated as a trace. To be sure, this estimate is influenced considerably by the extremely light fruit crop, but aside from this there was comparatively little blighting of branches.

In June blight was generally scarce but by August moderate infection was more frequently encountered in scattered areas, i. e. in Otterbein, Page, Humbolt, Scott, and Lee Counties. In the last three counties named the disease was more severe even than last year, especially on young trees.

CROWN GALL (Bacterium tumefaciens EPS. & Town.). A few infected trees were found as usual in nurseries.

SOOTY BLOTCH (Gloeodes pomigena (Sckw.) A. S. Colby). None was seen this year but it was common last year.

RUST (Gymnosporangium juniperi-virginiana Sckw.). Loss a trace. The seriousness of the disease was undoubtedly minimized by the slight crop of fruit this season. By June 11 a moderate infection (pycnia) was apparent on leaves over the state. Bechtel crab and the native crab (Malus ioensis) likewise showed infection; the latter most severely with twig hypertrophy occurring occasionally. In a number of orchards Wealthy showed the usual decided susceptibility in comparison with other varieties.

ELYSIUM (Leptothrium pomi (Mont. & Fr.) Sacc.). First report for the state. Very light this year but heavy last year.

BLISTER CANKER (Franklinia discreta (Sckw.) Tul.). Loss a trace. Blister canker is becoming less important than formerly because the varieties most susceptible are not being planted. However, St. James and Delicious are fairly susceptible.

BLOTCH (Phyllosticta salutaris Ell. & Lv.). Loss a trace. Blotch has been confined to the southern half of the state, i. e. the northern boundary of the blotch zone has corresponded to the so-called Delicious line. However, three recently discovered infections have extended the distribution. These have been found on Northwestern Greening in Monaca, Tazette, and Calhoun counties.

BLACK ROT (Physalospora malorum (Pk.) Sacc.). Loss a trace. Black rot was of slight importance, in part due to the failure of the apple crop. A slight to moderate leaf infection was observed generally. In Mecklenburg County the most severe infection ever seen occurred on some varieties.

Apple - Black Rot

The fungus, Coniothyrium pyrina, is found commonly on leaves in Iowa. According to the literature, this is a secondary invader of infection areas caused by Physalospora malorum.

*SCAB (Venturia inaequalis (Oke.) Aderh.). Loss 5 per cent.

Mature ascospores were found May 19 on over-wintered leaves at McGregor in Clayton County. Scab lesions were first observed June 4 at Cedar Rapids and June 10 in Muscatine County. In general the infection for the state was about 2 weeks late, due probably to the cold weather. Scab developed about 10 days to 2 weeks after blossoming.

The loss this year cannot be estimated accurately since there was only a very light crop of apples. The dry season of 1926 was highly unfavorable to scab development but heavy rains late in autumn resulted in heavy leaf infection, thus supplying abundant inoculum for the following season. In general infection was quite uneven early in 1927; some orchards showing very little or none. Later in the season, however, the disease was more severe in most sections than at any time last year. Infection and damage were slight in western Iowa. Due to the scanty fruit crop, however, observations were limited principally to leaf attack.

The native wild crab, *Malus icensis, suffered heavy leaf infection throughout the state. A moderate amount was observed on Bechtel crab in one locality.

Where spray was applied at calyx and 10 days after calyx (cover spray) there was good control. Unsprayed trees in June had about 30 per cent infection.

WINTER INJURY (Plate I. Fig. 1). The loss from winter injury is estimated at 1 per cent for 1927 and at 5 per cent for 1926. Dead or severely injured trees occur over the entire state. It is thought that the initial injury took place during the winter of 1924-25. Most of the injury is found on trees less than 10 years old, but older trees are also affected. In scattered home orchards losses of 50 to 95 per cent of the trees were frequent. In Clayton and Dubuque Counties along the bluffs overlooking the Mississippi River a 50 per cent loss has occurred. The main symptoms on severely affected trees are scanty or sparse foliage, longitudinal cracks in the bark, discolored or rotted heart wood. Quite often basal cankers are encountered. In one orchard where these cankers had been given careful treatment there were evidences that the bark would heal over the wounds. It is doubtful, though, if the trees will survive the injury which undoubtedly occurred on the roots and in the heart wood (See cherry winter injury).

Apple - Losses

LOSSES FROM APPLE DISEASES

Table C. Estimated percentage losses from apple diseases, 1927.

| Disease | Percentage loss | Disease | Percentage loss |
|--|-----------------|--|-----------------|
| Black rot (<i>Phylospora cydoniae</i>) | Trace | Scab (<i>Venturia inaequalis</i>) | 5 |
| Blotch (<i>Phyllosticta solitaria</i>) | Trace | Other diseases | 1 |
| Cedar rust (<i>Gymnosporangium</i>) | Trace | All diseases | 6 |
| Fire blight (<i>Bacillus xylovorus</i>) | Trace | | |

PEAR

BLIGHT (*Bacillus xylovorus* (Burr.) Trev.). Although blight infection was considerably reduced on apple, it appears that the pear suffered severely, especially in eastern sections and even in localities not affected last year. In a number of places the damage was considered to be the most severe ever experienced. In young plantings and nurseries large losses occurred.

In section orchards at Shenandoah, moderate loss occurred on Clapp Favorite and Flemish Beauty; severe loss on Bartlett, Beurré d'Angou, Duchess, Hierfer, Lincoln, and Worden Seckel.

In the horticultural experimental orchard at Ames considerable varietal susceptibility was noted this year on seedling trees and hybrids as follows:

Infection on seedling trees

| <u>None</u> | <u>Slight</u> | <u>Moderate</u> | <u>Severe</u> |
|-------------|------------------|-----------------|----------------|
| Chinese | Abley | Alamo | Earl de Hyst |
| Dearborn | Beur de La Motte | Amos | Flemish Beauty |
| Fluke | Lawrence | Orlando | Lowell |
| McElroy | Lincoln | | Longworth |
| New Orleans | | | Worden Seckel |
| Sheldon | | | |
| Walenta #1 | | | |

Pear - Blight

Infection on seedling hybrids

| <u>Name</u> | <u>Slight</u> | <u>Moderate</u> | <u>Severe</u> |
|---------------------------|------------------|----------------------------|------------------------------|
| Birkett X Mount Vernon | Kieffer X Seckel | Birkett X Bezi de La Motte | Birkett X Clairgeau |
| Howell X Birkett | | Kieffer X Howell | Croel #15 X Bezi de La Motte |
| Fluitt X Seckel | | | Seckel X Chinese |
| Lincoln X Howell | | | |
| Mt. Vernon X Duchess | | | |
| Seckel selfed | | | |
| Seckel X Bezi de La Motte | | | |
| Seckel X Kieffer | | | |
| Seckel X Longworth | | | |
| Seckel X Croel | | | |
| Warner X Howell | | | |

*LEAF SPOT (Coniothyrium piring (Sacc.) Sheld.). This organism occurs rather commonly and abundantly in leaf spots of pear. In one large orchard of seedlings the leaf spotting persisted in spite of a regular spray schedule.

*LEAF BLIGHT (Exoraeo maculata (Lév.) Atk.). This leaf blight was found only in nursery rows. Observations in September indicated considerable varietal differences in susceptibility as follows:

No infection--Ratten, Kieffer, Duchess, Dwarf, Bartlett.

Infection but no defoliation--Garber 10 per cent; Trunch 5 per cent; Clapp's Dwarf 5 per cent; Wilder 5 per cent.

Infection with defoliation--Flemish Beauty 10 per cent, and variety with name unknown, 60 per cent defoliated.

*BLISTER CANKER (Nummularia discreta (Cotw.) Tel.). First report for the state. Blister canker on pear was found in a nursery in the northern part of the state. Several lower branches on a single tree were being attacked and killed. The infected tree was one of two varieties introduced from China about 20 years ago. Blister canker on pear has been previously reported to the survey only from Delaware. It was first found in 1926 (1925) near Levinville, in Adams County.

*SCAB (Venturia pyrina Ador.). Observed but once in 1927. This was a severe infection on leaves and fruit at Meadgor.

PEAR - Losses

LOSSES FROM PEAR DISEASES

Table 9. Estimated percentage losses from pear diseases, 1927.

| Disease | Percentage loss | Disease | Percentage loss |
|---|--------------------|----------------|--------------------|
| Fire Blight (<i>Bacillus amylovorus</i>) | 10 | Other diseases | 0 |
| Scab (<i>Venturia pyrina</i>) | 0 | All diseases | 10 |
| Leaf Blight (<i>Fabrea maculata</i>) | Trace | | |

QUINCE

*LEAF BLIGHT (*Fabrea maculata* (Lév.) Atk.). Loss a trace. Quince in Iowa is grown mainly outside of nursery rows. In nursery rows this year there was severe defoliation on all the varieties grown as follows: 95 per cent Angers and Hrech; 85 per cent Orange; 85 per cent Osborn.

DISEASES OF STONE FRUITS

APRICOT

*LEAF SPOT (*Coccomyces* sp.). This leaf spot was plentiful in 1926 at Shenandoah in nursery rows. This year, however, infection was not observed.

*BACTERIAL SPOT (*Bacterium pruui* H.S.). First report for the state. A slight infection was observed in nursery rows at Shenandoah on the Alexis variety.

*POWDERY MILDEW (*Podosphaera oxycantana* (DC.) LBV.). Specimens collected in 1926 in a nursery at Shenandoah constitute the first report for the state. No observations were made this year.

CHERRY

*BACTERIAL SPOT (Bacterium pruni EFB.). Bacterial spot of cherry was located for the first time in the state. It occurred in five different counties, four of which (Sac, Boone, Harrison, and Page) are located in the southwestern quarter of the state; while the fifth, Winnebuck, is in the extreme northeastern corner. Thus it would appear that the disease is widespread in the state. Although the disease is reported for the first time, there is no doubt but that it has been present for a number of years, since Rolfs in 1915 (Cornell Expt. Sta. Memoir 8: 303) reports its occurrence in Iowa on hosts other than cherry.

The occurrence of the disease on cherry in a number of adjacent states has been reported in publications of the Plant Disease Survey. Possibly the presence of bacterial spot on cherry has been obscured by the commonly severe attacks of the Coccomyces leaf spot, and it is likely that some of the severe defoliation occurring in nursery rows may be on account of bacterial leaf spot.

No estimate of damage or loss in the state can be made at this time on so few observations. Although the presence of Bacterium pruni on cherry was not detected early enough this year to make careful observations in the field, it has been determined that a large portion of diseased leaves collected during the year are affected by this organism. In Boone County a number of trees were found to have suffered moderate defoliation due to infection by B. pruni.

*LEAF SPOT (Coccomyces nigralis Fig.). Loss 5 per cent. Severe infection and defoliation occurred in many places throughout the state and in Muscatine County were reported to be the most severe observed in the past five years. During late August and September trees were seen to be severely or entirely defoliated in many parts of the state. A complete spray schedule is a successful method of control, as shown in one orchard where the last spray application had been omitted in one section. In this the trees all showed moderate infection on young terminal growth. Infection was seen on wild cherry in one locality.

*POWDERY MILDEW (Podosphaera oxycanthae (DC.) DeV.). Loss 4 per cent. The powdery mildew of cherry occurs throughout the state although more commonly in the southern half. The most serious damage occurred in nurseries where young trees (Montmorency especially) were severely attacked. On more mature trees in orchards the young terminal growth and water shoots were subject to attack. On grown trees, however, the damage was of little importance this year.

BROWN ROT (Sclerotinia fructicola (Wint.) Rehm.). No losses from brown rot occurred in 1927 because an early frost killed the cherry blossoms. In an average year the losses range from a trace to 2 or 3 per cent. Only once has a 5 per cent loss been reported.

This year a slight infection of brown rot was found on Sand Cherry (Prunus besseyi), Rocky Mountain Dwarf Cherry (Prunus sp.) and on compass cherry. The report on P. besseyi is the first for the state for the host.

Cherry - Winter Injury

WINTER INJURY. Loss 4 per cent. During the growing seasons of 1926 and 1927 many cherry trees have died from winter injury which occurred initially during the winter of 1925. The autumn of 1925 was marked by severe drouth conditions, followed by a warm rainy period, then suddenly in early winter extremely low temperatures. It is reported that the soil was frozen to a depth of five feet. Following this there was a severe drouth in 1926 and again early in 1927, which undoubtedly augmented the original injury.

Frost at blossom time in 1927 killed practically the entire crop of fruit.

LOSSES FROM CHERRY DISEASES

Table 10. Estimated percentage losses from cherry diseases, 1927.

| Disease | : Percentage : loss | :: | Disease | : Percentage : loss |
|---|------------------------|----|-----------------|------------------------|
| Brown rot (<i>Sclerotinia cinerea</i>) | : 0 | :: | Other diseases: | 8 |
| Leaf spot (<i>Coccomyces hiemalis</i>) | : 5 | :: | All diseases | 13 |

PEACH

*BACTERIAL SPOT (*Bacterium pruni* BFS.). Loss a trace. An extremely slight infection occurred throughout the southern part of the state. In a few cases a slight to moderate defoliation was seen.

SCAB (*Gladosporium carpophilum* Thuem.). None observed in 1927. Two or three times in the past years scab has appeared when it caused damage estimated to be a trace.

*LEAF-CURL (*Exococcus deformans* (Berk.) Fockl.). Loss a trace. Infection and defoliation was quite severe throughout the southern half of the state.

Peach - Losses

LOSSES FROM PEACH DISEASES

Table 11. Estimated percentage losses from peach diseases, 1927.

| Disease | Percentage loss | Disease | Percentage loss |
|---|-----------------|--|-----------------|
| Leaf curl (<i>Exoascus deformans</i>) | Trace | Scab (<i>Cladosporium</i> <i>carpopophilum</i>) | 0 |
| Brown rot (<i>Sclerotinia cinerea</i>) | 0 | Other diseases | Trace |
| Yellows and little peach (undetermined) | 0 | All diseases | Trace |

PLUM

*BACTERIAL SPOT (*Bacterium pruni* EPS.). Two collections were made at widely separated places. The infection in both cases was slight.

*LEAF SPOT (*Coccomyces himalis* Higgins). Two collections were received. In one southern locality and in nursery rows severe defoliation occurred.

*POCKETS (*Exoascus pruni* Fockl.). Loss a trace. Infections were severe in Pottowattamie County, moderate in Fremont County, and slight in Muscatine County. The wild plum was much more susceptible than the cultivated varieties.

*HEART ROT (*Pomes fulvus* Fr.). First report for the state. Fruiting bodies were found in two parts of the state. They occurred on old trees: in one case on 30 year old Japanese hybrids in a nursery and again on Wild Goose in a home orchard.

*LEAF SPOT (*Phyllosticta prunicola* Sacc.). This leaf spot caused considerable shot-hole in some cases.

The specimens collected this year had spores corresponding to those of *P. circumscissa* Cke. but the spots were too large. (Cfr. Ellis and Everhart, N. Amer. Fungi #3353 and Fungi Col. #841.). The spores were ellipsoid, containing usually 2 oil droplets, olivaceous, 5-7 x 2-3.5 u. In general, the specimens are best considered as *P. prunicola*. (Cfr. Aderhold, "Über die Sprüh- und Dürfflockendkrankheiten des Steinobstes." Landwirtschaftliche Jahrbücher-1901.)

*SHOT HOLE (*Phyllosticta virginiana* (E. & Hals.) Seaver). One collection on water shoots and seedlings was made at Griswold.

Plum - Black Knot

*BLACK KNOT (Plowrightia morbosa (Schw.) Sacc.). Loss a trace. Black knot was found but once this year, in a nursery in the northern part of the state. In some cases the varieties developed by Minnesota and by Hansen were quite susceptible. The Hansen variety, Wahnita, was severely attacked and some of the trees were practically killed. Japanese varieties and crosses developed by the Gardner nursery were slightly susceptible. In the seedlings from Japanese crosses those with the most Japanese blood were most susceptible.

*POWDERY MILDEW (Podospheera oxycanthae (DC.) DBy.). Powdery mildew is widespread in the state on this host but it occurs only sparingly on lower leaves and on water shoots in shady locations. Presumably the damage is negligible.

BROWN ROT (Sclerotinia fructicola (Wint.) Rehm.). Loss 5 per cent. Frost killed a good portion of the crop but occasional severe infection was found on trees which escaped. One case of twig blight was reported. In one orchard observations over a number of years indicate that the Hansen varieties are quite susceptible while Japanese hybrids developed by the Gardner nursery are very resistant.

On prune, which occurs but rarely in the state, one infection was found.

RUST (Tranzschelia punctata (Pers.) Arth.). In one locality a moderate infection occurred on seedlings growing in a shaded location.

GERMAN PRUNE

*BACTERIAL SPOT (Bacterium pruni EFS.). First report for the state on this host. In nursery rows at Shenandoah, the trees of this variety had 95 per cent infection. Some of it, however, was due to Coccomyces prunomorae.

*LEAF SPOT (Coccomyces prunomorae Higgins). In nursery rows at Shenandoah a slight infection occurred mixed with a severe infection of Bacterium pruni.

LOSSES FROM PLUM AND PRUNE DISEASES

Table 12. Estimated percentage losses from plum and prune diseases, 1927.

| Disease | : Percentage : loss | :: | Disease | : Percentage : loss |
|---|------------------------|----|----------------|------------------------|
| Brown rot (<u>Sclerotinia cinerea</u>) | : 5 | :: | Other diseases | : Trace |
| | : | :: | All diseases | : 5 |

DISEASES OF SMALL FRUITS

BLACKBERRY

ORANGE RUST (Gymnocenia interstitialis (Schl.) Lagerh.). Loss a trace. The first infection of the year was observed May 19, on wild plants near McGregor. At this time only pycnia were present. The disease occurred generally with the host.

*ORANGE RUST (Runkelia nitens (Schw.) Arth.). Loss a trace. The first infection, (and this severe), of the season was found on wild plants, May 25.

*LEAF SPOT (Mycosphaerella rubi Roark). Loss a trace. The disease occurs commonly to a slight or moderate extent wherever host is grown.

ANTHRACNOSE (Plectodiscella veneta (Speg.) Burk.). Loss 3 per cent. The occurrence was general in the scattered plantings. This year the infection was severe, causing a loss equal to that of 1924. In an average year the disease is relatively unimportant.

WINTER INJURY. Loss 5 per cent. Evidences of winter injury on blackberry occurred throughout the state in the form of leaf burn followed often by death of the plant before or during full fruit. During the past two winters, weather conditions have been severe, that is, no snow with fairly low temperatures. These low temperatures injured the wood of plants which had failed to mature due to excessive moisture late in the fall.

CRRANT

*LEAF SPOT (Cercospora angulata Wint.). The crop is not commercial and is found only in gardens. This leaf spot was general over the state and caused severe defoliation. Usually all currants are totally defoliated by the latter part of September. The cause is not always Cercospora angulata since two other fungi (Mycosphaerella grossulariae and Pseudopeziza ribis) also occur and cause defoliation.

*LEAF SPOT (Mycosphaerella grossulariae (Fr.) Lindau). This leaf spot occurred in the southern part of the state as a moderate infection. See Cercospora angulata.

*ANTHRACNOSE (Pseudopeziza ribis Kleb.). Anthracnose was located in two gardens, one in Fayette and the other in Chickasaw County. In both cases there was severe defoliation. The same fungus attacks the wild gooseberry severely. See Cercospora angulata.

GOOSEBERRY

*LEAF SPOT (Mycosphaerella grossulariae (Fr.) Lindau). Loss a trace. In 1927, the disease was first observed June 15 in nursery rows at Shenandoah, where it occurred only on lower leaves. During July, in the nursery, infection spread to all the leaves; defoliation started in August and was quite severe during September. Defoliation occurred on 1 and 2 year plants as follows: Red Jacket 90 per cent; Downing 80 per cent; Houghton 60 per cent. A spray schedule reduced the infection on Downing and Pearl to 5 per cent with no defoliation.

*ANTHRACNOSE (Pseudopeziza ribis Kleb.). Loss a trace. The host is not commonly planted in Iowa but in several gardens and nurseries examples of severe infection and defoliation from anthracnose were found. The disease was found commonly throughout the state on the wild host, which was severely defoliated late in summer.

POWDERY MILDEW (Sphaerotheca mors-uvae (Schw.) B. & C.). Loss a trace. A severe infection occurred in one nursery where practically all the 2 year plants in a block were affected.

GRAPE

*BLACK ROT (Guignardia bidwelli (Ell.) Viala & Ravaz). Loss a trace. Due to the drouth this season, black rot infection was present only scantily. Generally slight, rarely moderate, leaf spotting was found. A slight infection on the fruit was met with several times. In several neglected vineyards in southeastern Iowa severe damage occurred. On wild grapes in southwestern Iowa frequently severe infection occurred on both leaves and fruit.

*DOWNY MILDEW (Plasmopara viticola (B. & C.) Berl. & De T.). Only two or three examples of slight to moderate infection on cultivated grape were seen this season. On the wild host infection was quite severe in a few central and southern localities.

ANTHRACNOSE (Sphaceloma ampelinum Deb.). A single report was received in 1927. This is the first report since 1910, when a slight amount occurred in one section of the state. In 1905, 25 per cent of the crop in one county was lost.

POWDERY MILDEW (Uncinula necator (Schw.) Burr.). Reports of infection were received from a single county (Muscatine) where the damage was slight.

CHLOROSIS. First report of occurrence in the state. Only a single specimen was received (Humbolt county). The symptoms resemble strikingly those described by F. E. Gladwin (N. Y. Agr. Expt. Sta. Bul. 449).

Grape - Losses

LOSSES FROM GRAPE DISEASES

Table 13. Estimated percentage losses from grape diseases, 1927.

| Disease | Percentage loss | Disease | Percentage loss |
|--|-----------------|----------------|-----------------|
| Black rot (<i>Oenogardia bidwellii</i>) | Trace | Other diseases | Trace |
| | | All diseases | Trace |

RASPBERRY.

CROWN GALL (*Bacterium tumefaciens* EFS. & Town.). A loss estimated as a trace occurred in scattered plantings.

ORANGE RUST (*Cymodozia interstitialis* (Schl.) Lagh.). Loss a trace. Four reports were received of infection on cultivated plants. Wild raspberries were affected generally and moderately.

CANE BLIGHT (*Leptosphaeria coniothyrium* (Fekl.) Sacc.). Loss a trace. This blight occurs quite abundantly following winter injury. This year it appeared later in the fall than usual.

LEAF SPOT (*Mycosphaerella rubi* Roark). Loss a trace. The distribution was general as usual.

ANTHRACNOSE (*Plectoniscella veneta* Burk.). Loss 2 per cent. Considerable loss was observed in Harrison County, and in addition many inquiries and specimens were received from other localities. The damage was considerably reduced due to the drought.

MOSAIC (*Virus*). Loss a trace. The losses from mosaic are evident only in an indirect manner because mosaic infected plants may live for an indefinite number of years; but such plants are more subject to winter killing and other unfavorable conditions.

WIND WHIPPING. Loss 1 per cent. A common trouble in raspberries this season has been manifested in a die-back and wilt, which on careful examination, has been explained as follows: Young canes when blown back and forth by the wind are partially broken loose from the crown. This allows the entrance of fungi and other organisms which quickly girdle the entire cane and thereby bring about the die-back and wilting.

WINTER INJURY. Loss 12 per cent. Practically every raspberry grower experienced considerable loss this season from winter injury. The injury was manifested in marginal burning of leaves, blasting of blossoms, or quite frequently the sudden death of an entire cane while in full fruit. In addition, the situation was often complicated with over-loading. This is to say, the injured plants which bore a heavy

Raspberry -- Winter Injury

crop of fruit could not stand the added load under the conditions of drouth which occurred throughout the season of 1927. In some plantings a 20 per cent loss occurred. This is the second consecutive year of severe winter injury. This trouble has been the largest factor contributing to losses in past years.

LOSSES FROM RASPBERRY DISEASES

Table 14. Estimated percentage losses from raspberry diseases, 1927.

| Disease | : Percentage : loss | :: | Disease | : Percentage : loss |
|--|------------------------|----|-----------------|------------------------|
| Mosaic and leaf curl (undetermined) | : Trace | :: | Other diseases: | : 13 |
| | : | :: | All diseases | : 13 |

STRAWBERRY

LEAF SPOT (Mycosphaerella fragariae (Tul.) Lindau.). The loss was a trace this year. Undoubtedly the severity of the disease was lessened by the drouth.

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

ASPARAGUS

*RUST (Puccinia asparagi DC.). Losses estimated as a trace occurred largely in home plantings. Commercial growers have reduced their losses by the use of resistant strains.

BEAN

BLIGHT (Bacterium phaseoli EFS.). A loss estimated as a trace occurred in the scattered plantings, principally home gardens.

ANTHRACNOSE (Colletotrichum lindemuthianum (Sacc. & Magn.) Briosi & Cav.). Only two reports were received. Infection was reduced due to drouth.

Bean - Powdery Mildew

POWDERY MILDEW (Erysiphe polygoni DC.). Appeared late on various common garden varieties, including Lima. The infection was moderate and the damage negligible.

RUST (Uromyces appendiculatus (Pers.) Lk.). Not observed in 1927. This disease is somewhat variable in prevalence from year to year. In 1917 there was a trace; in 1918 it was common; in 1919 there was again a trace. In 1925 it again appeared causing a loss estimated at a trace. However, in the average year either the disease does not occur or else is not prevalent enough to attract attention.

MOSAIC (Undet.). Estimates of loss during the last six years vary from 2 to 6 per cent. In 1927, however, infection was so scant that no observations were made. The reason for this reduced infection is not known.

LOSSES FROM BEAN DISEASES

Table 15. Estimated percentage losses from bean diseases, 1927.

| Disease | Percentage loss | Disease | Percentage loss |
|--|-----------------|-----------------------------------|-----------------|
| Anthracnose (<u>Colletotrichum lindemuthianum</u>) | 0 | Root rots (<u>Fusarium</u> spp.) | 0 |
| Bacterial blight (<u>Bacterium phaseoli</u>) | Trace | Other diseases | Trace |
| Mosaic (undetermined) | 0 | All diseases | Trace |

CABBAGE

LEAF SPOT (Cercospora beticola Sacc.). Moderate infections occur commonly over the entire state but the damage is negligible.

CABBAGE

BLACK-ROT (Bacterium campestris EFS.). The principal cabbage growing section is located in Mascoutah County. A survey in this area early in July failed to disclose any signs of black rot. After the peak of the harvest about two months later, however, infected plants were found commonly in several fields. Undoubtedly the absence of rains aided in checking the development of the disease.

Cabbage - Yellows

YELLOWS (Fusarium conglutinans Woll.). Loss 80 per cent. Yellows was more prevalent than last year despite the cold weather during the early part of the season in 1927. The disease appeared later than usual, due probably to the cold wet weather in May and June. In Muscatine County by August 1, however, two commercial varieties, Copenhagen Market and Golden Acre, in the experimental plots showed nearly 70 per cent infection. On the same date Iacope and Marion Market approximated 10 per cent yellows. The strains of Iacope vary somewhat in the percentage of marketable heads; one which appears to be particularly promising produced 85 per cent.

Table 16. Amount of yellows on different varieties of cabbage as shown by counts during the growing season.

| Variety | Amount of yellows | | | | Percentage marketable heads |
|-------------------|----------------------|--------|----------|-----------|-----------------------------------|
| | Percentage infection | | | | |
| | June 10 | July 9 | August 4 | August 20 | |
| Copenhagen Market | 5 | 55 | 69 | 70 | 17 |
| Golden Acre | 6 | | 70 | 70 | 22 |
| Marion Market | 2 | | 11 | 10 | 60 |
| Iacope | 1 | 5 | 9 | 10 | 62 |

CANTALOUPE

BACTERIAL WILT (Bacillus tracheiphilus EPS.). Loss 5 per cent. The principal cantaloupe area is located in Muscatine County where bacterial wilt was serious this season. Striped cucumber beetles (Diabrotica vittata) and 12-spotted cucumber beetles (Diabrotica duodecimpunctata) were both unusually prevalent. Six applications of dust, using calcium arsenate and gypsum (1-20), in a 40-acre field did not prevent a high percentage of bacterial wilt, 10 per cent being found by August 15. Cucumbers were less susceptible.

ANTHRACNOSE (Colletotrichum lagenarium (Pass.) Ell. & Hals.). Loss a trace. In Muscatine County the disease did not appear until after the middle of August. The damage thereafter was very slight.

MOSAIC (Undet.). Loss a trace. Infection occurred with the crop and in one place 5 per cent of the plants were affected.

CARROT

SOFT ROT (Bacillus carotovorus Jones). Late rains in the fall following a dry period brought on soft rot in some plantings. A 5 per cent loss was reported in a small plot at Ames.

*LEAF SPOT (Cercospora apii carotae Pass.). First report for the state. In two northern counties the infection was moderate with damage negligible.

CELERY

*EARLY BLIGHT (Cercospora apii Fresen.). First report for the state. Only one case was found, in experimental plots at Ames where the damage was slight.

*LATE BLIGHT (Septoria apii Rostr.). Observed but once, causing severe damage in a home garden.

CUCUMBER

ANGULAR LEAF SPOT (Bacterium lachrymans EFS. & Bryan). In 1927 the disease had little significance although in some years it has caused losses as high as 2 per cent.

BACTERIAL WILT (Bacillus tracheiphilus EFS.). Loss 10 per cent. This is one of the most serious diseases of cucumbers, causing large losses nearly every year. In 1927, reports were received of total losses in a number of home gardens. During early August the losses for the state averaged only 1 to 2 per cent but by the end of the month the disease had assumed its usual severity.

POWDERY MILDEW (Erysiphe cichoracearum DC.). Observed but once, in experimental plots at Ames, where the infection was slight.

MOZAIC (Undetermined). Loss a trace. In Mascatine County the prevalence was local and the damage slight. Symptoms were probably masked due to the hot weather.

DILL

*STEM AND LEAF SPOT (Phoma anethi (Pers.) Sacc.). First report for the state. Severe infections were found in two different sections of the state.

EGG PLANT

LEAF SPOT (Phomopsis vexans (Sacc. & Syd.) Hart.). In an average year the loss is estimated as a trace but this year only a few infected plants were seen.

GROUND CHERRY

*SMUT (Entyloma australe Speg.). Moderate infections were observed in several gardens. The injury was slight.

HORSERADISH

*WHITE RUST (Albugo candida (Pers.) Kuntze.). A slight infection was observed in Muscatine County in one planting.

*LEAF SPOT (Alternaria brassicae (Berk.) Sacc.). First report for the state. A rather severe infection was observed at Shenandoah.

*LEAF SPOT (Cercospora armoraciae Sacc.). First report for the state. A slight infection occurred in one locality.

ONION

SMUT (Urocystis cepulae C. C. Frost). Loss a trace. During the last ten years slight losses due to smut have occurred only a few times. Commercial growers have been very successful in controlling the disease with formaldehyde. In Muscatine County, 17 rows were left untreated in one field. From these not a single onion was harvested while the adjoining treated rows had only 2 per cent infection.

PARSNIP

LEAF SPOT (Cercospora apii pastinacae Earl.). Infected plants were observed once in Story County.

PEA

POWDERY MILDEW (Erysiphe polygoni DC.). Loss a trace. In the northern part of the state the combination of drouth conditions and severe powdery mildew infection caused complete loss of the crop in some gardens. In other cases the disease became severe only after the plants had borne their usual crop.

Pea - Root Rot

ROOT ROT (Fusarium martii pisi Jones). Loss a trace. During June, severe damage to a considerable number of home gardens was reported. The fungus no doubt was aided in its development by the high temperatures.

PEPPER, BELL

FRUIT ROT (Alternaria sp.). Loss a trace. First report for the state. The distribution is general.

PEPPER, RED

WILT (Fusarium sp.). First report for the state. Several wilted plants were found in the home garden of an Italian family. A few of the plants are said to wilt every year in this garden. The symptoms were those of Fusarium infection and tissue isolations yielded a species of Fusarium.

POTATO

SCAB (Actinomyces scabies (Thax.) Gues.). Loss 5 per cent. The disease was unusually prevalent and destructive this year. Various ideas have been advanced as to the reasons for this epidemic, none of which seem to explain the situation adequately. The following suggestions are offered:

1. The organism which causes potato scab is one which will grow in a wide range of soil temperatures, from 51.8° to 86° F.
2. The optimum soil temperature for scab infection is around 73° to 75° F.
3. The disease is influenced also to a marked extent by soil moisture. Dry soils favor scab while moist or wet soils are unfavorable to infection.
4. A combination of dry soil and favorable soil temperature makes an ideal condition for the development of scab.
5. The season of 1927 supplied these favorable conditions to a marked degree because in the first place it was very dry over the state as a whole, and in the second place, a dry soil always has a higher temperature than a wet soil provided other factors are the same in each case.
6. In addition to the above factors it has been found that the size and condition of the tubers when external factors are favorable for infection determine to quite an extent the amount of scab. This explains why some varieties escape and others do not.
7. Russet varieties are usually more resistant than smooth-skinned varieties.

Potato - Scab

8. The conditions which favor potato scab are at the same time unfavorable for the optimum growth of the potato plant.

EARLY BLIGHT (Alternaria solani (Ell. & Mart.) Jones & Grout. Loss a trace. Severe infection occurred in scattered home gardens.

BLACK LEG (Bacillus phytophthorus Appel). Loss 1.5 per cent. Black leg was widely distributed, especially in home gardens, where the greater part of the loss occurred. It has been determined that the use of certified seed and seed piece treatment are effective in the control of the disease. In the vicinity of Des Moines 5 per cent reduction in yield occurred. Here disease was common in fields planted with northern grown seed, while in one or two fields of home grown seed there were only a few infected plants. Near Clear Lake (Cerro Gordo County), a large acreage of Early Ohio and other varieties was more severely attacked than usual, although the loss was probably less than 1 per cent. This was true even with certified seed which had seed piece treatment.

SCURF (Corticium vagum Berk. & Curt.). Loss 6 per cent. Moderate infection was observed in different localities. At one place, in a large commercial field, the disease was severe enough to cause a slight loss; even though certified seed with seed piece treatment had been used.

WILT (Fusarium oxysporum Schl.). None found in 1927. Records of past years indicate that infection is rare or absent in the state, although there is a doubtful report from Adams County in 1911.

LATE BLIGHT (Phytophthora infestans (Mont.) DBy.). None found in 1927. This disease has occurred but rarely in the past. Since 1905 its presence has been reported only two or three times and then the damage was slight.

HOPPERBURN. Loss 15 per cent. This type of injury was quite common over the state and undoubtedly resulted in considerable loss. In two counties, Muscatine and Story, the loss was estimated at 20 per cent. At Magnolia (Harrison County) 10 per cent loss occurred. In general, growers interpret the damage as due to excessive drouth, but experimental plots in the potato section, in Muscatine County, sprayed with Bordeaux mixture, were practically free from injury. Neighboring fields belonging to private growers were badly injured.

LEAF ROLL (Undet.). Loss a trace. The distribution was general with the usual prevalence.

MOSAIC (Undet.). Loss a trace. In Polk County mosaic was quite general, although the damage was undoubtedly slight. It was common on Early Ohios and Irish Cobblers, causing considerable stunting and dwarfing. Mottling, however, was not common.

Potato - Spindle Tuber

SPINDLE TUBER (Undet.). In Muscatine County the disease was local and caused very slight damage. Infection was more common in fields planted with uncertified seed. In general this is a rare disease.

LOSSES FROM POTATO DISEASES

Table 17. Estimated percentage losses from potato diseases, 1927.

| Disease | : Percentage : loss | :: | Disease | : Percentage : loss |
|---|------------------------|----|--|------------------------|
| Mosaic (Undetermined) | : Trace | :: | Fusarium wilt (<i>Fusarium oxysporum</i>) | : 0 |
| Leaf roll (Undetermined) | : Trace | :: | Tipburn & Hopperburn (nonparasitic & leaf hoppers) | : 15 |
| Late blight (<i>Phytoph- thora infestans</i>) | : 0 | :: | Early blight (<i>Alternaria solani</i>) | : Trace |
| Rhizoctonia (<i>Rhizoctonia solani</i>) | : 6 | :: | Other diseases | : 5 |
| Blackleg (<i>Bacillus phytophthorus</i>) | : 1.5 | :: | All diseases | : 27.5 |

PUMPKIN

POWDERY MILDEW (*Erysiphe cichoracearum* DC.). Infection was common in experimental plots at Ames but the damage was slight.

RADISH

*WHITE RUST (*Albugo candida* Kuntze). Ordinarily white rust occurs on old plants, i. e., those which are maturing seed. Sometimes slight damage occurs on greenhouse plants. In 1927 slight infection was noted in several gardens on young plants. The loss is always negligible.

BLACK ROOT (*Aphanomyces raphani* Kendrick). A few infected plants were found in four or five gardens in Muscatine and Story Counties.

RHUBARB

*LEAF SPOT (Ascochyta rhei Ell. & Ev.). First report for the state. Shenandoah.

LEAF SPOT (Phyllosticta straminella Bres.). First report for the state. A moderate infection was observed in nursery rows at Shenandoah.

SPINACH

*DOWNY MILDEW (Peronospora effusa (Grev.) Ces.). The first report for the state. Diseased plants were found in the college greenhouses.

MOSAIC (Undet.). First report for the state. A moderate infection was found in one home garden.

SQUASH

BACTERIAL WILT (Bacillus tracheiphilus EFS.). In the past losses from this disease have been estimated as a trace. In 1927, the only infection noted occurred in the horticultural gardens at Anes with a loss of 1 to 2 per cent. Cantaloupe was more susceptible.

POWDERY MILDEW (Erysiphe cichoracearum DC.). Infection was observed in several localities. The damage in all cases was negligible. In one planting 5 per cent of the leaves had moderate infection.

SWEET POTATO

STEM ROT (Fusarium batatatis Woll. & F. hyperoxysporum Woll.). Loss 6 per cent. Stem rot appeared earlier than usual (1 per cent infection was common by June 10). Different lots of seed in experimental plots varied widely in their susceptibility. Studies during the summer indicate the possibility of selection of a resistant strain.

SURFACE ROT (Fusarium oxysporum Schl.). Loss a trace. First report for the state. In Mascatine County infection was generally prevalent although the damage was slight. Plants were killed in hot beds.

SCURF (Monilochaetes infuscans Hals.). The principal symptom occurs as a discoloration of slips in the hot bed. According to the growers, the yield is not reduced.

Sweet Potato - Soft Rot

SOFT ROT (Rhizopus nigricans Ehr.). Loss a trace. The use of better storage conditions and seed selection has reduced losses from this disease to a minimum.

*LEAF SPOT (Septoria bataticola Taub.). In Muscatine County the prevalence was general but with slight damage.

BLACK ROT (Sphaeronema fimbriatum (E. & H.) Sacc.). Loss 2 per cent. The disease occurred commonly in the few slip beds where the seed had not been treated. In the field, the disease did not make an appearance until September.

MOSAIC (Undet.). First report for the state. Mosaic was first observed in Muscatine County in a seed bed but later the disease was present in a few fields where it caused extreme mottling and distortion of leaves, especially on Nancy Hall. Apparently the damage was slight.

LOSSES FROM SWEET POTATO DISEASES

Table 18. Estimated percentage losses from sweet potato diseases, 1927.

| Disease | Percentage loss | Disease | Percentage loss |
|---|-----------------|----------------------------------|-----------------|
| Stem rot (<u>Fusarium hyperoxysporum</u> & <u>F. batatatis</u>) | 8 | Pox (<u>Cystospora batata</u>) | 0 |
| Foot rot (<u>Plenodomus destruens</u>) | 0 | Other diseases | 1 |
| Black rot (field losses) (<u>Sphaeronema fimbriatum</u>) | 2 | All diseases | 11 |
| Storage rots (various organisms including <u>Sphaeronema</u>) | Trace | | |

SWISS CHARD

*LEAF SPOT (Cercospora beticola Sacc.). First report for the state. The leaf spot occurs with the host, but infection is less than on beet.

TOMATO

EARLY BLIGHT (Alternaria solani (Eli. & Mart.) Jones & Grout.). Infection and damage were less than usual. A few plants in scattered gardens were attacked to a slight extent.

BACTERIAL SPOT (Bacterium vesicatorium Doidge). The loss was a trace in Muscatine County.

*LEAF MOLD (Cladosporium fulvum Cke.). Loss a trace. In 1927, as usual, the disease was important only on greenhouse crops. Occasionally the damage is severe in scattered houses and in some years the disease does slight damage in the field.

FUSARIUM WILT (Fusarium lycopersici Sacc.). Loss a trace. Occasionally wilt causes considerable loss in isolated areas but in Muscatine County, the principal tomato district, losses are always negligible. In 1927 only a few examples were observed.

LEAF SPOT (Septoria lycopersici Spag.). Loss 5 per cent. Early varieties of tomato in Muscatine County were severely attacked. One field of Earliana was entirely defoliated after most of the fruit had ripened. Late varieties escaped infection.

The drouth this year hindered development of the fungus.

BLOSSOM-END ROT (Non-par). This disease was generally distributed but the loss was only a trace.

MOSAIC (Undet.). Loss 1 per cent. Mosaic was less prevalent and caused less damage than usual.

STREAK (Undet.). First report for the state. Streak appeared in greenhouses among plants affected by mosaic and seemed to be confined to Bonny Best. Only a few plants were affected.

LOSSES FROM TOMATO DISEASES

Table 19. Estimated percentage losses from tomato diseases, 1927.

| Disease | : Percentage : loss | :: | Disease | : Percentage : loss |
|---|------------------------|----|--|------------------------|
| Blight (<u>Septoria lycopersici</u>) | : 5 | :: | Early blight (<u>Alternaria solani</u>) | : 0 |
| Fusarium wilt (<u>Fusarium lycopersici</u>) | : Trace | :: | Other diseases | : 1 |
| | | :: | All diseases | : 6 |

TURNIP

POWDERY MILDEW (Erysiphe polygoni DC.). First report for the state. A slight infection was observed in one garden.

WATERMELON

ANTHRACNOSE (Colletotrichum lagenarium (Pass.) Ell. & Hals.). Loss a trace. The disease this year was held in check by the exceedingly dry weather of July and August. Lesions on leaves and fruit were not observed until late in August. The damage was slight.

WILT (Fusarium niveum EFS.). Loss 50 per cent. The seriousness of watermelon wilt in Muscatine County this season but serves to emphasize the losses that this disease has caused in former years. Before wilt was introduced into this section the annual crop was about 7000 acres and the annual carlot shipments sometimes reached 1000 cars. With the importation of watermelon wilt, however, the acreage and shipments started a steady decline, until in 1926 the acreage was about 600 and the carlot shipments about 10. The 1927 acreage was even smaller than that of 1926.

This year the first signs of watermelon wilt appeared shortly after the emergence of the first seedlings, a symptom heretofore unrecognized in the field. Many seedlings were lost by wilt, but after seedling wilt had taken its toll and the stand was thinned to one plant per hill a perfect stand still remained. Wilt continued to be destructive until August when nearly 90 per cent of the plants of 40 commercial varieties in three experimental fields had died. Soil infestation in these three fields was particularly heavy, but in many commercial fields wilt had killed nearly 35 per cent of the plants which had survived seedling wilt. It is likely that weather conditions tended to increase the rate of wilting during certain periods. The variety Conqueror is somewhat resistant in this section and the citrons and several African types appear to be nearly immune. Losses of 95 per cent were common in local areas over the state.

BLOSSOM END ROT (Undet.). The usual 1 per cent loss occurred in Muscatine County.

MOSAIC (Undet.). Mosaic occurred on some watermelon-citron hybrids developed in experimental studies, but was not observed on watermelon.

DISEASES OF TREES AND ORNAMENTAL PLANTS

ACER NEGUNDO (BOXELDER)

*Septoria marginata Heald & Wolf, leaf spot. Practically all lower leaves were affected on nursery plants at Shenandoah. The damage was slight.

*Sphaeropsis albescens E. & E., twig blight. This disease occurs quite commonly at Ames.

ACER SPP. (MAPLE)

*Thomopsis lebiseyi (Sacc.) Died., seedling canker. Apparently first report for the United States. At Shenandoah in seedling beds about 5 per cent of plants were lost. A total of 20 per cent were cankered but many of them recovered by sending out new growth from below the canker. The fungus develops in cankered areas and on the killed stems.

Diedicke (Kryptogamenflora Mark Brandenburg 9: 242) reports the occurrence of this fungus in nurseries.

Septogloeum acerinum (Pass.) Sacc., leaf spot. This disease occurred rather commonly in the nurseries at Shenandoah. Varietal differences were noted as follows: On *Acer dasycarpum pyramidale, pyramidal silver maple, only a few leaves were affected. On *Acer platanoides, Norway maple, there was moderate infection. On *Acer platanoides var. schwedleri, schwedler maple, there was 100 per cent infection.

AESCULUS GLABRA (OHIO BUCKEYE)

*Guignardia aesculi (Pk.) Stewart, leaf blotch. This year observations indicated a widespread infection. Mature trees and young second growth were severely defoliated during September.

AESCULUS HIPPOCASTANUM (HORSECHESTNUT)

*Guignardia aesculi (Pk.) Stewart, leaf blotch. The principal damage occurred in nursery rows where there was 100 per cent infection on seedlings. Over the state, mature trees showed moderate infection and defoliation. Water shoots were severely defoliated.

*Uncinula flexuosa Pk., powdery mildew. First report for the state. Infection occurred abundantly on the lower leaves of mature trees in a nursery in the northern part of the state.

ALTHAEA ROSEA (HOLLYHOCK)

Cercospora kellermanii Bub., leaf spot. First report for the state. A moderate infection causing slight damage was found.

*Puccinia malvacearum Bertero, rust. The disease occurs but rarely from year to year. Two reports were received in 1927.

AMELANCHIER SP. (SHADBLOW)

*Febraea maculata (Lév.) Atk., leaf spot. In nursery rows at Shenandoah a 30 per cent infection occurred, causing considerable defoliation.

AMELANCHIER CANADENSIS (DOWNY SHADBLOW)

Nummularia discreta (Schw.) Tul., blister canker. Infected plants were first found in 1924 in Ledges Park, near Boone. The disease has been observed in the same locality in succeeding years.

AMPELOPSIS ENGELMANNI (ENGELMANN CREEPER)

*Cercospora ampelopsidis Pk., leaf spot. In nursery rows at Shenandoah 90 per cent of the leaves were infected, with slight shot-hole.

AMPELOPSIS QUINQUEFOLIA (VIRGINIA CREEPER)

*Cercospora ampelopsidis Pk., leaf spot. A slight infection occurred.

*Guignardia bidwellii (Ell.) Viala & Rav., leaf spot. Infection widespread. Considerable shot-hole occurred in nursery rows.

*Uncinula necator (Schw.) Burr., powdery mildew. Common.

AMPELOPSIS TRICUSPIDATA (BOSTON IVY)

*Guignardia bidwellii (Ell.) Viala & Rav. Occurring on plants in nursery rows.

*Septoria ampelopsidis Ellis, leaf spot. A 5 per cent infection occurred at Shenandoah in nurseries. In some cases, older plants suffered severe shot-hole.

ANTIRRHINUM MAJUS (SNAPDRAGON)

Puccinia antirrhini Diet. & Holw., rust. The disease occurred commonly in the state as the agent of considerable damage both in greenhouse and on outdoor plants.

AQUILEGIA SPP. (COLUMBINE)

Erysiphe polygoni DC., powdery mildew. First report for the state. Causing considerable infection in nursery rows at Osage.

BERBERIS VULGARIS

*Phoma berberina Sacc. First report for the United States. The fungus fruited abundantly on living stems.

*Leptosphaeria berberidis Rich. The perithecia were abundant on living stems in one locality.

BETULA SP. (BIRCH)

*Septoria betulina Pass., leaf spot. Prevalent generally in southern nurseries.

BETULA ALBA

Melanconium bicolor Nees, canker. First report for the state. This disease occurred commonly and was particularly important in nursery rows.

CALENDULA OFFICINALIS (CALENDULA)

Mosaic. Common in greenhouses and gardens.

CALLISTEPHUS CHINENSIS (CHINA-ASTER)

Coleosporium solidaginis (Schw.) Thuem., rust. Severe infections occurred on plants in the formal gardens at Ames.

Yellows. Severe infections observed in several localities.

CALYCANTHUS FLORIDUS (COMMON SWEETSHRUB)

Macrosporium calycanthi Cav., leaf spot. First report for the state. An occasional leaf was infected in nurseries at Shenandoah.

CANNABIS SATIVA

*Septoria cannabis (Lasch.) Sacc., leaf spot. The disease occurs commonly on plants escaped from cultivation.

CARAGANA ARBORESCENS (SIBERIAN PEA-TREE)

*Sphaeropsis sp., canker and dieback. This host is severely attacked at Ames with the result that many branches are killed each year. Associated with the death of the branches there ensues a peculiar enlargement of the lenticels and a brownish discoloration of the bark. The primary injury may possibly be initiated by winter injury.

CASTANEA DENTATA (AMERICAN CHESTNUT)

This host occurs but rarely in the state. A few scattered trees are to be found in yards and parks.

*Endothia parasitica (Burr.) P. J. & H. W. Anderson, blight. In September in a northern nursery, three medium sized trees which had been killed back to the roots by the blight were found. An infected tree was seen in the same nursery three years ago.

CASTANEA SP. (SORDEN VARIETY)

*Fusicoccum castaneum (Sacc.) Sacc., canker. This fungus does not seem to be reported in the literature as the agent of a disease: unless the Fusicoccum sp. reported in cankers from California should prove to be this organism. (U. S. Dept. Agr. Bul. 1366)

In the Gardner nursery, at Osage, several trees of the Sorden blight resistant variety were killed several years ago, presumably by winter injury. Seedlings from these trees now have an occasional cankered limb, on which the fungus has fruited abundantly. In one canker there occurred typical pycnidia and spores of Endothia parasitica.

CATALPA BIGNONIOIDES NANA (UMBRELLA CATALPA)

*Microsphaera alni vaccinii (Schw.) Salm., powdery mildew. In nursery rows, especially in shaded areas, 40 per cent of the leaves were affected.

CATALPA SP. (CATALPA)

*Cercospora catalpae Wint., leaf spot. Common in nurseries.

CELTIS OCCIDENTALIS (HACKBERRY)

*Mosaic (?). Practically 100 per cent of the leaves were affected in the nursery at Shenandoah.

CHRYSANTHEMUM SP. (CHRYSANTHEMUM)

*Septoria chrysanthemella Cav., leaf spot. In nursery rows at Shenandoah there was considerable difference in varietal resistance, e. g., Victory, none; *Little Bob, a few leaves infected; Mrs. C. Lowthian Bell, 50 per cent leaf infection.

CHRYSANTHEMUM MAXIMUM (SHASTA DAISY)

*Septoria chrysanthemella Cav., leaf spot. In nurseries at Shenandoah the Shasta Daisy had 5 to 10 per cent of the leaves affected, while Shasta Alba was immune.

CORNUS SP. (DOGWOOD)

*Septoria cornicola Desm., leaf spot. Wild plants were generally affected over the state. In nurseries, *Cornus stolonifera and *C. paniculata were the most severely attacked. On the former there was 50 per cent leaf infection with moderate shot-hole.

COSMOS SP.

*Phomopsis stewartii Peck, stem canker. This disease has been known to occur in Iowa for a number of years but it has not been previously reported in the literature. This year, the disease was found in two out of four gardens examined in several localities. About a fourth of the plants were infected.

CRATAEGUS MONGOLYNA

*Bacillus amylovorus (Burr.) Trev., blight. Ames.

CRATAEGUS OXYACANTHA (ENGLISH HAW)

*Bacillus amylovorus (Burr.) Trev., blight. First report for the state. In nursery beds at Shenandoah (1926) about 3 per cent of the young seedlings were killed.

*Phyllosticta rubra Pk., leaf spot. First report for the state. In 1926, this fungus was the cause of considerable defoliation on young seedlings in nursery beds.

CRATAEGUS OXYACANTHA PAULI (SCARLET THORN TREE)

*Fabraea maculata (Lév.) Atk. At Shenandoah, in nurseries, plants were 80 per cent defoliated.

DAHLIA SPP. (DAHLIA)

Erysiphe polygoni DC., powdery mildew. A moderate infection was observed in two localities.

DELPHINIUM SPP. (LARKSPUR)

*Bacterium delphinii (EFS.) Bryan, black spot. First report for the state. The disease was observed in several different sections of the state. At Des Moines, infection was severe on some English hybrids, while nearby American varieties were only slightly affected. In nursery beds at Shenandoah, 2 per cent of Delphinium belladonna plants were killed, while other varieties were only slightly susceptible. Specimens were also collected at Shenandoah in 1926.

DENTZIA SPP. (DENTZIA)

Cercospora dentziae E. & E., leaf spot. At Shenandoah, infection was found only on languishing lower leaves of *D. gracilis. Other varieties were not affected.

DIANTHUS BARBATUS (SWEET WILLIAM)

*Uromyces caryophyllinus (Schr.) Wint., rust. First report for the state. At Ames a severe infection occurred in the formal garden on the campus, which undoubtedly was a factor in the early death of the plants.

DIANTHUS CARYOPHYLLUS (CARNATION)

Uromyces caryophyllinus (Schr.) Wint., rust. None was seen in 1927, although it undoubtedly occurred as usual on greenhouse crops.

ELAEAGNUS ANGUSTIFOLIA (RUSSIAN OLIVE)

*Septoria argyraea Sacc., leaf spot. Specimens of this disease were collected in 1926 and 1927 at Shenandoah.

EUPHORBIA MARGINATA

Uromyces proeminens (DC.) Pass., rust. This rust occurs rather commonly in gardens.

FORSYTHIA SP.

*Alternaria forsythiae Harter, leaf spot. First report for the state. This leaf spot was rather common at Shenandoah in 1926 and 1927. (Cfr. Mycologia 3: 154.)

FRAXINUS AMERICANA (WHITE ASH)

*Cylindrosporium fraxini Ellis & Kell., leaf spot. In nurseries at Shenandoah a 100 per cent leaf infection occurred.

Puccinia fraxinata (Tk.) Arth., rust. Slight damage at Shenandoah.

FRAXINUS LANCEOLATA (GREEN ASH)

*Cylindrosporium fraxini Ellis & Kell., leaf spot. In nursery rows a 20 per cent infection occurred. Infection was observed also on seedlings of wild plants in the woods.

*Puccinia fraxinata (Tk.) Arth., rust. Collected several times at various places, with one case of severe hypertrophy of young twigs.

GAILLARDIA SPP. (GAILLARDIA)

*Septoria gaillardiae E. & E., leaf spot. First report for the state. In nursery rows at Shenandoah, this leaf spot was common in 1926 and 1927. This season a 40 per cent infection occurred.

GLADIOLUS SPP. (GLADIOLUS)

Bacterium marginatum McC., scab. Infection occurs widely with the host. In the nurseries at Shenandoah a 5 per cent loss occurred.

HELENIUM HOOPESI (ORANGE SNEEZEWEED)

*Septoria helenii E. & E., leaf spot. First report for the state. A moderate infection occurred in 1926 at Shenandoah.

HELIANTHUS DEBILIS (CUCUMBER SUNFLOWER)

*Erysiphe cichoracearum DC., powdery mildew. On plants in garden at Ames.

*Puccinia helianthi-mollis (Schw.) Jackson, rust. On plants in garden at Ames.

HELIANTHUS GIGANTEUS (GIANT SUNFLOWER)

*Erysiphe cichoracearum DC., powdery mildew. Common with the host.

*Puccinia helianthi-mollis (Schw.) Jackson, rust. Common with the host.

IRIS SPP.

Bacillus carotovorus Jones, soft rot. Observed several times.

*Didymellina iridis (Desm.) V. Hoehn., leaf spot. In several localities, early in the spring before the drouth set in, the disease was noted to be causing the death of a considerable number of leaves. In one nursery, late in summer, it was noted that only those plants in shaded areas were severely affected. In another nursery, growing a large number of varieties, there was some evidence of varietal differences in susceptibility.

Leptosphaeria heterospora (DeNot.) Niessl., Specimens were received from two localities. In one case the organism was found during the summer, evidently following an attack of soft rot. Again material was found early in spring on dead overwintered corms. No evidence that it was the cause of a disease. First report for the state.

JUGLANS CINEREA (BUTTERNUT)

*Gnomonia leptostyla (Fr.) Ces. & DeNot., anthracnose. General, moderate damage.

JUGLANS NIGRA (BLACK WALNUT)

*Gnomonia leptostyla (Fr.) Ces. & DeNot., anthracnose. By October severe defoliation had occurred over a greater part of the state on both young and mature trees. Since 1905 there have been two periods of several consecutive years during which walnut trees were severely defoliated. In the intervening years the disease was of slight or moderate importance.

*Microsphaera alni (Wallr.) Wint., powdery mildew. First report for the state on this host. It was found only in a southern nursery where it occurred on young trees in moist situations. This mildew was reported once before (1888) on J. regia. (Iowa Erysiphaceae. Proc. Iowa Acad. Sci. 14.)

JUNIPERUS SPP. (JUNIFER)

*Phomopsis juniperovora Hahn, nursery blight. In seedling beds in nurseries at Shenandoah there was a 40 per cent loss by July. The Forestry nursery at Ames lost all one and two year seedlings by June. The loss for the state was estimated at 20 per cent.

LIMONIUM LATIFOLIUM KUNTZE (BIGLEAF SEA LAVENDER)

Ascochyta plumbaginicola P. Hennings, leaf spot. Evidently this is the first report of the disease in the United States. At Shenandoah many leaves were badly spotted and killed both in 1926 and 1927.

LONICERA SEMPERVIRENS (TRUMPET HONEYSUCKLE)

*Cercospora antipus Ell. & Holw., leaf spot. A moderate infection occurred in one nursery.

LONICERA SPP. (HONEYSUCKLE)

*Microsphaeraalni (Wallr.) Wint., powdery mildew. This occurred commonly throughout the state. (*L. tartarica vars., alba, rosea, and sibirica.)

LYCHNIS CORONARIA (ROSE CAMPION, MALTESE CROSS)

*Phyllosticta lychnidis (Fr.) E. & E., leaf spot. First report for the state. This spot occurred in nursery rows at Shenandoah with a 20 per cent infection, especially on lower portions of the plants.

MALUS IOENSIS (DOUBLE FLOWERING CRAB)

*Gymnosporangium juniperi-virginianae Schw., rust. As usual, the rust was serious on leaves and branches in the nurseries at Shenandoah. By early September, 5 per cent of the branch tips had been killed. Where a regular spray was applied the damage was kept in check.

*Venturia inaequalis (Cke.) Aderh. See apple.

MORUS SPP. (MULBERRY)

Bacterium mori (B. & L.) EFS., blight. First report for the state. The disease occurs over the entire state, with few plants escaping infection. The Russian mulberry (*M. alba tartarica) was particularly susceptible, especially in nursery beds and rows. This season at Shenandoah, one block of 100,000 seedlings showed 75 per cent of the plants with one or more stem cankers. Leaf infection was noted to be especially severe on the lower portion of the same plants.

*Cercospora moricola Cooke, leaf spot. Infection occurred in one northern county.

*Gibberella moricola Ces. & DeNot., twig blight. This fungus was found widely over the state. There is reason to believe that it is a secondary organism following the attack of Bacterium mori. First report for the state.

OENOTHERA LAMARCKIANA (LAMARCK EVENING PRIMROSE)

*Septoria oenotherae West., leaf spot. Common in nursery rows.

PAEONIA SPP. (PEONY)

*Cladosporium paeonine Pass., leaf mold. The disease was common in the state, causing considerable killing of leaves. The damage was slight.

*Mosaic, ring spot. First report for the state. Infected plants were rather common at Shenandoah. Material was sent to F. D. Fromme, at Blacksburg, Va., who reported that the trouble was similar to the ring-spot of tobacco recently described and illustrated by him (Phytopath. 17: 321-328.). The disease is perhaps the same as that described by Whetzel (Trans. Mass. Hort. Soc. 1915; p. 103-112.).

PANAX QUINQUEFOLIUM (AMERICAN GINSENG)

Alternaria panax Whet., blight. One report was received.

Phytophthora cactorum (Leb. & Cohn) Schroet, blight. Infected plants were received from one locality.

Papery leaf spot (nonpar.). Material was received from one locality.

PHLOX SPP. (PHLOX)

*Cercospora amphokodes Ell. & Holw., leaf spot. The disease was generally prevalent at Shenandoah on the Miss Lingard variety (*P. glaberrima suffruticosa). Infection occurred on 10 per cent of the leaves, causing yellowing.

Erysiphe cichoracearum DC., powdery mildew. The disease was common in the state and in some cases caused severe damage.

*Septoria phlogis Sacc. & Speg., leaf spot. Found commonly in nursery rows. (*P. paniculata, var. La Vague)

PINUS STROBUS (WHITE PINE)

Winter killing. A high percentage of seedlings were killed in the Forestry Nursery at Ames. The white pine is used extensively in windbreaks over the state and many of the younger trees in these were entirely killed; while older trees lost either limbs or the entire top.

PLATANUS OCCIDENTALIS (AMERICAN PLANE TREE)

*Gnomonia veneta (Sacc. & Speg.) Kleb., anthracnose. (Plate II Fig. 1.) As usual anthracnose was severe in scattered localities. On the campus at Ames, several young trees were completely defoliated early in the spring. Each new set of foliage, developed from time to time throughout the year, was in turn attacked. Several trees were killed.

POPULUS SP. (VOLGA POPLAR)

*Discella populina Sacc., canker. The disease was rather abundant in nursery rows. (See under *Populus alba nivea*.)

POPULUS ALBA NIVEA (SILVER LEAF POPLAR)

*Discella populina Sacc., canker. Presumably this is the first report of this disease in the United States. (Cfr. Saccardo Ann. Myc. 6: 562 and Petrak, Ann. Myc. 20: 308) At Shenandoah more than half of one block of young trees, 5 to 7 feet high, was ruined because of cankered limbs. Abundant material was collected from another unnamed variety. The disease was first found in 1925.

POPULUS CANDICANS (BALM-OF-GILEAD)

*Melampsora medusae Thuem., rust. In nurseries.

POPULUS EUGENEI (CAROLINA POPLAR)

Marssonina brunnea (E. & E.) Sacc., leaf spot. In nurseries.

POPULUS SPP. (POPLAR)

Bacterium tumefaciens EPS., crown gall. In the nurseries at Shenandoah the poplars are attacked by this organism every year. In 1927 galls were found on 5 per cent of P. bolleana.

Cytospora chrysosperma (Pers.) Fr., canker. This organism is commonly a factor in the death of young trees in the nursery. It is especially prevalent on plants affected by winter injury.

Dothichiza populea Sacc., canker. Cankers on young trees are common.

Marssonina populi (Lév.) Sacc., leaf spot. In nurseries, where the infection was common.

*Napichidium tremulae (Frank) Sacc., leaf spot. First report for the state. Diseased leaves were received from one locality.

*Septoria populi Desm., leaf spot. In nursery rows.

PRUNUS BESSEYI (SAND CHERRY)

*Bacterium pruni EPS., bacterial spot. First report for the state. Specimens collected in 1913.

*Sclerotinia fructicola (Wint.) Rehm., brown rot. First report for the state. Slight infection.

PRUNUS HORTULANA (WILD PLUM)

*Exoascus mirabilis Atk., hypertrophy. Common near Randolph (Fremont County) in plum thickets

PRUNUS SEROTINA (WILD BLACK CHERRY)

Cercospora circumscissa Sacc., shot hole. Common throughout the state.

PRUNUS TOMENTOSA (NANKING CHERRY)

*Podosphaera oxycanthae (DC.) DBy., powdery mildew. Evidently this host, in comparison with other cultivated varieties, is somewhat resistant.

PRUNUS VIRGINIANA (CHOCHECHERRY)

Cercospora circumscissa Sacc., shot hole. Common throughout the state.

PRUNUS SP. (ROCKY MOUNTAIN DWARF CHERRY)

*Bacterium pruni EPS., bacterial spot. First report for the state.

*Podosphaera oxycanthae (DC.) DBy., powdery mildew. Trees were severely infected at Shenandoah during the latter part of September. The upper half of the trees were whitened with mycelium.

Sclerotinia fructicola (Wint.) Rehm., brown rot. Slight.

QUERCUS ALBA (WHITE OAK)

*Marssonina martini (Sacc. & Ell.) Magn., leaf spot. This leaf spot occurred commonly. The damage was negligible.

QUERCUS RUBRA (RED OAK)

*Marssonina martini (Sacc. & Ell.) Magn., leaf spot. This leaf spot was abundant in 1925 and 1927 on young plants in beds at Shenandoah. The damage seemed to be slight. Infection was observed also on older trees in nursery rows and on trees growing wild.

QUERCUS SPP. (OAK)

*Gnomonia veneta (Sacc. & Speg.) Kleb., anthracnose. (Plate II, Fig. 2) Oak anthracnose is usually severe every year during the summer but ordinarily the trees recover before fall. In 1927, however, the disease assumed an epidemic form in nurseries, on city streets, and in

Oak - Anthracnose

woods. The white oak especially was attacked. Usually a severely defoliated tree recovers by sending out a second growth of leaves, but this year the second and in many cases the third growth was killed. This severe strain coupled with an extremely dry season resulted in the death of many trees. Late in the fall evidences of the infection were seen in numerous dead terminals and branches.

*Microsphaera alni (Wallr.) Wint., powdery mildew. The distribution of this disease was scattered and the infection was rather slight.

*Taphrina coerulescens (Mont. & Desm.) Tul., leaf blister. A mild infection was observed on saplings in one locality.

RHUS GLABRA LACINIATA (CUT-LEAF SUMAC)

*Septoria rhoina B. & C., leaf spot. At Shenandoah infection occurred on all lower leaves causing discoloration and some defoliation.

Sphaerotheca humuli (DC.) Burr., powdery mildew. At Shenandoah severe infection occurred on nursery plants 2 to 3 feet high. Twenty per cent of the young branches and in some cases the leaders were killed.

ROSA SPP. (ROSE)

Bacterium tumefaciens EPS., crown gall. A few infected plants were found in nurseries.

*Cercospora rosicola Pass., leaf spot. One collection was made this year.

Diplocarpon rosae Wolf, black spot. In nurseries most of the varieties were but slightly affected this year. Crimson Rambler was 50 per cent defoliated; while John Hopper had 50 per cent and Dorothy Perkins 10 per cent leaf infection.

Sphaerotheca pannosa (Wallr.) Lévl., powdery mildew. In nursery rows Crimson Rambler had a 50 per cent infection. Rosa multiflora had 50 per cent of the growing points attacked. Dorothy Perkins and Rosa setigera showed 50 per cent leaf infection. Other varieties were affected slightly or not at all.

RUDBECKIA PURPUREA (PURPLE CONEFLOWER)

*Cercospora rudbeckia Fk., leaf spot. In nursery rows. Importance slight.

SALIX PENTANDRA (LAUREL-LEAF WILLOW)

*Cylindrosporium salicinum (Pk.) Dearn., leaf spot. First report for the state. In nursery rows at Shenandoah severe defoliation practically ruined several blocks of 1 year plants. Many wild trees were affected throughout the state.

SALIX VITELLINA (GOLDEN WILLOW)

Cylindrosporium salicinum (Pk.) Dearn., leaf spot. First report for the state. This host was as severely affected as Salix pentandra (see above).

SALIX SPP. (WEeping WILLOW)

Cylindrosporium salicinum (Pk.) Dearn., leaf spot. First report for the state. This host was but slightly affected in comparison with Salix pentandra and S. vitellina (see above).

SEDUM SPECTABILE (SHOWY STONECROP)

*Septoria sedi West., leaf spot. This disease occurred commonly in nursery plantings. In 1926 the fungus caused a stem canker also. In 1927 *S. spectabile var. Brilliant showed 3 per cent leaf infection and *S. spectabile variegata 30 per cent.

SORBUS AUCUPARIA (EUROPEAN MOUNTAIN-ASH)

*Cytospora rubescens Fr., canker. About 80 per cent of the young trees in nursery rows at Shenandoah had cankers on the main stem. However, the fungus may be a secondary invader on tissue affected by winter injury.

*Nummularia discreta (Schw.) Tul., blister canker. (Plate I Fig. 2) First report for the state. Collected from two localities. At Osage, in an avenue of these plants in the Gardner nursery, a number of trees have been killed, while in others many branches were attacked.

*Phyllosticta sorbi West., leaf spot. First report for the state. Common with the host. In nurseries a moderate infection occurred on young seedlings in beds; on 3 to 4 year old plants in rows there was severe infection and defoliation; and on mature trees there was heavy infection with slight defoliation.

*Septoria aucupariae Bres., leaf spot. First report for the state and apparently the first report for the United States. Common in nurseries at Shenandoah.

SPIRAEA SPP. (SPIREA)

Cylindrosporium filipendulae Thuem., leaf spot. First report for the state. At Shenandoah there were varietal differences in susceptibility: *S. douglasi 40 per cent defoliation, *S. margarita 40 per cent, S. thunbergii 30 per cent, *S. vanhouttei 15 per cent.

SYMPHORICARPOS SPP. (SNOWBERRY)

*Microsphaera diffusa Cke. & Pk., powdery mildew. Infection is common and heavy wherever the host occurs. In nursery rows young plants were damaged considerably. (*S. racemosa, *S. vulgaris variegatus.)

SYRINGA SPP. (LILAC)

*Cercospora macromaculans Heald & Wolf, leaf spot. First report for the state. A slight infection occurred at Shenandoah.

Microsphaera elni (Wallr.) Wint., powdery mildew. The disease occurred commonly as usual. Evidently the damage was negligible.

Winter injury. Reported from one locality.

TILIA AMERICANA

*Rabenhorstia tiliae Fr. This organism was abundant at Shenandoah on branches of young trees which had been recently killed.

ULMUS SPP. (ELM)

*Gnomonia ulmea (Sacc.) Thuem., black spot. This disease was extremely common and widespread.

VIBURNUM OPULUS (EUROPEAN CRANBERRYBUSH)

*Cercospora opuli (Fckl.) V. Hoehn., leaf spot. Generally prevalent with slight damage.

VIBURNUM OPULUS STERILE (COMMON SNOWBALL)

*Cercospora opuli (Fckl.) V. Hoehn. Common.

VIBURNUM TRILOBUM

*Cercospora opuli (Fckl.) V. Hoehn. Slight infection at Shenandoah.

VIOLA CUCULLATA (BLUE MARSH VIOLET)

*Cercospora violae Sacc., leaf spot. This native species is cultivated in one nursery where the leaf spot was found moderately.

ZINNIA SP. (ZINNIA)

*Erysiphe cichoracearum DC., powdery mildew. Infection was moderate or severe over the state.

EXPLANATION OF PLATES

I.

Fig. 1. Apple tree affected by winter injury.
Note sparse foliage. Grundy County, Iowa.
Sept. 13, 1927.

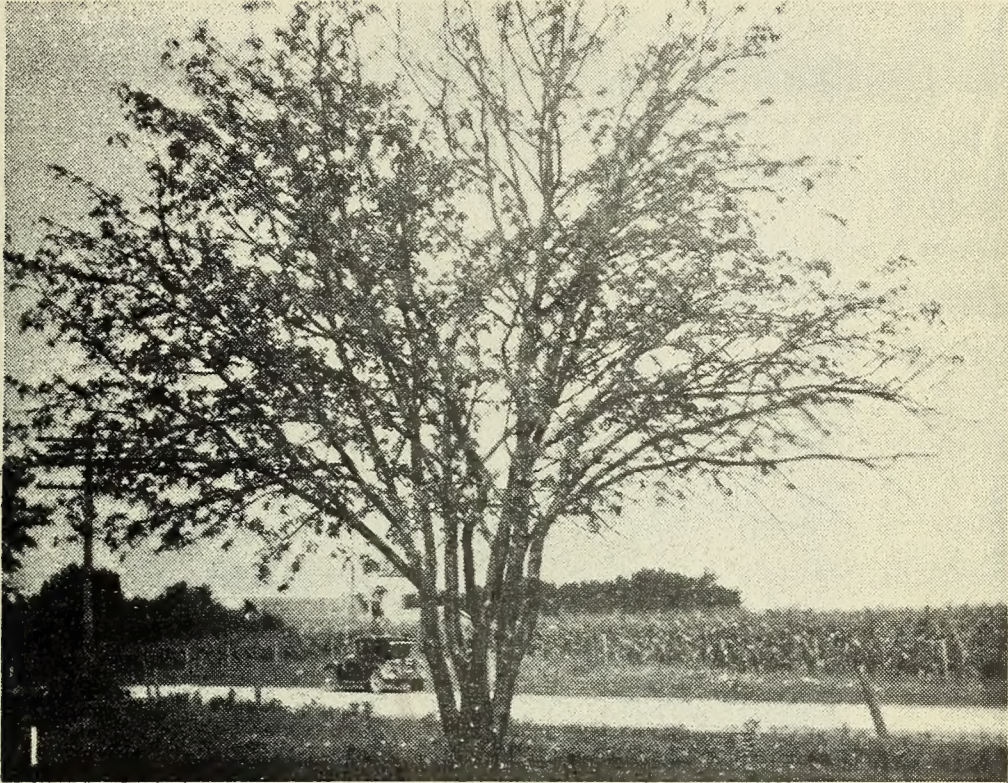
Fig. 2. A tree of *Sorbus aucuparia* killed by
Nummularia discreta.

II.

Fig. 1. Young *Platanus* tree defoliated by
Gnomonia veneta.

Fig. 2. Dead branches on *Quercus* caused by
Gnomonia veneta.

PLATE I



PLATE

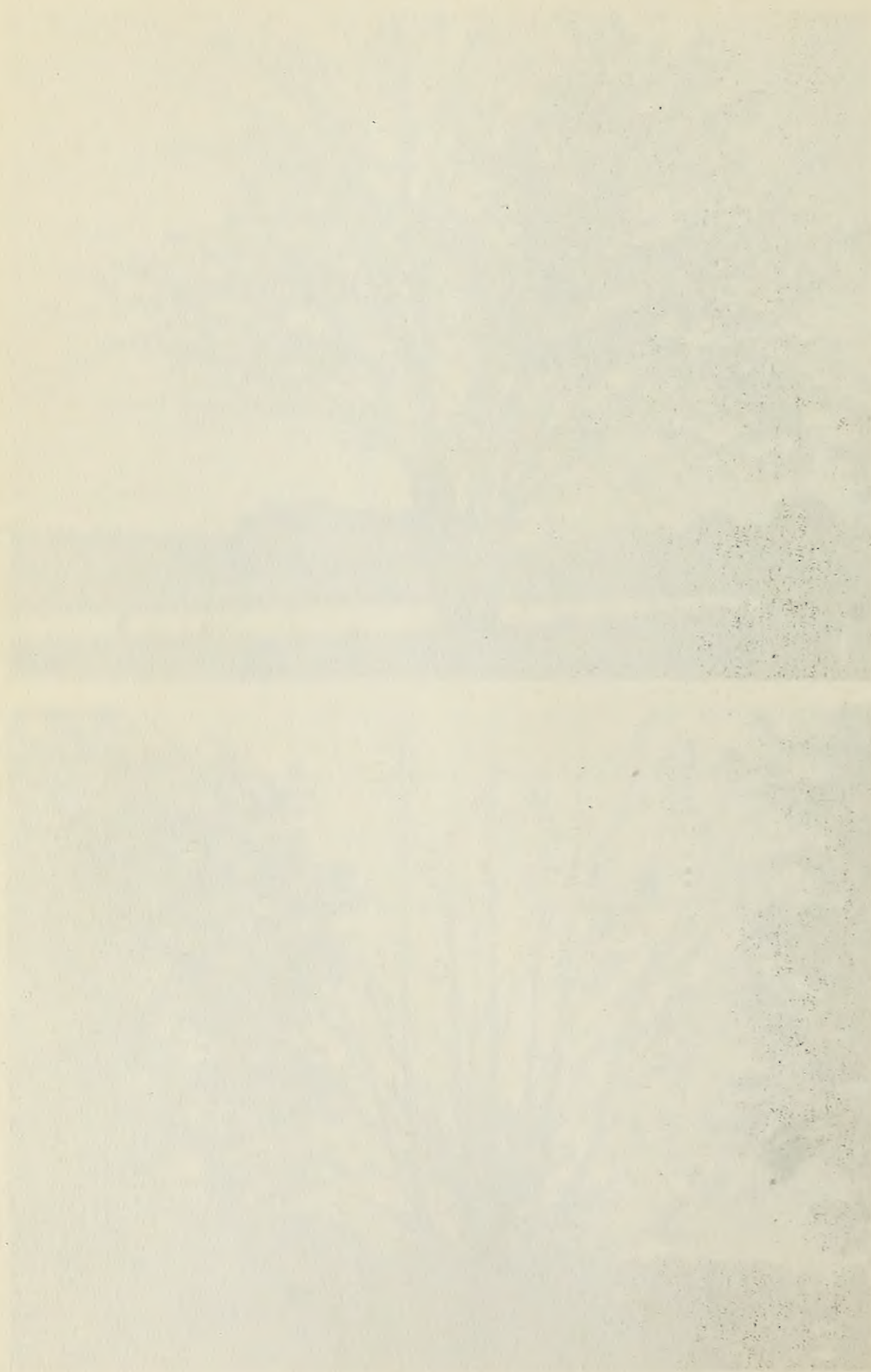


PLATE II

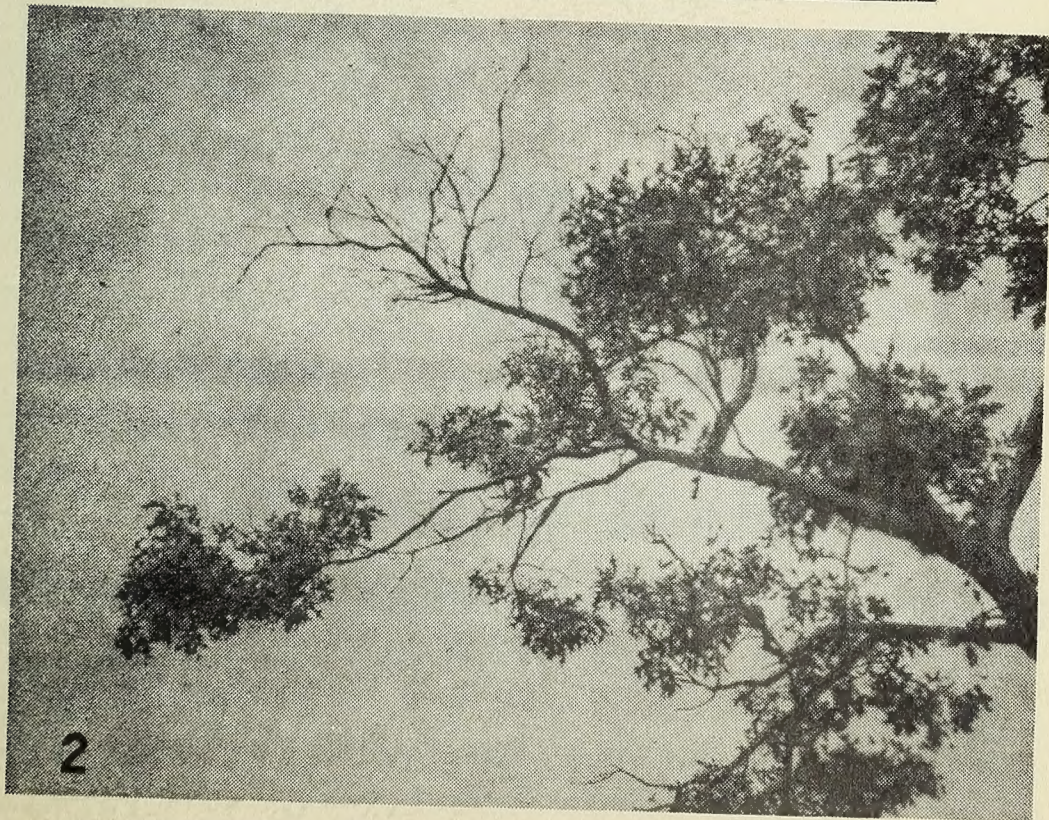


PLATE B

