DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

EXPERIMENTAL FARMS BRANCH

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REPORT

OF THE

CANADIAN

PLANT DISEASE SURVEY

1932

Compiled by

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FOREWORD

The twelfth annual report of the Canadian Plant Disease Survey differs little in form or content from the last two reports. No special sections were contributed this year and in consequence the report is somewhat smaller than last year's. The number of individual reports was, however, equal to last year and many specimens and special notes were contributed.

There have been several new diseases, especially of bulbs and ornamentals reported for the first time in Canada. The most important was the epidemic of bacterial blight or Stewart's disease of sweet corn, which occurred in western Ontario.

I have not made a list of collaborators, but I wish to thank most cordially everyone who has contributed to the Survey. Mr. Réné Pomerleau, Berthier, Que., and Mr. R. C. Russell, Saskatoon, Sask., contributed a substantial list of parasitic fungi found chiefly on non-economic hosts in their respective province. Professor T. C. Vanterpool, Saskatoon, Sask., prepared a memorandum on certain mechanical diseases of wheat which should be helpful in diagnosing diseases of this type.

April 15, 1933
Division of Botany,
Ottawa, Ontario.

I. L. Conners
Plant Pathologist.

I. DISEASES OF CEREAL CROPS

WHEAT

STEM RUST - Puccinia graminis Pers.

Alta.- Stem rust was first observed on wheat on Aug. 7. It was found in zones 8 to 11 in 12 fields out of 488 examined. Infection was never more than a trace. (See 1930 Report for explanation of zones).

Sask.- Stem rust was found at Broadview on July 17 and on the experimental plots at Saskatoon on July 18. Rust infection was heaviest in eastern and south-eastern Saskatchewan. Due to hot weather in late July and to the lack of reserve soil moisture much of the crop ripened rapidly, if not prematurely, and in consequence no damage was caused by rust except to late crops.

Man.- The first infection of stem rust was observed at Morden on June 20. By the end of June, traces of rust could be found in The Red River valley as far north as Winnipeg. On a rust survey trip made July 12 to 14, a trace or a low percentage of rust was observed on most plants at Jordan and on about 10 per cent of the plants at Morden. Traces of rust were present on common wheat throughout southern Manitoba as far west as Virden, but stem rust was difficult to find in areas, where durum wheat chiefly replaced common. On a similar trip on July 25 to 28 all plants of common wheat were affected in the Red River valley, infection reaching a maximum of 2 to 5 per cent between Portage la Prairie and Winnipeg. In the southwestern part about Deloraine the crops were light and rust was correspondingly light. Traces of rust were found there and at Brandon, Birtle and Dauphin, while in the Swan River valley traces of rust were present on 5 per cent of the plants.

At harvest time rust infection ranged from a trace to 5 per cent in the south-western and northern areas of the province, the damage being very slight. In the Red River valley the range of infection was from 5 to 15 per cent; damage was less than 2 per cent.

Durum wheats were in general only lightly infected.

Ont.- In a survey trip from Ottawa to Brockville in late July, only traces of stem rust were found on wheat.

On May 18 pycnia of Puccinia graminis were just appearing on the purple-leaved barberry in Lincoln county. Infection was

moderately heavy. Mature aecia were found on June 9 in the Arboretum, Ottawa, on Berberis vulgaris, B. vulgaris var. purpurea and B. sinensis.

The following barberry plantings were located by personal observation or from infromation supplied by others and have been examined:-

(1) North Gore, Carleton Co.: 12 small bushes on a church property.
(2) Central Experimental Farm, Ottawa: Escaped bushes were observed by Mr. Anderson on the Experimental Farm. A single purple-leaved bush was found on the Merivale road, near Carling Ave., Ottawa. It seems probable that this bush is an escape from the Experimental Farm.
(3) Ramsay Tp., Lanark Co.: The original hedge on an estate at Appleton was not seen, but this property is the centre, from which barberries have escaped and spread out over an area apparently of considerable extent. In 1930 eradication was attempted under The Barberry Shrub Act 1929 of Ontario, but from observations made this past fall it is evident that chemical methods must be used on the more difficult terrain and a more careful survey of the whole area must be made to determine how far the barberry has spread.
(4) Lanark village, Lanark Co.: Two barberries were found on an estate, but no escaped bushes were noticed.
(5) Town of Perth, Lanark Co.: The oldest hedge is probably that on a property at the north side of the town. Subsequently other hedges have been planted in the town. The barberry has escaped into three of the neighbouring municipalities.
(6) Andrewsville, Lanark Co.: A cultivated hedge was found on a farm on Lot 4, Con.A, Montague Tp. The barberry has spread up and down the river for at least 6 miles. The crops were examined in this area for stem rust. In none of the fields were more than traces of rust to be found and the barberry did not appear to play an important role this year in initiating what rust there was. However, the barberries evidently had been heavily rusted in the spring. (I.L. Conners)
Que.- Stem rust slightly infected 5 to 50 per cent of the stems in eastern Quebec. It caused no apparent damage as infection was late.

Cultivated barberries were noted at Chelsea station, Chelsea and at the monument "Aux Braves", Chemin de St. Foy, Quebec city. Mature aecia were found on common and purple barberry at Macdonald College on June 16. First infections were observed on June 2, the last on July 28.

N.B.- Garnet was slightly infected at the Experimental Station, Fredericton. Practically no rust was to be found throughout the province.

P.E.I.- Wheat was heavily infected by stem rust late in the season in all parts of the province, and was seriously damaged. Stem rust appears to be on the increase in recent years, possibly due to favourable weather conditions late in the season.

LEAF RUST - Puccinia triticina Erikss.

Alta.- Leaf rust was found in zones 8 to 11 in 20 fields out of 488 examined. The infections varied as follows: in 11 fields, trace; in 3, light; in 4, medium; and in 2, heavy.

Sask.- Leaf rust was found in 98 out of 298 fields examined. It was first reported at Saskatoon on July 6, and was common in most fields in Saskatchewan by July 28. Infections were light in southern Saskatchewan, while they were very heavy and severe at Kinistino and Beatty in zone 10.

Man.- Leaf rust appeared early this year. Primary infections were found at Morden on June 12 and at Winnipeg on June 16. It was quite severe in southern Manitoba, infections ranging from 25 to 80 per cent. In northern Manitoba range of infection was from 5 to 25 per cent.

Ont.- In six fields of wheat between North Augusta and Ottawa in late July, infection ranged from 20 to 70 per cent.

Que.- Leaf rust was first observed at Macdonald College on June 30. Late infections ranged from 10 to 95 per cent on individual leaves. In eastern Quebec 75 per cent of the leaves were heavily infected with rust, which caused them to dry up prematurely.

N.B.- Red Fife and Huron wheat were moderately infected in Carleton and York counties.

P.E.I.- Leaf rust varied from a trace to very heavy on Aug. 1. During the next month it became very heavy in all parts of the province.

STRIPE RUST - Puccinia glumarum (Schmidt) Erikss. & Henn.

B.C.- Stripe rust was reported once from Vancouver island.

Alta.- Stripe rust was first observed in southern Alberta on July 8 on Hordeum jubatum. In central Alberta it was not seen until Aug. 10, when it was collected on the same grass. During

late August and September it became general in this region.

Stripe rust failed to overwinter in the tests and observations made on plants, which were heavily rusted late in October, 1931. The rust did not develop on the new foliage in April and May, when moisture conditions were apparently very favourable.

Sask.- Stripe rust was collected on Agropyron at Whitewood, Tp. 16, R.2, W. 2nd Meridian on Sept. 15. This collection is the most easterly made in Canada, being only some 35 miles from the Manitoba boundary. The rust was collected the previous day on Hordeum jubatum, at Regina and McLean, Tp. 18, R.16, W. 2nd M.

BUNT - Tilletia Caries (DC.) Tul. & T. foetens (Berk.) Tul.

Besides the field surveys in the separate provinces, Table 1 summarizes the data collected from the records of the Western Grain Inspection Division from Aug. 1, 1931 to October 31, 1932 on the amount and percentages of "smutty" wheat inspected. These data were kindly supplied by Dr. W.F. Hanna.

It will be seen from Table 1 that there has been a considerable reduction in the amount and percentage of "smutty" wheat inspected in the three months ending Oct. 31, 1932 in comparison with the corresponding period in 1931. The chief factor has been the marked decrease in the number of cars of durum wheat graded "smutty" in the latter period, the percentage falling from 5.7 per cent (6.5 per cent for the year 1931-32) to 1.2 per cent. The downward trend begun in 1931 has been definitely continued in 1932 in all kinds of wheat. The results of field inspections to be reported below confirm the inspection data.

Alta.- Bunt was found in 6 fields out of 488 inspected in widely scattered zones. The highest infection observed was one per cent.

Two cars of Garnet wheat grown at Chapman in 1932 graded "smutty" when inspected at Edmonton (1). This grain contained no bunt balls and lacked the characteristic odour of wheat infected with bunt. On examination the spores were found to be reticulated, but much smaller than those of Tilletia Caries. Examination of a sheaf of grain from the field, where the wheat was grown, disclosed the presence of a large percentage of weeds especially dock-leaved persicary, Polygonum lapathifolium L. Approximately

(1) Aamodt, O.S. & Malloch, J.G. "Smutty" wheat caused by Ustilago utriculosa on dock-leaved persicary. Can. Journ. Research 7:578-582, pl.1. 1932.

Table 1. Wheat Bunt in Western Canada

Period of Inspection	Cars Inspected	Cars "Smutty"	Percentage "Smutty"
3 months: Aug. 1, 1931 - Oct. 31, 1931			
Hard Red Spring	53,794	607	1.1
Alberta Red	57	8	14.0
Durum	3,509	200	5.7
All wheat	57,456	816	1.4
1 year: Aug. 1, 1931 - July 31, 1932			
Hard Red Spring	174,182	1,350	0.8
Alberta Red Winter	102	8	7.8
White Spring	262	0	0.0
Amber Durum	5,135	333	6.5
All wheat	179,768	1,695	0.9
3 months: Aug. 1, 1932 - Oct. 31, 1932			
Hard Red Spring	92,398	538	0.6
Alberta Red Winter	88	11	12.5
White Spring	85	1	1.2
Amber Durum	4,372	46	1.2
All wheat	97,001	599	0.6

one half of the persicary was heavily infected with a smut, Ustilago utriculosa (Nees) Tul. Aamodt and Malloch demonstrated conclusively that no bunt spores were present on the seed, but that the persicary smut had much the same effect on the flour and bread made fromthis "smutty" wheat as wheat contaminated with bunt spores. Thus, occasionally weeds may have a direct effect on the quality of crop from fields, in which they are growing.

Sask.- Bunt was observed in 6 fields out of 298 inspected, the highest infection being 4 per cent. Tilletia caries was found in 3 and T. foetens in one out of 4 samples examined,

Man.- Ten per cent of bunt was observed in one field at Neepewa.

Que.- Two fields showing 5 per cent of bunt were seen in Kamouraska county.

LOOSE SMUT - Ustilago Tritici (Pers.) Jens.

Alta.- Loose smut was found in 14 fields out of 488 examined, the average damage in infected fields being 0.6 per cent.

Sask.- A trace of loose smut was observed in 7 fields out of 298 examined.

Man.- Loose smut was found in 45 fields, causing an average damage of 1.6 per cent. Of these, 23 fields were sown with Reward wheat, the average damage being 2.2 per cent.

Ont.- A trace to 2 per cent of loose smut was reported in 3 fields out of 6 examined in Carleton and Grenville counties.

Loose smut was widespread and prevalent in Middlesex county. (G. C. Chamberlain).

Que.- A trace to 8 per cent of loose smut was observed in spring varieties at Macdonald College. In one field in L'Islet county 15 per cent of the heads were destroyed.

P.E.I.- In a survey of the province the average infection was high, being 22.5 per cent for all varieties grown. The destruction of 20 per cent of the heads was common in Huron and Red Fife in some localities (R. R. Hurst).

BLACK CHAFF - Pseudomonas translucens J.J. & R. var. undulosa (S.J. & R.) Stev.

Sask.- Ninety per cent or more of the leaves were severely affected by a bacterial leaf spot in a plot of Golden Ball at the Experimental Farm, Indian Head. This leaf spot was common and intermixed with Septoria leaf spot on Australian White and Hard Federation. It also caused moderate damage in 5 fields out of 298 examined. This spot is referred, with considerable doubt, to black chaff.

Man.- Black chaff was observed in 10 fields causing slight damage.

BASAL GLUME ROT - Pseudomonas atrofaciens (McCull.) Stev.

Alta.- Basal glume rot was found in 4 fields out of 488 examined. Infection was heavy in one field.

Sask.- Basal glume rot caused a trace to slight damage in

11 fields out of 298 examined

Man.- This disease was found in the following places; Morden, trace; Swan River and Benito, 2 per cent of the plants infected.

ERGOT - Claviceps purpurea (Fr.) Tul.

Alta.- Ergot was found in 6 fields, all in zone 10, out of 488 examined. In one field 80 per cent of the heads contained from 3 to 4 ergots each. In another field in the same district 50 per cent of the heads contained ergots.

Sask.- A trace of ergot was found in 1.4 per cent of the fields examined.

P.E.I.- A trace of ergot was observed in Huron wheat at the Experimental Station, Charlottetown.

POWDERY MILDEW - Erysiphe graminis DC.

Alta.- Traces to light infections were common especially in the northern part of the province.

Sask.- A trace of powdery mildew was seen on Hard Federation at the Experimental Farm, Indian Head.

Que.- Winter wheat was severely infected with powdery mildew at Macdonald College. On June 2, 80 per cent of the plants were infected and at maturity the heads were only half filled.

P.E.I.- Traces of powdery mildew were present on Huron at the Experimental Station, Charlottetown.

GLUME BLOTCH - Septoria nodorum Berk.

Alta.- Glume blotch was found in 26 fields out of 488 examined. Infection was as follows: trace, 12 fields; light, 8; medium, 5; heavy, 1.

Sask.- Glume blotch was observed mostly on prostrate culms, in 28 fields out of 298 examined. The damage was a trace to slight.

N.B.- A trace of glume blotch was found in one field in York county.

P.E.I.- Glume blotch caused slight damage on Huron wheat in Queens county.

SPECKLED LEAF BLOTCH - Septoria Tritici Desm.

Alta.- Speckled leaf blotch was found in 7 fields out of 488

examined, infection being a trace to medium.

Sask.- Speckled leaf blotch was common, but not serious on Australian White wheat at Indian Head.

Leaf spots, the causal organism of which was undetermined, caused a trace to moderate damage in 24 fields out of 298 examined.

FOOT ROTS

As the majority of the plant pathologists, who are working on cereal diseases in western Canada, have agreed that the term "foot rot" is appropriately used for those diseases, which occur on the basal parts of the culm and the adjacent portions of the roots, it will be used here in preference to "root rot". The latter term will be used only for those diseases, which occur exclusively on the roots of cereals.

Alta.- Take-all (Ophiobolus graminis Sacc.) was found in 33.2 per cent or 162 fields out of 488 examined. The average damage in the infected fields was estimated to be 3.3 per cent. The disease was found to be most prevalent and slightly more destructive in zones 9, 10, and 11. However, in most parts of southern Alberta the soil was too dry for typical take-all symptoms to develop and in consequence it may be more prevalent there than these figures indicate.

Foot rot attributed to Helminthosporium sativum Pamm., King & Bakke and Fusarium spp. was found in 48.8 per cent or 238 fields out of 488 examined. It was about equally prevalent in all parts of the province. The average damage in the infected fields was 1.2 per cent. In all fields affected with foot rot, the above organisms were considered to be the cause unless typical take-all symptoms were observed.

Sask.- Take-all was found in 18.1 per cent or 54 fields out of 298 examined. The average damage was usually a trace, but in zone 10 it was slight.

Foot rot due to Helminthosporium sativum and Fusarium spp. was found in 95.7 per cent or 285 fields out of 298 examined. On the average 50 per cent of the plants were infected; the damage was slight to moderate. This disease was widespread in the dry areas, where the actual damage was very difficult to assess.

Prematurity blight (cause unknown) was observed in 10 fields out of 298 examined; the damage was a trace.

Man.- Foot rot caused by Fusarium, Helminthosporium, etc. was found in 87.7 per cent or 135 fields out of 154 examined. Damage was as follows: trace, 33; slight, 69; medium, 22; severe, 11.

Ont.- A sample of Reward wheat grown at Packenham gave a germination of only 60 per cent when it was tested in the Seed Branch Laboratory, Ottawa. Darkened and discoloured seeds were conspicuous in the sample. These were picked out, surface sterilized and plated on agar. None of the seed was free of fungi, 50 per cent yielding Helminthosporium sativum, the rest non-parasitic species as Alternaria, Macrosporium, etc.

BROWNING ROOT ROT - Pythium spp.

Alta.- Browning root rot caused 15 per cent damage in one field in zone 8.

Sask.- Browning root rot was observed in 31 fields out of 298 examined. It was estimated that 19 per cent of the plants were infected, the damage was slight. Pythium oospores were found in the lesions of all specimens examined. In one field at Kinistino (zone 10), 90 per cent of the plants were infected. (H. W. Mead).

Browning root rot was very severe on several summerfallow fields between Environ and Sonningdale. Severely affected fields were also found at Scott, Wilkie, Saskatoon, Dana and Lanigan. In general, browning root rot appeared to be more severe on lighter land than it has for the past few years. Invariably it is worse on wheat on early-ploughed, well-worked summer fallow (T. C. Vanterpool).

Ont.- Durum wheat was found heavily infected with root rot caused by Lagena radicicola Vanterpool & Ledingham at Vineland Station on May 27. (J.H.L. Truscott).

HEAD BLIGHT - Giberella Saubinetii (Mont.) Sacc. & Fusarium spp.

Man.- A trace of head blight was seen at Benito and Brandon.

P.E.I.- A moderate infection was noted late in the season on Huron and White Fife at the Experimental Station, Charlottetown.

BRITTLE DWARF - Cause unknown

Sask.- Brittle dwarf was described for the first time in the Canadian Plant Disease Survey for 1931, p.11. This year early in August, it was found in one field each at 3 places in central or southern Saskatchewan as follows: Kindersley, Aberdeen and Balgonie. In each field the damage was a trace. In addition it was common in the Plant Pathology and the Field Husbandry plots at Saskatoon, where it was first observed. Diseased plants occurred most frequently on the edges of the plots.

WHITE TIP - Cause unknown

Sask.- White tip was observed in 3 fields, causing about 10 per cent damage in two. This disease is probably caused by extremely hot weather during the filling of the heads.

SEED INJURY

Sask.- In 2 fields in zone 9, injury apparently due to Penicillium spp. was observed on seedlings which were about 4 inches high and one month old. The estimated damage was one per cent.

DROUGHT INJURY OR FIRING

Sask.- Early in July, a survey trip through central Saskatchewan including the districts of Regina, Moose Jaw and Indian Head, revealed a large amount of Drought Injury or Firing of wheat. At about heading time there is a distinct browning and dying of the leaves. The plants are also noticeably retarded. It is caused in all probability by a lack of reserve moisture especially at the lower depths. This trouble is sometimes called browning, but it should not be confused with browning root rot (P. M. Simmonds and B. J. Sallans).

GLUME DARKENING - Cause unknown

Sask.- Glume darkening was observed in Reward at Indian Head.

NEMATODE DISEASE - Heterodera punctata Thorne

Sask.- Slight damage was caused in one field in zone 7 by this nematode.

Aphelenchus avenae Bastian was found as a saprophyte in 11 places in one field near Edmonton.

PHYSIOLOGICAL DISEASES

A memorandum on physiological or mechanical diseases was prepared in June 1932 by Professor T. C. Vanterpool, University of Saskatchewan, Saskatoon, after personal consultation with Prof. W. P. Fraser and Dr. P. M. Simmonds and correspondence with Drs. J. H. Craigie, A. W. Henry and G. B. Sanford. His memorandum has been copied below with some alterations and omissions. In addition to the memorandum, Prof. Vanterpool submitted excellent photographs of straw break and stem kink, which unfortunately cannot be reproduced here.

I Straw Break (Breaking over of Wheat Straw)

Straw Break is characterized by an abrupt breaking over of the culm usually about a half to one inch above the second node.

This break is seldom complete and consequently the plants bend upward almost invariably at the node immediately above the break and ordinarily attains maturity. The heads of affected plants although upright, are considerably nearer the ground, but are nevertheless readily gathered in harvesting operations. On the Canadian prairies, the breaking over occurs after the middle of July and isolated plants scattered throughout the field are affected. A stricken field does not have the appearance of lodged grain. The bends, however, always occur in one direction thereby indicating that strong winds and rain are responsible for the final break, although the primary cause of the weakness in the straw is not known. In some instances foot-rotting fungi may be the indirect cause.

Plants affected with straw break are ordinarily free from any signs of hail damage. However, plants slightly bent over by hail have been found which have regained an upright position in the manner described above.

Straw break is of special interest for many farmers confuse it with hail injury and expect compensation from hail insurance companies when straw break occurs in fields which happen to be insured.

Haskell (1) has described a breaking over of wheat straw which appears to be identical with straw break.

References:

1. Haskell, R. J. Breaking over of wheat straw. U.S.D.A. Plant Disease Reporter 14:157-158. 1930.

2. Canadian Plant Disease Survey Rept. 11:11. 1932.

3. U.S.D.A. Plant Disease Reporter 14:224. 1930 (Apparently straw break and not crinkle joint as reported).

4. U.S.D.A. Plant Disease Reporter Suppl. 81:52. 1931.

II. Stem Kink (Contortion, Krinkle Joint, Crinkle Joint)

Stem Kink was first reported from western Canada as Krinkle Joint (2). It is recognized by a kink, bend, or buckling of the lower internodes of the stem immediately above the nodes, usually above the second. As the plant matures, the stem breaks at this point, the plant falls over and usually produces no grain. It is believed that unfavourable meteorological conditions cause the culm and head to be firmly held in the upper enclosing sheaths, which fail to expand and open normally. On the return of good growing conditions the stem buckles in the region of greatest meristematic activity producing a characteristic kink. It is

possible that much of the crinkle joint of various observers belongs to this category, although stem distortion in the meristematic region may deviate from the type here described. It seems highly probable that the contortion of wheat stems as described from New South Wales (1) is identical with stem kink.

References:

1. Darnell-Smith, G.P. Wheat straw breaking down through "Contortion" or the attacks of insects. Agr. Gazette, N.S.W. 25:377-378. 1914.

2. Drayton, F.L. A summary of the prevalence of plant diseases in the Dominion of Canada 1920-1924. Dom. Dept. Agr. Bull. 71 n.s.:9-10. 1926.

III. Distortion and Buckling of the Spike-bearing Internode.

The sheath enclosing the head fails to unroll normally with the result that, as growth continues, there is a buckling of the internode bearing the head, more commonly called the neck, immediately below the head. Distortion of the head also often occurs. The trouble is more common in bearded varieties. Observations made by Mr. B. J. Sallans indicate that the sheath enclosing the head may sometimes fail to unroll on account of being injured by hail. Other adverse meteorological conditions may produce the same effect. Similar distortions have been found where the affected parts contain bacteria. This abnormality also occurs in barley and oats.

OATS

STEM RUST - Puccinia graminis Pers.

Alta.- Stem rust was observed in zones 8 to 10 in 11 out of 152 fields examined. The damage was a trace in 9 fields and light in 2..

Sask.- Stem rust heavily infected oats in the extreme southeastern part of the province, where the damage was moderate. In other parts of Saskatchewan, infections were light and the damage was a trace to slight. Rust appeared late, during late July and early August in both the south and north. It was collected July 28 on wild oats at Saskatoon.

Man.- Primary infections of stem rust were found on oats on June 29 at Winkler. In general oats was found slightly more heavily infected than wheat in most parts of the province on a survey trip made July 25 to 28. No appreciable damage to the crop occurred except to very late fields, which were few in number.

Ont.- Out of 67 fields examined between Ottawa and Brockville in late July, no rust was found in 29. Traces were abundant near Manotick, Tincap and between North Augusta and Merrickville. Between Carsonby and Becketts Landing, only an occasional field showed rust. Traces of stem rust were present at Franktown and Smiths Falls, while near Kilmarnock rust infection was about 3 per cent.

Que.- Stem rust was first collected on oats on July 25 at Macdonald College. Infection was never more than slight. In Kamouraska county infection was slight. In one field of Alaska, 15 per cent of the stems bore pustules.

N.B.- A trace of stem rust was found in one field in Westmoreland county.

N.S.- A heavy infection of stem rust was observed in Halifax county; in 2 fields in Colchester county infection was slight.

P.E.I.- Traces of stem rust were found on all varieties.

CROWN RUST - Puccinia coronata Corda

Sask.- Traces of crown rust were found in 5 fields out of 77 examined. It was mostly on the lower leaves or in late fields.

Man.- A light sprinkling of crown rust was present as far north as Benito. It caused no appreciable damage. Three pustules of rust were found on a buckthorn hedge at Macdonald on June 23.

Ont.- On a survey trip between Ottawa and Brockville in late July, crown rust was found in 42 fields out of 80 examined. In 29 fields only traces of rust occurred but around Merricksville, Andrewsville and Burritts Rapids, heavy stands especially on the bottom lands near the Rideau river commonly showed infections ranging from 40 to 60 per cent. Escaped buckthorns are plentiful in this area. In one field at North Augusta, 10 per cent of rust was present, but no buckthorn was found. Traces of crown rust were also found at Kilmarnock, Smiths Falls and Franktown.

The following buckthorn plantings were located by personal observation or from information supplied by others and have been examined, except where noted.

(1) Merivale Road, near City View, Carleton Co.: Escaped bushes were noted along the road, but the source was not determined.

(2) Central Experimental Farm, Ottawa: Escaped bushes are common in the Arboretum. Whether they may have escaped from the Arboretum was not determined.

(3) Ramsay Tp. Lanark Co.: Escaped bushes were seen opposite a buckthorn hedge 15 to 20 ft. high growing on a farm on Lot 9, Con. 9. A similar hedge is said to occur on a farm on Lot 11, Con. 8. The actual area, over which buckthorn has here escaped, was not determined.

(4) Town of Perth, Lanark Co.: The original hedge was on what is now the Hospital property. Escaped bushes are extremely abundant in the town, but they may be found in at least three of the adjoining municipalities.

(5) Lanark village, Lanark Co.: A small buckthorn hedge was found on the south side of the village. It has escaped over the neighbouring hillside. Two buckthorns were found on a farm on Lot 6, Con. 11, Drummond Tp. near Lanark village. No escapes were found between the farm and the village.

(6) In the Andrewsville area, a buckthorn hedge was found across the Rideau river in Wolford Tp. Grenville Co. It has spread far and wide on both sides of the river. The presence of escaped buckthorn in this area has made it unprofitable to grow oats on account of the losses from crown rust.

(7) Antrim area, Carleton Co.: Hedges of buckthorn occur on adjacent farms on Lot 11, Con. 6, Fitzroy Tp. The bushes have escaped up to at least 1½ miles from the original plantings. (See 1930 Report).

(8) Eastons Corners, Grenville Co.: A buckthorn hedge was found here. Whether or not the bush has escaped was not determined

(9) West of Spencerville, Grenville Co., buckthorns have escaped, but this area has not been investigated. Complaints and specimens of heavily rusted oats were sent to the Division of Botany several years ago.

It has been observed personally and reported to me by observers at first hand, that the buckthorn is responsible for serious epidemics of crown rust on oats growing in close proximity to the bush. (I. L. Conners).

Que.- Buckthorns infected with crown rust were observed on June 2, at Macdonald College and vicinity. Aecia were mature on June 16. Only traces of crown rust were found this year at Macdonald college. Usually oats is moderately to severely infected.

N.B.- Victory was moderately infected with crown rust at the Experimental Station, Fredericton.

N.S.- Infections of crown rust ranged from a trace to 5 per cent in infected fields in Colchester, many being free from rust. In Pictou county a trace was found in one field.

P.E.I.- Crown rust was first observed on August 13 at Charlottetown. A survey in early September showed that this rust was widespread in the province and caused slight to severe damage. Buckthorns were moderately infected with crown rust in Queens county.

SMUT - Covered Smut - Ustilago levis (Kellerm. & Swingle) Magn. and Loose Smut - Ustilago Avenae (Pers.) Jens.

Alta.- Covered smut was widespread in Alberta; 23 per cent or 35 fields out of 152 examined were smutty. The average damage was 5.2 per cent in the infected fields or 1.2 per cent loss for all fields. Infections ranging from 25 to 40 per cent were observed in several fields. Loose smut was found in only 5 fields, the highest infection being observed was 3 per cent.

Sask.- Covered smut was found in 29 out of 77 fields examined, the average damage being slight. Loose smut was found in only 2 fields; the average damage was a trace.

Man.- Covered smut was reported from 11 fields, the average damage in the infected fields being 14.4 per cent.

Ont.- In a survey trip from Ottawa to Brockville in late July, smut was found in 57 fields out of 78 examined. In 46 of these fields the species present was recorded; 2.5 per cent of the heads were destroyed by covered smut and 2.7 per cent by loose. The highest infections were: covered smut, 16 per cent; loose, 30 per cent. Smut seemed to be more prevalent between Ottawa and Manotick, than elsewhere.

Que.- About Macdonald College, infections of loose smut varied from a trace to 10 per cent. In Kamouraska county, 5 per cent of loose smut was found in two fields examined and 30 per cent in a third; a trace of covered smut was also found in one field.

N.B.- Banner oats were slightly infected by both loose and covered smuts at the Experimental Station, Fredericton. A specimen of loose smut was also received from Bath.

N.S.- Covered smut destroyed 3 per cent of the heads in one field in Colchester county. Loose smut infections were reported

as follows: in Colchester county, 10 per cent in 3 fields; in Pictou county, 3 per cent in one field.

P.E.I.- Loose smut of oats was general in the province this year. Recorded infections ranged from 5 to 10 per cent.

HALO BLIGHT - Pseudomonas coronofaciens (Ch. Elliott) Stev.

Alta.- Halo blight was reported from 56 fields out of 152 examined. The damage was assessed as follows: trace, 42 fields light, 14. The disease was most prevalent in zones 9 and 10.

Sask.- This blight was found in 3 fields out of 77 examined; 10 to 20 per cent of the plants were moderately affected.

Man.- Halo blight was general at Morden.

Que.- This disease was observed at Macdonald College the last week of May when the plants were 6 to 8 inches high. Infections were slight to moderate.

BACTERIAL STRIPE BLIGHT - Bacterium (Pseudomonas) striafaciens Ch. Elliott.

Alta.- Bacterial stripe blight was found in 58 fields out of 152 examined and is fairly widespread. Damage was reported as follows: trace, 25 fields; light to medium, 33 fields.

Man.- A bacterial leaf disease badly injured the leaves at Winnipeg.

Ont.- Blade blight caused by Phytomonas Avenae (Manns.) Bergey et al, was present on specimens from Sturgeon Falls. The leaves were seriously affected on account of the damage done by secondary fungi (D. H. Jones).

FOOT ROTS

Alta.- Foot rot caused by Fusarium spp. was found in 2 per cent of the fields. Damage was a trace except at Beaverlodge, where it was reported to be heavy.

Sask.- Foot rot attributed to Helminthosporium sativum and Fusarium spp. affected 57 fields out of 77 examined. In the infected fields, 26 per cent of the plants were diseased on the average and the damage was slight.

A trace of prematurity blight was found in 3 fields.

Man.- Helminthosporium-Fusarium foot rot caused very slight

damage in 14 out of 19 fields examined.

N.B.- Foot rot due to Helminthosporium was widespread; the damage was slight.

BLAST - Cause unknown

Alta.- At least a trace of damage from blast was present in all fields examined. Estimated losses of 15 to 20 per cent were observed in a few fields.

Sask.- A trace to slight damage was recorded in 40 per cent of the fields. One field of wild oats near Saskatoon was severely blasted.

N.B.- Blast was widespread; the damage was slight.

P.E.I.- Traces of blast were found at the Experimental Station, Charlottetown.

LEAF BLOTCH - Helminthosporium Avenae Eidam

Alta.- Leaf blotch caused a trace of damage in one field out of 152 examined.

Ont.- Two specimens of an undetermined leaf blight collected in Carleton county in 1930 were found on examination to be affected with leaf blotch. The leaves were severely withered.

P.E.I.- Leaf blotch caused moderate damage to 25 per cent of the leaves in fields in Queens and Prince counties.

SPECKLED LEAF BLOTCH - Leptosphaeria avenaria Webber (Septoria Avenae Frank)

Que.- Speckled leaf blotch was found on July 14 at Macdonald College. Infection varied from slight to moderate according to the variety and location in the field.

BARLEY

STEM RUST - Puccinia graminis Pers.

Alta.- A trace of stem rust was found in 2 fields in zone 10 out of 75 examined.

Sask.- Stem rust was found in 6 fields out of 27 examined. Damage was moderate in zone 1, nil or a trace in other zones.

Man.- Infections of stem rust varied from 10 to 35 per cent in the Red River valley; the damage was slight.

Ont.- Traces of stem rust were found in late July in 4 fields in Carleton and Grenville counties.

N.B.- A trace of rust was found in 2 fields in York and Sunbury counties.

P.E.I.- Traces to 10 per cent of rust were found at the Experimental Station, Charlottetown.

LEAF RUST - Puccinia anomala Rostr.

Sask.- A trace of leaf rust was present in 3 fields out of 27 examined. It was found rather late in the season on late barley.

Man.- A trace to light infections of leaf rust were found at Ste. Anne des Chênes, Poplar Point and Portage la Prairie.

Ont.- A trace to 10 per cent of leaf rust was found near Burritts Rapids.

Que.- Barley was slightly to moderately infected with leaf rust at Macdonald College.

COVERED SMUT - Ustilago Hordei (Pers.) Kellerm. & Swingle

Alta.- Covered smut was present in 25 out of 75 fields examined. The two highest infections recorded were 30 per cent in a field in zone 8 and 15 per cent in one in zone 11. The average damage in infected fields was 2.9 per cent. Covered smut is thus about one half as prevalent and destructive as it was last year.

Sask.- A trace to moderate infections of covered smut were reported from 4 fields out of 27 examined.

Man.- Infections of 2 and 5 per cent respectively were reported from 2 fields.

Ont.- A trace of covered smut was recorded in 2 out of 3 fields examined in Carleton county.

Que.- A sample of barley seed very heavily inoculated with covered smut was received from a Montreal seed house. It was from

a crop grown this year in the province. Diseased specimens were also received from Timiskaming.

N.B.- Slight infections of this smut were found in all varieties in the test plots at Fredericton.

P.E.I.- In 58 fields examined throughout the province, 4 to 50 per cent of the heads were destroyed by covered smut in the infected fields.

LOOSE SMUT - Ustilago nuda (Jens.) Rostr.

Alta.- Loose smut was found in only 3 fields out of 75 examined. The highest infection was 3 per cent.

Sask.- A trace of loose smut was recorded from 2 fields out of 27 examined.

Ont.- A trace of loose smut was found in one out of 2 fields examined near Ottawa.

Que.- Infections of loose smut varied from a trace to 4 per cent in the different varieties at Macdonald College.

N.S.- Infections ranging from 10 to 20 per cent were reported in 3 fields in Colchester and Pictou counties.

P.E.I.- Infections of loose smut varied from 0.5 to 15 per cent in Queens county.

SPRIPE - Helminthosporium gramineum Rabh.

Alta.- Stripe was reported in 4 fields in zone 10 out of 75 examined. It did very little damage this year, infections ranging from a trace to light.

Sask.- Traces of stripe were found on Colsess barley at Saskatoon and on this and other varieties at Indian Head.

Ont.- A trace of stripe was noticed in one field near North Gower.

Que.- Stripe slightly to moderately infected 6-rowed varieties at Macdonald College.

N.B.- Stripe was widespread on several varieties, but the damage was slight.

P.E.I.- A few to 10 per cent of the plants were found affected in fields in Queens and Prince counties. The average damage was slight.

FALSE STRIPE - Cause undetermined.
Alta.- A trace of false stripe was found in 2 fields.

NET BLOTCH - Pyrenophora teres (Died.) Drechsl.
(Helminthosporium teres Sacc.)
Alta.- Net blotch was present in 28 out of 75 fields examined, it was most prevalent in zones 9 and 10. The damage was estimated as follows: trace, 12 fields; light, 16.

Sask.- Net blotch was found in 11 fields out of 27 examined. The average damage in the infected fields was slight.

Man.- Medium infections of net blotch were found in two fields at Basswood and Poplar Plains.

Ont.- Net blotch was found in 3 fields in Carleton county; 20 to 50 per cent of the leaves were affected, damage being a trace.

Que.- Net blotch severely infected one 2-rowed variety at Macdonald College.

N.B.- A trace of net blotch was found in one field in Doak Settlement, York county.

P.E.I.- Traces of net blotch were found everywhere, but the damage was insignificant.

SPOT BLOTCH - Helminthosporium sativum P.K. & B.
Alta.- Spot blotch was found in 19 fields, chiefly in zone 10, out of 75 fields examined; the damage was a trace in 5 fields and slight in 14.

Man.- Spot blotch was reported from two places, being fairly severe at Souris, and slight at Ste. Anne des Chênes.

Que.- This disease was severe on one 2-rowed variety at Macdonald College.

FOOT ROTS

Sask.- Foot rot attributed to Helminthosporium sativum and Fusarium spp. was found in 23 fields out of 27 examined. In the infected fields over 40 per cent of the plants were attacked; the damage was slight to moderate.

Man.- Helminthosporium-Fusarium foot rot caused slight damage in 14 fields.

N.B.- Foot rot caused by Helminthosporium was widespread, but infection was slight in the plots at the Experimental Station, Fredericton.

P.E.I.- Each year barley is affected by foot rot in the late seedling stage. Although the plants appear to be seriously injured at that time, they generally recover. Fusaria have been isolated from diseased plants.

SCALD - Rhynchosporium Secalis (Oud.) Davis

Alta.- Scald was found in 5 fields in zone 10; the damage was a trace in 2 fields and light in 3.

ERGOT - Claviceps purpurea (Fr.) Tul.

Alta.- A trace of ergot was present in one field.

Sask.- Barley was moderately affected with ergot in one field at Saskatoon.

N.B.- Ergot was present in one per cent of the heads in a field at Fredericton.

P.E.I.- A trace of ergot was found in one field.

POWDERY MILDEW - Erysiphe graminis DC.

P.E.I.- Traces of powdery mildew were recorded on O.A.C. 21 and Duckbill at Charlottetown.

BACTERIAL BLIGHT - Pseudomonas translucens J.J.R.

Sask.- A trace of bacterial blight was found on Colsess barley in the Field Husbandry plots, Saskatoon.

BRITTLE DWARF - Cause unknown

Sask.- Brittle dwarf was found for the first time on barley when the disease was observed on Colsess in the Field Husbandry

Plots at Saskatoon the first week of August by Messrs. W. G. Sallans and R. J. Ledingham. About 7 per cent of the plants were affected. The symptoms on barley are very similar to those on wheat.

RYE

STEM RUST - Puccinia graminis Pers.

Sask.- Considerable rust was found on late volunteer rye in the Field Husbandry plots, Saskatoon. Traces were found in one field in zone 1.

LEAF RUST - Puccinia dispersa Erikss.

Alta.- A trace of leaf rust was found in one field out of 8 examined.

Sask.- A light sprinkling of leaf rust was observed on July 9 on the experimental plots, Indian Head. In 3 fields out of 8 examined, infection varied from a trace to moderate.

Man.- A trace of leaf rust was recorded from Foxwarren and Morden.

Ont.- Leaf rust was common on lower leaves of rye in Lincoln county; damage was negligible.

Que.- Rye was moderately infected with leaf rust at Macdonald College; damage was slight.

ERGOT - Claviceps purpurea (Fr.) Tul.

Alta.- Ergot was found in 4 fields out of 8 examined. In one field in zone 8 the damage was heavy, as 90 per cent of the heads were infected. Traces only were present in the other fields.

Sask.- Ergot was found in 5 fields out of 8 examined; damage was slight. At the Experimental Farm, Indian Head, 4 to 5 per cent of the heads contained from one to 3 ergots each.

POWDERY MILDEW - Erysiphe graminis Pers.

Ont.- Powdery mildew was common on winter rye in Lincoln county; damage was negligible.

Que.- Moderate infections of powdery mildew were recorded at

Macdonald College, with no apparent damage

BACTERIAL BLIGHT - Pseudomonas translucens J.J.R. var. Secalis (J.R. & G.) Stapp

Alta.- Bacterial blight caused light damage in one field.

Sask.- A stem streak, possibly due to bacteria, caused slight damage in one field.

FOOT ROTS

Sask.- Foot rot attributed to Helminthosporium sativum and Fusarium sp. was found in 6 out of 8 fields examined. The damage was slight.

Five per cent of the plants in one field were affected by prematurity blight.

Man.- Foot rot caused slight damage in 8 fields examined.

STERILITY

Sask.- Ten to 25 per cent of the heads were sterile in Dakold etc, in the Field Husbandry plots, Saskatoon. This trouble is ordinarily attributed to hot, dry winds at heading time, but such was not true this year. A study of the meterological and soil conditions at that time suggests that the trouble in 1932 was due to the upper layer of soil being too dry at a critical time for the plant. The majority of the sterile heads were on the shorter and presumably weaker culms. This trouble was also observed on field trips.

II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

COMMON LEAF SPOT - Pseudopeziza Medicaginis (Lib.) Sacc.

B.C.- In some alfalfa fields around Summerland the older foliage was heavily infected with this leaf spot. It was also quite general at Vernon, Kelowna and South Okanagan, especially on old alfalfa cover crops.

Alta.- Medium to heavy infections of common leaf spot were found in 7 fields out of 16 examined; the damage, if any, was very slight.

Sask.- Slight damage was caused by common leaf spot at Indian Head.

Ont.- Traces of this leaf spot were present in the plots at Ottawa.

Que.- Common leaf spot was first observed at Macdonald College, on June 2nd, and nearly every leaf was infected in several plots by August. It caused some defoliation on the lower parts of the plant. This leaf spot was also reported from Kamouraska and Deux Montagnes counties; it caused slight defoliation.

N.B.- Common leaf spot was widespread; the damage was moderate.

N.S.- This leaf spot was quite general, but it was not severe in any field examined.

P.E.I.- Common leaf spot caused moderate infections on alfalfa in Queens and Prince counties; the damage was moderate.

YELLOW LEAF BLOTCH - Pseudomonas Jonesii Nannf.
(=Pyrenopopeziza Medicaginis Fuck.)

Nannfeldt has recently published an excellent treatise entitled "Studien uber die Morphologie und Systematik der nich-lichenisierten inoperculaten Discomyceten" (Nova Acta Reg. Soc. Sci. Upsaliensis ser 4, vol. 8, No. 2 pp. 1-368, text fig. 1-47, pl.1-20. 1932). In this work he has added greatly to our understanding of these fungi. In consequence of his researches he has been compelled to change the names of some of the commoner fungi. Such a change is the one above, but it is proposed to adopt these names in the Survey.

Que.- A slight infection of yellow leaf blotch was observed

on June 2nd; it tended to disappear as the season advanced. A heavy infection was observed in two localities on well-drained and fertilized soils in Rimouski county.

RUST - Uromyces Medicaginis Pass.

Man.- This rust, which appeared in small quantities late in 1931, was not seen this year.

Ont.- Traces of rust were collected in the Forage Division Plots at Ottawa late in the season.

DOWNY MILDEW - Peronospora Trifoliorum de Bary

Ont.- Specimens of alfalfa collected in the Forage Division plots were found to be heavily infected with downy mildew. According to the severity of the disease the varieties were given a rating between 1 and 10 by the Forage Crop Division. The standing was as follows: Nebraska selection, Brooks Grim, Ontario Variegated, 1 (least injured); Ladak, 2; Hardistan, 3; Lytben, 9 (most injured).

FOOT ROT - Sclerotinia Trifoliorum Erikss.

Alta.- Foot rot caused a trace to light damage in 3 fields out of 16 examined. The fungus was found associated with severe winter killing of alfalfa at Brooks.

BROWN ROOT ROT - Plenodomus Meliloti Dearn. & Sanf.

Alta.- A trace to light damage was caused by brown root rot in 5 fields. The fungus was also associated with the severe winter killing of alfalfa, which occurred at Brooks.

MACROSPORIUM LEAF SPOT - Macrosporium sp.

Alta.- A trace to light infection of this leaf spot was reported from 3 fields.

WITCHES' BROOM - Cause undetermined

B.C.- Two-year old alfalfa plants affected with a witches' broom were sent to the laboratory from Smithers and Saanichton. Many small shoots, instead of a few normal ones, arose from the crown. The disease may be important economically (W. R. Foster).

DODDER - Cuscuta epithymum Murr.

B.C.- Dodder was reported from Yale county.

BACTERIAL BLIGHT - Pseudomonas Medicaginis Sackett
Alta.- A light infection of bacterial blight was reported from several fields at Beaverlodge.

COMMON CLOVER

COMMON LEAF SPOT - Pseudopeziza Trifolii (Biv.-Bern.) Fuck.
P.E.I.- All red clover was moderately infected with common leaf spot in Prince, Queens and Kings counties.

MOSAIC - Virus
Que.- Varying amounts of mosaic were present in the different varieties at Macdonald College.

P.E.I.- Four plants were seen in one field of red clover at Charlottetown.

POWDERY MILDEW - Erysiphe Polygoni DC.
Que.- Powdery mildew was general in the Montreal district. It was also general in the eastern part of Quebec; in some fields it was so severe that a small percentage of the leaves shrivelled and dried up.

N.B.- Powdery mildew was widespread; the damage was slight.

N.S.- Red clover was severely infected with powdery mildew in Durham Tp., Pictou Co. This year haying was not completed owing to showery weather, until after the middle of August, a delay of at least 2 weeks. Usually no mildew is found on the first crop.

P.E.I.- Second crop of red clover was severely injured by powdery mildew in Queens, Kings and Prince counties.

RUST - Uromyces Trifolii (Hedw.f.) Lév.
Alta.- White clover was slightly to moderately infected with rust throughout the province.

Que.- A moderately heavy infection of rust was found in Chateauguay county. Slight infections of rust were reported in fields throughout eastern Quebec.

N.S.- Alsike clover was moderately infected in Colchester county. Rust is very common on second crop clover, but it does not appear to cause serious injury.

P.E.I.- Rust was rather abundant on red clover this year in all parts of the province. It apparently caused slight damage. It was also reported on alsike clover from Queens county.

SOOTY BLOTCH - Dothidella Trifolii (Pers.) Bayl.- Elliott & Stansf. (Polythrincium Trifolii Kunze)

N.S.- A trace of sooty blotch was present on alsike clover at Kentville. Red clover was moderately infected in a field in Colchester county.

P.E.I.- Traces of sooty blotch were reported from the Experimental Station, Charlottetown.

ANTHRACNOSE - Kabatiella caulivora (Kirchn.) Karak. (=Gloeosporium caulivorum Kirchn.)

Alta.- Anthracnose caused slight damage to a field of Alberta Swede red clover at Spruce Grove.

WITCHES' BROOM - Cause unknown

B.C.- Witches' broom produced similar symptoms on clover and was found at the same places as it was on alfalfa (see above).

SWEET CLOVER

MOSAIC - Virus

B.C.- Mosaic was reported from Summerland.

FOOT ROT - Sclerotinia Trifoliorum Erikss.

Alta.- Foot rot caused slight to medium damage in 5 fields in zones 1, 2 and 10 out of 20 examined. Severe killing was produced experimentally at Edmonton.

BROWN ROOT ROT - Plenodomus Meliloti Dearn. & Sanf.

Alta.- A trace to light damage from brown root rot was found in 8 fields in zones 1, 10 and 12.

STEM CANKER - Stagonospora Meliloti (Lasch.) Petr.
(=Ascochyta Meliloti (Trel.) Davis)

Alta.- Stem canker of the Ascochyta Meliloti type caused a trace of damage in 9 fields out of 20 examined. A leaf spot bearing Stagonospora Meliloti was reported in 5 fields; infection was a trace to light except in one field at Athabasca where the plants were moderately infected.

CORN

RUST - Puccinia Sorghi Schw.

Sask.- Corn rust was very severe on the lower leaves of corn in the variety test plots at Indian Head. A trace was found at Imperial. This appears to be the first report of this rust from Saskatchewan.

Man.- A trace of rust was found at Gimli.

Que.- Rust was abundant, the heaviest ever observed, in many fields in Jacques Cartier county. It may have caused some damage. (F. Godbout).

SMUT - Ustilago Zeae (Beck.) Unger

Sask.- A specimen was sent in from Lydden.

Man.- One per cent of the plants was smutted in a field at Winnipeg.

Ont.- Corn smut was noticed in several fields in Lincoln county. The disease was most prevalent on early varieties, where the land was heavily manured. Late field corn was not as severely affected. A specimen was sent to the Division at Ottawa from Blind River.

Que.- A trace of smut was observed in a field of corn in Kamouraska county.

N.B.- A trace of smut was found in a field at the Experimental Station, Fredericton.

N.S.- Traces of corn smut were reported from several places in the province.

BACTERIAL STALK ROT - Bacterium dissolvens Rosen

Alta.- A trace of bacterial stalk rot probably caused by Bacterium dissolvens was found in an Edmonton garden. The

disease was not nearly as prevalent or severe as in 1931.

Ont.- Specimens of this disease were submitted to the Bacteriological Dept., O.A.C. for determination. (D. H. Jones).

FLAX

RUST - Melampsora Lini (Ehrenb.) Desm.
Sask.- A trace of rust was found in one field out of 8 examined.

Man.- Traces of rust were reported from Oak Lake, Jordan and Ste. Agathe.

WILT - Fusarium Lini Bolley
Sask.- A trace of wilt was reported in one field.

HEAT CANKER - Non-parasitic
Alta.- Heat canker caused a trace of damage in one field in zone 3.

BROWNING - Polyspora Lini Laff.
Alta.- Browning was reported from one field in zone 8.

DAMPING OFF - Rhizoctonia sp.
Sask.- A damping off or seedling blight was general in the University plots, Saskatoon, but the damage was a trace. The plants were attacked at the soil level, when they were 3 to 4 inches high. The zone of infection was a half to one inch long. Rhizoctonia only was isolated in pure culture. This seedling blight appears earlier than wilt caused by Fusarium. It has been under observation for 3 years (T. C. Vanterpool).

SUNFLOWER

FOOT ROT - Sclerotinia Sclerotiorum (Lib.) de Bary
B.C.- Foot rot was observed at Saanichton on June 27. Usually several stems were killed in a clump, some clumps being completely destroyed.

RUST - Puccinia Helianthi Schw.
Sask.- Sunflowers were heavily rusted in the University gardens, Saskatoon.

MANGEL

BLACK LEG - Phoma Betae (Oud.) Frank
N.S.- A crown rot caused by Phoma Betae was present in some plots at the Experimental Station, Kentville. It apparently followed tarnished plant bug injury.

SOY BEAN

LEAF SPOT - ?Pseudomonas glycineum Coerper
Sask.- Fifty to 75 per cent of leaves were slightly to severely attacked in a plot at the Experimental Farm, Indian Head.

CULTIVATED GRASSES

BROOM MILLET (Panicum mileaceum)
Smut (Sorosporium Panici-mileacei (Pers.) Takah.) A specimen of this smut was sent to the Laboratory at Saanichton, from a farm at Vernon, B. C.
Six per cent of the heads in three 1/40 acre plots of hog millet were destroyed by smut at Indian Head, Sask.

FOX-TAIL MILLET
Downy Mildew (Sclerospora graminicola (Sacc.) Schroet) Downy mildew caused 2 to 3 per cent damage in a plot of Siberian millet at the Experimental Farm, Indian Head, Sask. Hungarian and common millet did not appear to be infected in the neighbouring plots.

Leaf Spot - A light infection of a bacterial leaf spot was reported from a field near Vermilion.

RED TOP (Agrostis alba)
Stem Rust (Puccinia graminis Pers.) Traces of stem rust were found in Queens county, P.E.I.

TIMOTHY
Stem rust (Puccinia graminis Pers. var. Phlei-pratensis (Erikss. & Henn.) Stakm. & Piemeisel) Stem rust is common on wild

plants throughout Alberta. A medium infection occurred in a field at Barrhead.

A light infection of stem rust was found in Lincoln county, Ontario.

Stem rust was plentiful on timothy throughout Prince Edward Island causing slight to severe damage. Last year the damage was negligible.

Smut (Ustilago striaeformis (West.) Niessl). Timothy was found heavily smutted in Lincoln county, Ontario.

WESTERN RYE GRASS (Agropyron tenerum)

Smut (Ustilago bromivora (Tul.) Fisch. v. Waldh.) Traces to light infections were found at several places in zones 8 and 9 in Alberta. The damage was estimated to be 6 per cent in a field at Vermilion.

Smut was found in 4 fields out of 5 examined in Saskatchewan, causing moderate damage. It is rather common north of North Battleford; several fields were rejected by the Seed Inspection Branch, Saskatoon, on account of smut.

Ergot (Claviceps purpurea (Fr.) Tul.) Fifty per cent of the heads were infected in a field near Drumheller, Alta. It was fairly common on road-side plants everywhere.

LAWN GRASS

Circular areas, where the grass died completely, were observed in a lawn at Charlottetown, P.E.I. An active pathogen was not isolated.

A snow mould (Cause unknown) also attacked bent grass growing in rows at Charlottetown; all plants were killed. (R. R. Hurst)

III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

RUST - Puccinia Asparagi DC.

Sask.- A slight infection in the telial stage was found in the University gardens, Saskatoon on Sept. 19.

Ont.- A specimen of asparagus slightly affected with rust was brought to the Ottawa Laboratory from Eastview on Sept. 19.

Que.- Eighty per cent of the plants were heavily affected with telia in one field at Chateauguay Basin on Sept. 19; 5 to 7 per cent of the plants had been killed back. No rust was found in 6 other fields.

P.E.I.- A trace of rust was reported in one field in Queens county.

BASAL STEM ROT - Fusarium sp.

Sask.- A trace of basal stem rot was found in the Horticultural plots at Saskatoon. One large clump was entirely killed. On August 5 the clump was beginning to turn yellow and by August 29, it was injured beyond recovery. Several other asparagus plants showed symptoms of this rot later in the season.

BEAN

RUST - Uromyces appendiculatus (Pers.) Lév.

N.B.- Rust was severe on one variety of pole beans at the Experimental Station, Fredericton. A specimen of rust was sent to the Laboratory from Edgetts Landing.

P.E.I.- A trace of rust was collected in one field in Queens county.

MOSAIC - Virus

Alta.- A light infection of bean mosaic was observed at Lacombe.

N.B.- A trace of mosaic was found in a garden at Fredericton.

N.S.- Mosaic can usually be found in many of the gardens at Kentville.

P.E.I.- In the experimental plots, Charlottetown, 0.5 per cent of Golden Wax beans were affected with mosaic.

ANTHRACNOSE - Colletotrichum Lindemunthianum (Sacc. & Magn.) Bri. & Cav.

Sask. - Anthracnose was moderately severe in one garden at Indian Head.

Ont.- A moderate infection of anthracnose was reported from Neustadt.

Que.- A trace of anthracnose was present in the different varieties grown at Macdonald College. Infections of anthracnose varied from slight to 75 per cent in farm gardens in L'Islet and Kamouraska counties; in one field over 50 per cent of the crop could not be sold. In 4 one-half acre fields in Portneuf county, 25 per cent of each field was severely infected, while the rest of the field was very slightly diseased.

N.B. - Anthracnose was widespread in the province; the damage was severe in private gardens in Fredericton.

N.S.- Light infections of anthracnose were noted at Kentville and Middleton.

P.E.I.- On all garden varieties infections of anthracnose varied from a trace to heavy; the damage was slight to severe in each of the three counties, in many fields the plants being completely destroyed.

BACTERIAL BLIGHT - Pseudomonas Phaseoli E.F.Sm.

Alta.- Susceptible varieties were found moderately to severely damaged at Brooks, Lethbridge, Olds, Lacombe and Edmonton.

Sask.- Bacterial blight was found in the Field Husbandry plots at Saskatoon on several varieties including Carleton and Norwegian. It was also observed in a city garden at Saskatoon and at Maryfield.

Man.- Bacterial blight was found at Killarney.

Que.- Slight to moderate infections of bacterial blight were present on the different varieties at Macdonald College and vicinity. It was first observed on June 23 and increased in severity as the season advanced. In some varieties 50 per cent of the pods were moderately diseased. The amount of blight seemed to be associated with the source of the seed. In L'Islet, Quebec and Kamouraska counties the disease was general this year wherever beans were grown; in one field 100 per cent of the plants were affected.

N.B.- Bacterial blight caused moderate damage to several varieties of beans in gardens at the Experimental Station, Fredericton and at the Dominion Seed Testing Laboratory, Saskville.

N.S.- This disease was very common at Kentville and elsewhere; it caused severe damage in a few small plantings.

P.E.I.- Traces only of bacterial blight were observed in Queens county.

DRY ROOT ROT - Fusarium Martii App. & Wall. var. Phaseoli Burkh.
Alta.- Dry root rot attributed to the above Fusarium caused severe damage in patches in fields at Brooks.

WILT - Sclerotinia Sclerotiorum (Lib.) de Bary
N.B.- Severe damage was caused by wilt in two gardens in Fredericton.

WILT - Botrytis cinerea Pers.
Alta.- A pathogenic strain of Botrytis cinerea was isolated, by the Dominion Laboratory, Edmonton, from diseased plants sent from Lethbridge.

BROAD BEAN

STEM ROT
Sask.- Broad bean plants affected by a stem rot were sent from Togo, Sask., to the Dominion Laboratory, Saskatoon. The bases of the stems were dark and decayed and were covered with bacterial ooze. No definite organism was isolated, but it is thought the disease was caused by bacteria.

BEET

SCAB - Actinomyces scabies (Thaxt.) Güssow
P.E.I.- One per cent of the roots were affected by scab in a garden in Queens county.

LEAF SPOT - Cercospora beticola Sacc.
N.B.- Leaf spot was widespread, but caused slight damage.

P.E.I.- Leaf spot was common and of varying intensity in all gardens in Queens county, but the damage was insignificant.

CABBAGE

CLUB ROOT - Plasmodiophora Brassicae Woron.

B.C.- In fields totaling 20 acres in area at Keating, 75 per cent of the cauliflower and 62 per cent of the cabbage were affected with club root. Similarly in some fields at Victoria, cabbage and other crucifers were practically worthless on account of this disease. The plants were infected in the seed bed, before they were transplanted. A severe infection of Chinese cabbage (Brassica peckinensis Rupr.) occurred in a Chinese garden near Vancouver. This disease is on the increase as several severe infestations have been reported on cabbage and cauliflower in Chinese truck gardens near Vancouver and New Westminister. The disease was also reported on cabbage at Armstrong.

Ont.- A cabbage root affected with club root was sent to the Ottawa Laboratory from Ferris.

P.E.I.- One per cent of the plants of Danish Ballhead were affected with club root in a garden in Queens county.

BLACK ROT - Pseudomonas campestris (Pamm.) E.F.Sm.

Ont.- Black rot caused moderate damage to cabbage and cauliflower at Newmarket and severe damage at Dundas. Cabbage heads in storage were found severely damaged by black rot at Guelph in January.

P.E.I.- Black rot destroyed 0.5 per cent of heads in a garden at Charlottetown.

BLACK LEG - Phoma Lingam (Tode) Desm.

B.C.- Black leg was reported as quite common on cabbage, but kohlrabi was free from the disease at Prince George. The damage was severe. The soil was a silty loam of pH 7.

CANTALOUPE

INTERNAL BREAKDOWN - Non-parasitic

B.C.- Internal breakdown was quite prevalent in Yale county this year.

SCAB - Cladosporium cucumerinum Ell. & Arth.
Ont.- Scab severly infected cantaloupe in a field in Lincoln county, killing the young terminal growth.

BACTERIAL WILT - Bacillus tracheiphilus E.F.Sm.
Ont.- Wilt infected 5 per cent of the Honey Rock melons in a field in Norfolk county. It was also noticed in Wentworth county.

LEAK - Mucor curtus Berk. & Curtis
B.C.- Practically all the fruit in a carload from Yale county was affected with leak when the car reached Vancouver. Apparently during transit the temperature was too high inside the car. (G. E. Woolliams).

CARROT

YELLOWS - Virus
N.B.- Ninety per cent of the carrots were affected with yellows in a two-acre field in Sunbury county; 5 per cent were similarly diseased in a garden at Fredericton.

CAULIFLOWER

CLUB ROOT - Plasmodiophora Brassicae Woron.
B.C.- (See the note on this disease under cabbage).

Ont.- Cauliflower was moderately infected with club root in a field in Lincoln county. In a garden in Toronto all plants except 3 failed to head on account of club root.

P.E.I.- One per cent of the plants were infected with club root in a garden at Charlottetown.

BACTERIAL LEAF SPOT - Pseudomonas maculicola (McCull.) Stev.
Alta.- A medium infection of bacterial leaf spot was found at the Experimental Station, Lacombe.

DOWNY MILDEW - Peronospora parasitica (Pers.) Tul.
B.C.- Fifty per cent of the plants of Dwarf Early Erfurt were affected in a outdoor seed bed in North Saanich Tp., Vancouver island.

BLACK ROT - Pseudomonas campestris (Pamm.) E.F.Sm.
Ont.- (See the note on this disease under cabbage).

CELERY

LATE BLIGHT - Septoria Apii Chester
B.C.- Late blight severely infected celery in a field in Saanich Tp., Vancouver island. The disease was checked by applications of Bordeaux. Late blight was also reported from Armstrong.

Ont.- Late blight caused by Septoria Apii var. graveolentis Dorokin was prevalent and severe on unsprayed blocks of Paris Golden in Lincoln county.

P.E.I.- Late blight caused moderate to severe damage in commercial gardens in Queens county.

EARLY BLIGHT - Cercospora Apii Fres.
Ont.- A specimen of celery affected with early blight was sent to the Ottawa laboratory from Bishops Mills. The correspondent writes "This is the third year for this trouble. Eventually the leaves become yellow or brown spotted and even the stem 'melts down'".

BLACK HEART - Cause unknown
Ont.- A slight infection of black heart was reported in Lincoln county.

P.E.I.- Black heart is an exceedingly serious disease of celery in commercial gardens. The disease was also seen at the Experimental Station, Charlottetown, this year. All early varieties are apparently susceptible (R. R. Hurst).

SOFT ROT - Bacillus carotovorus L.R. Jones
Ont.- In a field in Waterloo county, 90 per cent of the crop was destroyed.

N.B.- Soft rot caused slight damage in a garden in Fredericton.

DROP - Sclerotinia Sclerotiorum (Lib.) de Bary
N.B.- A trace of drop was found on celery in a garden in Fredericton.

CUCUMBER

SCAB - Cladosporium cucumerinum Ell. & Arth.

Ont.- Specimens of cucumber affected with scab were sent from Port Credit to the Ottawa Laboratory by J. C. Shearer, Agricultural Representative.

B.B.- Scab was widespread and in most fields the damage was severe.

N.S.- Scab was widespread in the province and serious in many small gardens. A grower in Kings county brought specimens to the Kentville laboratory. He estimated that he had lost 50 per cent of his crop.

P.E.I.- Scab caused severe damage in Queens and Kings counties and moderate in Prince; considerable loss was sustained by commercial growers. This is the first report of this disease in Prince Edward Island.

BACTERIAL WILT - Bacillus tracheiphilus E.F.Sm.

Ont.- Ten per cent of the plants were affected with wilt in a field in Wentworth county.

The disease caused severe damage at Watford, Wolverton and at the Experimental Farm, Ridgetown. At the last place the plants were grown in a greenhouse and the crop was almost a total loss. (D. H. Jones).

DAMPING OFF - Pythium de Baryanum Hesse

N.B.- Ninety per cent of the plants were destroyed by damping off in a garden in Fredericton.

EGG PLANT

LEAF SPOT - Alternaria Solani (Ell. & Martin) Jones & Grout

N.S.- A bed of about 50 egg plants was affected at Kentville with a leaf spot. The Alternaria present agree microscopically with A. Solani (K. A. Harrison).

WILT - Verticillium sp.

Ont.- Wilt was prevalent in a field of New York Purple in Lincoln county.

N.S.- Egg plant and okra sent from Pictou to the Ottawa Laboratory were found to be affected with wilt. The grower stated

that several plants were affected.

HOP

DOWNY MILDEW - Pseudoperonospora Humuli (Miyabe & Tak.) Wils.

B.C.- Downy mildew was general on hops in the Fraser River valley. Owing to high precipitation during the summer months, infection was heavy in the Cluster variety. Considerable infection occurred in the "bur" and early cone stages; infection of the mature cones was checked during the dry weather. Slight infection of the cones was present in Kent Golding at Agassiz. No cone infection was observed in Fuggles.

INFECTIOUS CHLOROSIS - Virus

B.C.- Two virus diseases of hops not previously recognised in British Columbia were found in 1932. They are infectious chlorosis and nettlehead. These diseases have been reported in England.

Infectious chlorosis was present in the Golding and Fuggles varieties. About 0.5 per cent of the plants of the former variety were found infected in one hop yard in 1932. The reduction in yield was apparently negligible. As a preventative measure the growers are gradually roguing out plants showing the disease.

On casual observation the majority of affected plants do not appear to be different from normal healthy ones. However, they are usually lighter green in colour and possibly weaker in growth. In typically diseased plants, the leaves are distorted and puckered, generally rolling downwards irregularly. They may also show large blotchy primrose yellow areas of different shapes. These areas may be circular and "ribbony" margined with a green centre or horse-shoe shaped; they may be scattered over the leaf area or aggregated to form irregular blotches extending outwards along the veins. In severely diseased plants, where puckering and distortion of the leaves are present, the blotchy primrose yellow areas are generally found at the base of the leaf and along the veins.

In Fuggles, a variety with harsh textured foliage, diseased plants bear "rusty" appearing leaves. Examination of these rusty leaves has shown that the chlorotic areas had become rusty brown and brittle. This brittle tissue breaks away easily from the green part; the leaves appear punctured and have the appearance similar to those injured by the hop flea beetle. This symptom of infectious chorosis is quite prevalent in Fuggles in the Fraser River valley.

NETTLE HEAD - Virus

One plant of the Fuggles variety showing definite symptoms of nettle head was observed in the Fraser River valley. This disease is more serious than infectious chlorosis, as the affected plants remain barren or produce a few malformed hop cones. As the name implies, plants affected with this disease resemble, in a general way, the common nettle.

CROWN GALL - Pseudomonas tumefaciens (Sm. & Towns.) Duggar

B.C.- Crown gall was observed on the roots of several hop plants in the Fraser River valley. According to one grower this disease is fairly general. The yield obtained from affected plants is apparently not reduced.

KOHLRABI

LEAF SPOT - Alternaria Brassicae (Berk.) Sacc.

Alta.- A light infection of leaf spot was present in a garden near Edmonton.

LETTUCE

DROP - Sclerotinia Sclerotiorum (Lib.) de Bary

Alta.- Drop caused severe damage to head lettuce at Lethbridge, Lacombe and Edmonton. In one field 80 to 100 per cent of the heads were a total loss. The sclerotia of Sclerotinia Sclerotiorum were not always found in rotted heads.

TIP BURN - Non-parasitic

B.C.- Tipburn is a limiting factor in the production of lettuce in the Okanagan valley. Varieties otherwise desirable, such as New York, produce a crop, which is largely unmarketable on account of this disease.

RUST - Puccinia patruelis Arth.

Man.- Many plants of cultivated lettuce were marked by conspicuous aecial spots of this rust in the Kildonan district.

ONION

NECK ROT - Botrytis Allii Munn

B.C.- Fifteen per cent of the onions shipped from Armstrong

district to Vancouver were lost due to neck rot. It affected about 20 per cent of the crop in a field of White Portugal. It was also reported from Kelowna.

N.S.- Less than one per cent of the onions were affected with neck rot in a garden at Kentville. A few diseased specimens were received from affected gardens.

BULB ROT - Fusarium sp.
B.C.- Bulb rot caused an average loss of 5 per cent of the crop at Kelowna.

SMUT - Urocystis Cepulae Frost
Man.- Onion smut occurred in small amounts in the Kildonan market gardens. It is never a serious disease in Manitoba.

SMUDGE - Colletotrichum circinans (Berk.) Vogl.
N.S.- Smudge was stated to be common on onions in storage, which had been grown at the Experimental Station, Kentville.

PEA

POWDERY MILDEW - Erysiphe Polygoni DC.
B.C.- Powdery mildew was general and severe at the Experimental Station, Saanichton.

N.B.- This disease was widespread, but the damage was slight. At the Experimental Station, Fredericton, it severely infected all plants seen.

Que.- Powdery mildew developed to a slight extent, late in the season in Gaspé, but caused no apparent damage.

P.E.I.- Peas were moderately infected with powdery mildew in Queens county. This disease was also reported from Kings and Prince counties.

DOWNY MILDEW - Peronospora Viciae (Berk.) de Bary
B.C.- Downy mildew was prevalent on peas in the Fraser River valley. From 20 to 30 per cent of the plants were infected in some fields.

Que.- Downy mildew occurred to a slight extent in Gaspé. It

developed late in the season and caused no apparent damage.

LEAF AND POD SPOT - Ascochyta Pisi Lib.

B.C.- This disease was fairly common at Saanichton but the damage was slight.

Alta.- Leaf and pod spot was very severe in some gardens at Olds, Lacombe and Edmonton.

Que.- Leaf and pod spot and Mycosphaerella blight (see below) were by far the most important diseases on Tall Telephone peas in Gaspé in 1932. Due to the similarity in the symptoms of these two diseases, it is often extremely difficult to tell them apart in the field. Accordingly no effort has been made to assess the losses due to each, but they appeared to be of equal importance. This year the average loss for the district was estimated to be 50 to 60 per cent of the crop and infection varied from 25 to 100 per cent in every field. Higher humidities and lower temperatures are thought to be responsible for the higher infection this summer.

The two fungi causing these diseases have been found to be the chief causal agents of the severe rotting of peas in storage or transit.

In experiments to control these diseases in the field, Bordeaux Mixture 4-4-40 with Resin Fish Oil added as a sticker increased the yield from 38.5 per cent in the check to 77.6 per cent in the treated plots. Six applications were made at irregular intervals depending on the time at which rain fell.

Seedling blight due to Ascochyta spp. caused some reduction in germination and stand of plants. (E. Lavallée)

This spot was general on leaves and pods in Kamouraska county, but the disease was not severe.

N.B.- Leaf and pod spot caused slight damage in the gardens at the Experimental Station, Fredericton, and the Dominion Seed Testing Laboratory, Sackville.

N.S.- Peas in the experimental garden at Kentville were moderately infected with leaf and pod spot.

P.E.I.- This disease was moderately destructive after the crop matured.

MYCOSPHAERELLA BLIGHT - Mycosphaerella pinodes (Berk. & Blox.) Stone (Ascochyta pinodes L.K. Jones)

Que.- This disease is discussed along with that caused by Ascochyta Pisi. L.K. Jones (N.Y. Agr. Exp. Stat. Bull. 547, 1927) reports the isolation of Ascochyta Pisi, A. pinodes and A. pinodella L.K. Jones, from pea seed from eastern Canada. The last named organism causes a foot rot in peas.

BACTERIAL LEAF SPOT - ?Pseudomonas Pisi Sackett

Sask.- Field peas were moderately infected with bacterial leaf spot at Indian Head. The spots were chiefly on the lower leaves and stipules. They were rounded to irregular, dark brown at the margin, lighter towards the centre and translucent.

MOSAIC - Virus

N.S.- A heavy infection of mosaic was observed in the variety plots at Kentville. In some varieties 70 per cent of the plants were affected.

RUST - Uromyces Fabae (Pers.) de Bary

Que.- Peas were slightly to severely damaged by rust at Macdonald. The damage was reported as follows: very severe on Laxtons Progress; severe on Blue Bantam; moderate on Price of Wales, Laxtoniam and Telephone; slight on Thomas Laxton and Horal; and none on Onward.

LEAF BLOTCH - Septoria Pisi West.

Alta.- A medium infection of leaf blotch was present in a garden near Edmonton.

WIND INJURY

N.B.- Several varieties of peas were severely damaged by wind in the experimental plots, Dominion Seed Laboratory, Sackville.

POTATO

As in previous years Mr. Tucker, Chief Potato Inspector, has kindly supplied a summary of the prevalence of disease in fields of potatoes inspected for certification throughout Canada. These fields were grown from certified seed. Of the fields inspected 2,520 or 28.2 per cent failed to pass inspection on account of disease, etc., a considerable increase over last year's figure of 2,176 fields or 19.3 per cent rejections. Mosaic was responsible

for this marked increase in rejections as 56.9 per cent of the fields rejected contained too high a percentage of mosaic. The greater amount of mosaic observed this year was probably due to the season being cooler and therefore more favourable for the detection of the disease than the past two seasons have been. It may be expected that the percentage of fields rejected on account of disease will again fall next year. The percentage of rejections due to other diseases were as follows: black leg, 7.4 per cent; leaf roll, 4.6 per cent; adjacent to diseased fields, 9.5.

LATE BLIGHT - Phytophthora infestans (Mont.) de Bary

B.C.- Late blight was very prevalent in the Fraser valley during the growing season, the tops being seriously damaged in many fields. Dry weather prevented much tuber infection late in the season.

Que.- Late blight was severe throughout the province, the tubers rotting badly. It was estimated that the yield would be reduced by 30 bu. per acre.

N.B.- Late blight was widespread and severe.

N.S.- Late blight infection was slight in Kings county and westward, while it was severe in the eastern part of the province especially in Colchester and Cumberland counties. In well-sprayed fields in Colchester county good control was obtained. Tuber rot was correspondingly higher in these two counties, the average being 3 per cent.

P.E.I.- Late blight was severe, causing a great reduction in yields throughout the potato growing section. Where spraying was done carefully, blight was scarcely noticeable, but where the plants were poorly or not sprayed, great quantities of tubers rotted in the field or later in storage.

In greenhouse tests using Irish Cobbler and Green Mountain set rot was induced with P. infestans.

RHIZOCTONIA - Corticium Solani (Prill. & Del.) Bourd. & Galz. (Rhizoctonia Solani Kühn)

B.C.- Rhizoctonia was very general throughout the province and a fairly high percentage of the tubers were unmarketable.

Alta.- The damage from rhizoctonia was estimated in August as follows: severe in 7.5 per cent of the fields; moderate in 24.2 per cent, slight in 61.8 per cent and none in 6.5 per cent.

N.B.- Rhizoctonia was widespread, but the damage was slight. It was estimated that 8.5 per cent of the tubers were affected in 797,000 bushels examined.

N.S.- Rhizoctonia was most severe in Kings county where 40 per cent of the tubers in one bin were infected and the average infection was 12.0 per cent. In the other countries the average infection ranged from 5.6 to 1.0 per cent.

P.E.I.- Rhizoctonia was most prevalent on Irish Cobblers, it occurred in decreasing amounts on Green Mountain, Bliss Triumph and Spaulding Rose.

COMMON SCAB - Actinomyces scabies (Thaxt.) Güssow

B.C.- Common scab was not severe on the general crop in British Columbia.

N.B.- Common scab was widespread and severe in limited areas; 2.3 per cent of the tubers were scabby in 797,000 bushels examined.

N.S.- Scab was not as prevalent as rhizoctonia. It was most prevalent in Kings county, where as high as 15 per cent of the tubers were infected in one bin and the average for 44 bins was 3 per cent. In the other counties, the average percentage of tubers infected ranged from 2.6 to 0.3 per cent.

P.E.I.- At the Experimental Station, Charlottetown, the maximum number of tubers infected in any experiment was 100 per cent in Irish Cobbler, 50 per cent in Green Mountain, 25 per cent in Bliss triumph and 5 per cent in Spaulding Rose.

BLACK LEG - Bacillus phytophthorus Appel

B.C.- Black leg was present in many fields in the Fraser valley. In some fields infection was heavy, in others slight. Six fields grown from certified seed were rejected on account of black leg.

Alta.- Forty fields out of 219 fields grown from certified

seed contained black leg. The average damage was 0.2 per cent.

N.B.- Black leg was common in Carleton, Restigouche, Victoria and York counties.

N.S.- Black leg was found in small amounts in practically all counties, but it was most prevalent in Cumberland county. Infection ranged from 0 to 3.3 per cent in the individual fields.

P.E.I.- Black leg was not an important disease in 1932. Irish Cobblers and Green Mountains showed infections 0.5 and 0.1 per cent respectively.

EARLY BLIGHT - Alternaria Solani (Ell. & Martin) Jones & Grout

B.C.- Early blight was general in potato fields, particularly those situated on the Lower Mainland. Damage was slight.

Man.- Early blight caused slight damage in a field at Benito.

N.B.- Although early blight was widespread the damage was slight.

N.S.- Early blight was general. It caused the early death of the vines of Irish Cobblers in eastern Pictou, Cumberland and the valley district of Kings counties and reduced the yield by at least 25 per cent.

P.E.I.- Early blight was most prevalent on early varieties, especially Irish Cobblers. It is estimated that it caused a loss of 10 per cent of the crop.

LEAF ROLL - Virus

B.C.- A high percentage of the plants were affected with leaf roll in some fields in the Fraser valley. Nine fields grown from certified seed were rejected on account of leaf roll.

Alta.- Leaf roll was present in 65 fields out of 219 inspected. The average damage was 0.13 per cent.

N.B.- Leaf roll was common in Carleton, Restigouche and York counties. The average infection was 0.07 per cent.

N.S.- Leaf roll affected 0 to 8 per cent of the plants in

individual fields. The average infection varied from 0.5 per cent in Cumberland to 0.06 per cent in Halifax.

P.E.I.- Leaf roll was recorded in the following varieties in the plots at Charlottetown: Irish Cobblers, 0.1 per cent; Green Mountain 0.5 per cent; Bliss Triumph, 2.0 per cent.

MOSAIC - Virus

B.C.- Mosaic was faily common in British Columbia although the percentage of plants infected was not high. Very little rugose mosaic was present. Forty-three fields from certified seed were rejected on account of mosaic.

Alta.- Mosaic was present in 32 out of 219 fields inspected. The average infection was 0.14 per cent.

Que.- Mosaic was more prevalent this year than it has been for many years past and was found in all parts of Quebec.

N.B.- Mosaic was widespread. The average infection was 1.6 per cent.

N.S.- The 3 highest average infections of mosaic were 1.6 per cent in Halifax and Hants counties and 1.5 per cent in Digby. In the other counties the percentage of mosaic was materially less. The highest individual infection was 20 per cent.

P.E.I.- In the experimental plots, Charlottetown, mosaic infections were reported as follows: Irish Cobbler, 2 per cent; Green Mountain, 2; Bliss Triumph, 5.; and Spaulding Rose, 15.

SHOE STRING MOSAIC - Virus

Que.- An occasional plant affected with shoe string mosaic was found in several counties.

WITCHES' BROOM - Virus

B.C.- Witches' broom was reported in a few fields in the lower Fraser valley and in the Interior. The percentage in any field was not high.

Alta.- Witches' broom was found in 10 fields out of 219 inspected. The two highest infections were 0.6 and 0.3 per cent respectively.

N.B.- A trace of witches' broom was found in Bliss Triumph grown from imported seed.

P.E.I.- All the plants were affected with witches' broom in a 1/80th acre plot at Charlottetown. The plants were pulled up and destroyed. The seed came from British Columbia.

SPINDLE TUBER - Virus

N.B.- Spindle tuber occurred only in Carleton and Westmoreland counties. The average percentage was 0.1 per cent.

P.E.I.- Traces of spindle tuber were found in Irish Cobblers.

STEM-END HARD ROT - Phomopsis tuberivora Güssow & Foster

B.C.- A new disease of potato named stem-end hard rot (1) was found in 1930 on several varieties including Irish Cobbler, Green Mountain, Early Ohio and Bliss Triumph. It was observed on Vancouver island and in the Fraser valley. It has not been reported from any sections of the interior. The causal organism was found to be a new species, Phomopsis tuberivora Güssow & Foster. (2)

DRY ROT - Fusarium spp.

N.B.- Dry rot was widespread; the damage was slight, 0.6 per cent of the tubers showing dry rot in 797,000 bushels inspected in September.

P.E.I.- Dry rot caused serious storage losses. At the Experimental Station, Charlottetown in March, the dry rot present was as follows: Green Mountain, 0.1 per cent; Irish Cobbler, 1.0; Bliss Triumph, 0.5; Spaulding Rose, 1.5.

FUSARIUM WILT - Fusarium oxysporum Schlecht.

Que.- Wilt appears to be spreading in Quebec, In some fields

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(1) Foster, W. R. & MacLeod, H.S. A new stem-end rot of potato. Can. Journ. Research 7:520-523, pl.1, text fig.10. 1932.

(2) Güssow, H. T. & Foster, W.R. A new species of Phomopsis Can. Journ. Research 7:253-254, pl.1-2, text fig. 5. 1932.

in Temiscouata county, 50 per cent of the plants were affected and the tubers also showed soft rot.

SILVER SCURF - Spondylocladium atrovirens Harz

N.B.- In September 0.1 per cent of the tubers were affected with silver scurf in 797,000 bushels inspected.

P.E.I.- Traces of silver scurf were detected by Nov. 1, in Irish Cobblers. Potatoes in storage inspected on March 25, showed an abundant development of silver scurf causing some injury to the "eyes".

POWDERY SCAB - Spongospora subterranea (Wallr.) Lagerh.

N.B.- Powdery scab was found only in Carleton and Restigouche counties. Of the total crop, 0.2 per cent of the tubers were affected.

N.S.- Out of 24 lots of Garnet Chili examined in October, 22 were free from powdery scab. In the other 2 lots, one and two per cent of the tubers respectively were affected.

P.E.I.- Powdery scab caused slight to severe damage in the eastern part of the province. Infection ranged from a trace to 25 per cent in Bliss Triumph and Irish Cobblers. Traces of powdery scab were observed in Green Mountains. The blisters remained unbroken although the spore-balls formed in masses under the skin.

PHOMA ROT - Phoma tuberosa Melhus, Rosenbaum & Schultz

N.B.- A trace of Phoma rot was found in York county.

P.E.I.- A survey of stored potatoes showed this disease to be active where powdery scab was present. Phoma rot renders the tuber useless for seed and is responsible for considerable losses in storage.

GIANT HILL - Virus

B.C.- Giant hill is apparently on the increase particularly in Netted Gem and Burbank. It was found in most sections of the province; 15 fields from certified seed were rejected on account of this disease.

NET NECROSIS - Cause undetermined

N.B.- A trace of net necrosis was found in seed stock of Green Mountain at the Experimental Station, Fredericton.

LEAF AND STEM NECROSIS - Cause undetermined

N.B.- A trace of a type of necrosis resembling that described by Quanjer as "acropetal necrosis" was found in one field of Irish Cobbler is York county. The necrosis was chiefly in the collenchyma of the veins of the leaves, petioles and stems.

BICHLORIDE INJURY

P.E.I.- Injury occurs annually to seed potatoes where they are improperly treated by the mercury bichloride method.

SOFT ROT OR LEAK - Pythium sp.

B.C.- A species of Pythium has been constantly isolated from a soft rot, which has been found affecting cut sets in the early spring immediately after they have been planted, but which had also been found in potato tubers during harvesting and in storage. This rot has been observed on the Lower Mainland and on Vancouver island. It is believed that this Pythium is the initial cause of decay of the seed pieces in early spring and the subsequent rot of the seed piece results in many misses.

LEAT SPOT - Botrytis sp.

N.B.- A trace of a leaf spot caused by Botrytis sp. was found on Green Mountains at the Experimental Station, Fredericton.

STEM ROT - Botrytis sp.

P.E.I.- Fifteen per cent of the plants were infected with a stem rot in a half acre field of Green Mountain in Queens county. The affected plants died. The plants were growing on poor soil and were not thrifty. The fungus was probably a weak parasite.

BLACK DOT - Colletotrichum atramentarium (Berk. & Br.) Taub.

Sask.- Black dot was found on the tops of Early Ohio in April in a garden at Saskatoon. It is estimated that 3 per cent of the hills had been attached. In the fall of 1931, the potatoes were harvested before the foliage had dried out to any extent in order to avoid frosts. No black dot was observed at that time.

P.E.I.- Black dot was found heavily infecting the dead stems of Irish Cobblers in March.

FLEA BEETLE INJURY

N.B.- Flea beetle injury on potato tubers was widespread, but the damage was slight. It was observed on Bliss Triumph, Green

Mountain and Irish Cobbler. The lenticels showed punctures of the beetles filled with starch, but at the time the trouble was first detected a definite core of suberized tissue about the puncture was not always present. In consequence at first it was difficult to determine the cause.

RHUBARB

CROWN ROT - Cause unknown

Sask.- Crown rot was reported from Lawson, Rosthern and Saskatoon. Ruby and Macdonald, especially the former, are very susceptible to the disease.

LEAF SPOT-- Ascochyta Rhei Ell. & Ev. and Phyllosticta straminella Bres.

Sask.- A trace of Ascochyta leaf spot was found at Indian Head.

P.E.I.- Leaf spots caused by both the above organisms were observed in Queens county.

LEAF SPOT - Cause unknown

Sask.- A leaf spot of unknown cause was found at Wilkie and Saskatoon. The spots were small, 1-4 mm. across, scattered all over the leaf. The centre was greyish or light-coloured with red to purple margin. On the petioles, long sunken spots were numerous. No evidence of a fungus was found by microscopic examination. These symptoms are quite distinct from those produced by crown rot.

SALSIFY

ROOT ROT - Sclerotinia Sclerotiorum (Lib.) de Bary

N.S.- Roots of salsify affected by this rot were collected at Kentville and brought to the laboratory for examination.

SPINACH

DOWNY MILDEW - Peronospora effusa (Grev.) Rabh.

B.C.- Spinach was severely infected with downy mildew in a vegetable garden at Saanichton.

Man.- Downy mildew was found on spinach near Winnipeg.

Que.- Downy mildew caused some damage to spinach in Laval county in September. It causes some loss every year, the time

when the disease is destructive varying with the weather conditions. It was less destructive this year than last.

ROOT ROT - Fusarium sp.

Ont.- Five per cent of the plants were affected with root rot in a field in Welland county. The diseased plants matured early and died; the tap root was completely destroyed. Fusarium sp. was isolated from affected plants.

SUGAR BEET

CROWN GALL - Pseudomonas tumefaciens (Sm. & Town.) Duggar

B.C.- Crown gall was reported on sugar beet from Summerland.

ROOT ROT - Cause undetermined

Alta.- Root rot caused a trace of damage in two field in zone 2.

Man.- Sugar beet seedlings were killed in some instances by a root rot near Emerson; isolations gave a Fusarium, which Dr. Gordon found to belong to the F. gibbosum group

SWEET CORN

COMMON SMUT - Ustilago Zeae (Beckm.) Unger

Alta.- A trace of smut was found on sweet corn at Brooks.

Que.- A trace to 10 per cent of the ears were destroyed by smut in 15 fields of sweet corn examined in the Montreal district. The disease is frequently reported by gardeners.

N.S.- Corn smut appears to be increasing slightly in prevalence. It was present in the experimental plots at Kentville and diseased specimens were received from scattered points in the province.

P.E.I.- Smut caused a trace of damage in a plot of Golden Bantam in Queens county.

BACTERIAL WILT OR STEWART'S DISEASE - Bacterium Stewartii (E.F.Sm.) Stev.

Ont.- Bacterial wilt or Stewart's disease of sweet corn was

recognized in Canada for the first in 1932. Severe outbreaks of the disease occurred in Essex, Kent and Norfolk counties, while scattered infections were found in Elgin, Huron, Lambton, Brant, York, Middlesex, Halton, Wentworth and Lincoln counties. In the counties, where the disease was prevalent, the damage was severe, some fields being a total loss. The disease was most severe on sweet corn, but it was also observed on field corn and once on pop corn. (G. C. Chamberlain)

Bacterial wilt was also very prevalent in Illinois, Ohio, Pennsylvania and other states in the United States, where it had been observed previously, but it was also found in several states such as Connecticut, where it had never been noticed before.

TOBACCO

The information reported below was compiled by Mr. R. A. Bothroyd, Tobacco Division, Ottawa.

(1) Seed-Bed

DAMPING-OFF - *Pythium de Baryanum* Hesse

Much damage was reported in the Farnham district, Que., and in the l'Assomption area where the seedbeds were sown too thickly. Very few cases were reported in south-western Ontario.

BLACK ROOT ROT - *Thielavia basicola* Zopf

A few isolated cases were reported from the Farnham district, Que., but in l'Assomption-Montcalm 40-50 per cent of the plant beds were affected to a greater or lesser degree. The disease was general on Burley tobacco in the Ontario district, with most damage occurring at Malden, around Chatham and east of Blenheim.

SEEDBED MOULD - *Pyronema confluens* (Pers.) Tul.

One or two cases reported in the Farnham district, Que., Formaldehyde (1:1,000) used as seedbed control.

(2) Field

BLACK ROOT ROT - *Thielavia basicola* Zopf

Numerous cases were reported in the Quebec districts, and considerable damage was caused by the disease in south-western Ontario. In this area the varieties Judy's Pride and Kelly were most adversely affected, but due to a hot spell after planting, a

remarkable recovery was noticed in other varieties.

WILDFIRE - Pseudomonas tabacum (Wolfe and Foster) Stev.

A number of plants, notably of the Belge varieties, were affected with this disease at the Central Experimental Farm, Ottawa, Ont. In the commercial districts only one case was reported from Farnham, Que. This crop was ploughed under.

ANGULAR LEAF SPOT - Pseudomonas angulata (Fromme & Murray) Stev.

No cases were reported from the Farnham district, Que., and less damage than usual resulted from this disease in the l'Assomption-Montcalm area. In the New Belt of south-western Ontario many mature crops were infected, one case at Teeterville showing 75 per cent infection. A correlation appeared to exist between the amount of precipitation and wind and the severity of infection.

MOSAIC - Virus

Heavy infections were reported from l'Assomption, Que., and south-western Ontario; less mosaic was observed in the Farnham area than usual. The mature leaves of infected plants showed severe damage, though there were signs of recovery in many cases following topping. In a number of fields in the l'Assomption district, infestations ran as high as 60 per cent. At the Central Experimental Farm, Ottawa, Ont., percentage of infection was very low.

FRENCHING - Nitrogen deficiency

In the Old Belt of Ontario, in fields, where drainage was temporarily restricted, considerable frenching occurred, notably in the Windham district.

PHYSIOLOGICAL LEAF SPOTS

A few fields in the New Belt of Ontario, particularly in the vicinity of Vittoria and Teeterville, showed considerable spotting.

WIND & HAIL

Hail damaged a strip of about 200 acres of Burley tobacco in the vicinity of Cedar Springs and Blenheim, Ont. High winds did slight damage around Albuna and Blythwood, Ont., during the second week of August.

IMMATURE SUN-YELLOWING & FIRING

This condition was quite prevalent in the Old Belt of Ontario, especially on the variety Standup Resistant when grown on light, gravelly soils and spring-ploughed fields.

(3) Curing Barn

POLE BURN

Slight damage was reported in some localities in the province of Quebec.

TOMATO

BLOSSOM-END ROT - Non-parasitic

Que.- In one field in Montmagny county, 10 per cent of the fruit were affected with this disease. It was reported to have been destructive on tomatoes under glass at Lachine during the past two years.

P.E.I.- Blossom-end rot was observed in both 1931 and 1932 in Queens county. This year it was found both in the greenhouse and the field.

MOSAIC - Virus

Ont.- Ninety per cent of the plants were affected with mosaic in a greenhouse crop of Lloyds Forcing and Grand Rapids varieties at Grimsby. Twenty-five per cent of the plants were infected and severely stunted by mosaic of the shoe-string type in a field of Earliana in Wentworth county. John Baer was similarly affected, but less severely.

P.E.I.- Infections varying from a trace to 10 per cent were observed in tomatoes in the field and greenhouse in Queens county.

STREAK - Virus

B.C.- Streak was severe in some greenhouses on Vancouver island; in some the crop was a total loss.

LEAF MOULD - Cladosporium fulvum Cke.

B.C.- Leaf mould was a very common disease in 5 greenhouses

out of 8 visited, around Victoria. Where the plants were heavily infected, the damage was considerable.

N.B.- Leaf mould was severe at the Experimental Station, Fredericton.

EARLY BLIGHT - Alternaria Solani (Ell. & Martin) Jones & Grout

B.C.- Four consignments of tomatoes from 4 different growers on Mayne island, one of the Gulf Islands, contained 20, 23, 30, and 44 per cent of the fruit respectively showing black spot, when they were inspected by the Dominion Fruit Inspector, 4 days after shipping, although all fruit was said to have been unblemished when packed. On field examination it was found that the leaves bore blight infections, varying from a trace to 100 per cent, which resulted in almost complete defoliation of the vines while practically all the fruit were spotted. An occasional stem canker was also found. The fungus was isolated repeatedly from the fruit. (J.W. Eastham)

P.E.I.- Early blight caused a trace to 10 per cent infection in a field of tomatoes in Queens county.

LEAF SPOT - Septoria Lycopersici Speg.

B.C.- Leaf spot was prevalent on Earleana and John Baer varieties in a field in Wentworth county. The damage was slight.

Que.- Leaf spot had moderately infected several varieties at Macdonald College by September 15, and caused some defoliation. The disease was not as serious as it was last year when the vines were almost defoliated by the above date.

LATE BLIGHT - Phytophthora infestans (Mont.) de Bary

P.E.I.- Several varieties were badly affected with late blight in the variety tests at Charlottetown. Some of the fruits rotted in the field and practically the entire crop was affected, the diseased tissue subsequently breaking down rapidly.

BACTERIAL SPOT - Pseudomonas vesicatoria (Doidge) Stapp

Ont.- An outbreak of bacterial leaf spot occurred on several farms near Harrow and caused considerable damage to the early fruit, 90 per cent of the fruit being infected. It caused slight damage also at Picton and St. Catharines.

WILT - Verticillium sp.

B.C.- In a greenhouse at Victoria, wilt caused nearly 100 per cent damage; Verticillium was isolated from the diseased stems that were plated.

Ont.- Verticillium wilt caused the death of plants in a garden in Middlesex county.

SPOTTED WILT - Virus

Sask.- Thirty plants affected with what appeared to be spotted wilt out of 550 plants were removed from the University plots, Saskatoon, on July 22, but several taller and more recently affected plants were left. On August 8, a few of these diseased plants showed typical fruit spotting. (T. C. Vanterpool)

This is the first report of this disease to the Plant Disease Survey. For a description of the disease see, Samuel, G. et al. Council Sci. Indust. Res. Australia, Bull. 44. 1930. Doolittle and Summer report the finding of this disease in Wisconsin in 1930. (Phytopath 21.106. 1931).

TURNIP

CLUB ROOT - Plasmodiophora Brassicae Woron.

N.B.- Club root was widespread and destructive. Infection ranged from 2 to 100 per cent in 37 gardens examined; the damage was estimated to be $15,000.00.

N.S.- Bangholm was completely destroyed by club root in the test plots at Kentville. In Colchester county, 25 per cent of the crop was destroyed by this disease; in 5 other fields the crop was free from infection.

P.E.I. - Club root was common in all parts of the province. At the Experimental Station, Charlottetown, infection varied from a trace to 100 per cent, resulting in total loss of the crop in some plots. Club root developed on turnips growing on land which had produced a disease-free crop in 1931.

BROWN HEART - Non-parasitic

Que.- Brown heart was found at Macdonald College on several

selections of Bangholm Sludsgaard and Pajbjerg varieties; 40 to 100 per cent of the plants were affected, the damage ranging from slight to severe.

N.B.- Brown heart was widespread and destructive; the loss was estimated at $25,000.00. Eighty-five to 100 per cent of the turnips were affected at the Experimental Station, Fredericton.

P.E.I.- A trace to high percentage of the turnips were affected with brown heart in every county. Contrary to previous observations, all varieties did not appear to be equally affected.

BLACK ROT - Pseudomonas campestris (Pamm.) E.F.Sm.
P.E.I.- Traces of black rot were present in Queens and Prince counties.

STORAGE ROT - Corticium Solani (Prill. & Del.) Bourd. & Galz.
(Rhizoctonia Solani Kuhn)
P.E.I.- This rot caused annually appreciable losses in storage.

WILT - Sclerotinia Sclerotiorum (Lib.) de Bary
N.S. - At the Experimental Station, Kentville, 30 per cent of roots were affected with wilt in a field on which sunflowers had been grown previously and had been affected with this disease. A few stalks of seed turnips were also wilted in a field in Cape Breton.

DRY ROT - Phoma Lingam (Tode) Desm.
P.E.I.- Dry rot infections were usually heavy in all 3 counties. It was found on Hasgards Improved. Hills Westbury and Bangholm.

DAMPING OFF - Cause undetermined.
N.B.- Fifty per cent of the plants were destroyed in one field near Sackville.

VEGETABLE MARROW

WILT - Sclerotinia ?Sclerotiorum (Lib.) de Bary
Man.- Wilt affected vegetable marrow at Birtle

TRANSPORTATION DISEASES

The following observations were made by Mr. A. Cannadine of

the Can. Pacific Railway Company at Saskatoon and communicated by Dr. P. M. Simmonds. They represent observations made on cars of vegetables received and inspected there.

CABBAGE - Decay in cabbage was chiefly due to soft rot (Bacillus carotovorus L. R. Jones) and to an unidentified leaf spot, possibly bacterial leaf spot (Pseudomonas maculicola (McCull.) Stev.).

CUCUMBER - Decay was present only when the cucumbers were over-ripe and the tissue broken down.

LETTUCE - Some loss occurred from red heart, a red discolouration starting at the stem end of the lettuce, and tip burn.

POTATO - The loss in potatoes was chiefly due to soft rot (Bacillus phytophthorus Appel) dry rot (Fusarium spp.), black heart and frost injury.

TOMATO - Considerable loss is occasioned by "bacterial spot" (?Pseudomonas vesicatoria (Doidge) Stapp), and by breakdown due to shipping immature or over-ripe fruit. From two carloads showing disease on arrival at Montreal, samples were sent to Ottawa. Anthracnose (Colletotrichum phomoides (Sacc.) Chester) was found on the fruit from the car originating in the West Indies and Phoma rot (Phoma destructiva Plowr.) in the one from Texas.

WATERMELON - Anthracnose (Colletotrichum lagenarium (Pass.) Ell. & Halst.) caused some damage.

No diseases were noted in carrots and celery.

IV. DISEASES OF FRUIT CROPS

APPLE

SCAB - *Venturia inaequalis* (Cke.) Winter
Fusicladium dendriticum (Wallr.) Fuck.

B.C.- The perfect stage of the fungus was found fruiting on dead twigs of Winter Banana on Apr. 9, at Saanichton. The ascospores were being discharged at that time.

In the Kootenay Lake district Mr. J.W. Eastham has kindly given the results of counts on unsprayed trees: McIntosh at Willow Point, of 1,300 apples on the tree, 1,151 or 87.1 per cent were scabby; McIntosh near Nelson, of 358 apples, 98.8 per cent were scabby; Cox Orange at Queens Bay, of 19 apples, 37 per cent scabby; Rome Beauty, of 271 apples, 90.8 per cent scabby. At Willow Point considerable loss occurred from "pin-head" scab on sprayed trees. It developed on the apples just before they were picked and to some extent afterwards, while they were still in the packing house. In the sprayed plots of Cox Orange at Queens Bay, 3 trees bore 453,447 and 435 apples respectively, which suggested that the set of fruit has been greatly reduced by scab.

In the Salmon Arm district, the sprays were generally not applied early enough and the rainfall was unusually heavy in the spring. In consequence, apple scab was serious, the losses aggregating at least $10,000. At Vernon in some orchards scab caused slight damage, while in others it was severe. It was also reported from Armstrong, Enderley and in the south Okanagan. In the latter district it is very rare.

Ont.- In Lincoln county apple scab appeared in epidemic form this year. In some orchards the crop was a total loss. McIntosh, Greening and Baldwin were by far the most susceptible varieties. In one orchard of McIntosh under oberrvation, the following data were collected: sprayed trees, July 15, 7.3 per cent of the foliage and 1.7 per cent of the fruit infected; Sept. 21, at harvest time, 61 per cent of the fruit infected; unsprayed trees, July 15, 86.8 per cent of the foliage and 96.8 per cent of the fruit infected; Sept. 1, 100 per cent of the foliage and fruit infected. Conditions were especially favourable for late midsummer infection. First ascospore discharge was recorded on Apr. 13; free discharge on Apr. 18. In Western Ontario scab was generally prevalent, but in the Georgian Bay and Northumberland districts the disease was not severe (G.C. Charberlain).

Que.- Apple scab was prevalent again in 1932 on McIntosh and Fameuse in Western Quebec. Last spring perithecia were very numerous in most orchards. Mature perithecia were found about May 1,

a few days later than in 1931. The first ascospore discharge, however, occurred only about May 20 and scab infections were found on June 5.

In contrast to the spring of 1931, no sepal infection occurred. Primary infection was also less common. In the majority of well-sprayed orchards, where the 5 sprays advised by the "Quebec Spray Service" had been applied, very little scab was present except in the tops of trees. But in August there appeared many new infections which were followed by heavy outbreaks of pin-head infection in September. This fall, the only scab-free orchards were those, which had been very thoroughly sprayed in the spring. In unsprayed orchards, 90 per cent of the fruit were scabby (F. Godbout).

In eastern Quebec apple scab heavily infected the fruit in unsprayed orchards, the crop being a total loss in most localities. First ascospore discharge was noted at Ste. Anne de la Pocatière on May 23 and primary scab infection was observed on the leaves on June 11. In the experimental orchard, fruit infection was as follows: Duchess, 0.06 per cent, Salome 1.0; Wealthy, 1.5; Melba, 3.8; Fameuse, 7.7; McIntosh, 11.4, and St. Lawrence, 12.5 (C. Perrault).

N.B.- Scab caused only slight damage on the Experimental Station, Fredericton. Unsprayed trees (check) of McIntosh and Fameuse were only slightly infected with scab.

N.S.- Apple scab was generally light in well sprayed orchards. Some late infection appeared on winter varieties and was severe in some orchards, 40 to 50 per cent of the fruit being affected. The late infection was probably spread by the heavy gale on Sept. 17. (J.F. Hockey)

P.E.I.- Scab was readily kept in control, where the orchards were properly sprayed. It was observed in the 3 counties on several varieties.

FIRE BLIGHT - Bacillus amylovorus (Burr.) Trev.

B.C.- A light blossom infection of fire-blight was observed at Summerland and Penticton, principally on Jonathan, King and Spitzenburg varieties.

Sask.- Twig infections of fire-blight were observed in the University orchards, Saskatoon. Bacterial exudate was abundant; the damage was nil. This appears to be the first report of this disease for Saskatchewan.

Man.- A specimen affected with fire-blight was received from Morden at the Ottawa laboratory.

Ont.- In Lincoln county, fire-blight was observed several times. It appeared to be more prevalent than usual. It also caused moderate damage in orchards at Gananoque and Galt.

Que.- Fire-blight was prevalent throughout the province in 1932, being more widespread than in 1931. It was less severe in the Rougemont, St. Hilaire, Oka and St. Joseph du Lac districts, while there was an increase in the Abbotsford, Chateauguay, Hemmingford, Franklin Centre and Montreal Island districts. It was present in Portneuf, Quebec and Levis, L'Islet and Kamouraska counties, being severe in one orchard at Village des Aulnaies, L'Islet county. The disease occurred almost entirely as twig infections. Blossom infection was observed on some Alexanders and Fameuse trees at Abbotsford, and on some Fameuse trees at Hemmingford. On the whole, little damage was caused.

BLACK ROT - Physalospora malorum Shear
(Sphaeropsis malorum Pk.)

Ont.- A scattered infection of black rot was observed in a block of Greenings in Lincoln county.

Que.- Black rot slightly infected leaves of several varieties especially Alexander at Macdonald College. A trace was found on the fruit of the same variety at Chateaugyay. Traces of black rot are found on the fruit every year especially in neglected orchards.

N.S.- A trace of black rot was found on the fruit in an orchard in Kings county.

P.E.I.- A very severe leaf spot infection of black rot was present on wild trees at Marshfield. The disease was very common this year.

CORKY CORE - Physiological

Que.- On about 12 trees of McIntosh, a few to 60 per cent of apples were affected with corky core at Macdonald College.

N.S.- About 4 per cent of fruit were affected with corky core in certain fertilizer plots at Kentville. It was found only in

McIntosh trees growing on soils which have received much lime and phosphate, but little nitrogen.

DROUGHT SPOT - Physiological

B.C.- Drought spot as well as corky core and die back increased in prevalance and spread to orchards not previously affected in the Okanagan valley. It is probably the most important disease in this region. As the fruit are usually unsaleable the losses this year were very heavy. In one orchard where a careful estimate was made, the loss was assessed at 25 per cent of the crop.

Que.- Drought spot affected 80 per cent of fruit on two trees of Fameuse and a slight amount occurred on several others at Macdonald College. The same trouble is also present at Oka (see 1931 Survey, p. 62).

RUST - Gymnosporangium spp.

Ont.- Three leaves fairly heavily marked by rust were sent from Campbellford to the Ottawa Laboratory. Pycnia only were present. A specimen of red cedar bearing telia of Gymnosporangium Juniperi-virginianae Schw., was sent from Morpeth.

Que.- A special survey of the prevalence and distribution of rust on apple was made in eastern Quebec. The only species of rust affecting apples observed in this district was Gymnosporangium clavipes Cke. & Pk. (G. germinale (Schw.) Kern). In sprayed orchards rust was scarce, but in neglected orchards or on wild trees, as high as 80 per cent of the fruit have been found affected. The disease was present through the region and although it does not cause appreciable loss to the growers, it is increasing slowly from year to year. Some varieties such as Wolf River, St. Lawrence and Wealthy appeared to be more susceptible than others. The symptoms also varied with the variety, but on all varieties observed, the part invaded by the rust mycelium took on and kept a deep green colour. Early varieties such as Montreal Peach, Yellow Transparent, etc. are rarely found affected; on other varieties rust infections may be found, but the later the variety the later it is in the season before the rust appears. At best, aecia were only imperfectly formed at anytime, which suggests that the apple is not a congenial host for this year.

On Amelanchier both G. clavipes and G. clavariaeforme (Jacq.) DC. were found in abundance. All the bushes were severely infected along the roadsides and in the fields and woods. Fifty to 100 per cent of the fruits were infected, both species of rust being common, while 10 to 25 per cent of the leaves were infected

with G. clavariaeforme. Infection on the Amelanchier was observed early in July, five weeks to two months before it could be detected on apple.

Gymnosporangium clavipes was also found on Crataegus, but much less frequently than on Amelanchier; 5 to 20 per cent of the fruits were infected.

Gymnosporangium Juniperi Lk. (G. cornutum (Pers.) Arth.) was found on Sorbus americana. All trees examined bore some infected leaves. No infection was observed on the fruit. The aecia matured from 4 to 8 weeks after the other rusts.

Juniperus communis var. depressa the alternate host of these 3 rusts, grows extensively from Levis to Rimouski (C. Perrault).

Specimens of the three rusts on their respective hosts, of apple, Amelanchier, Crataegus and Sorbus sent by Mr. Perrault confirm the above findings. In addition, Professor Campagna sent specimens of the telia of all three on J. communis var. depressa besides aecia on the above mentioned hosts. He also sent aecia of G. clavipes on Aronia melanocarpa. Near Wrightville the aecia of G. clavipes were found in abundance on the fruits of most Crataegus species. On some bushes, of evidently a different species, the new shoots were badly infected, so much so that the bushes were stunted and bore no fruit. Aecia were rather scattered on these. Leaves on some species showed a few infections, but development had ceased after the pycnia were formed and the diseased tissue was dead at the time of examination (I. L. Conners)

POWDERY MILDEW - Podosphaera leucotricha (Ell. & Ev.) Salm.

B.C.- Powdery mildew was general, but the infection was light at Saanichton. It was very prevalent in some sections of the Okanagan valley. By marking the fruit it caused considerable loss this year.

Ont.- Powdery mildew was prevalent on the new growth in an orchard in Lincoln county; the foliage was somewhat dwarfed and the new growth stunted.

N.S.- Powdery mildew was reported on seedlings at Kentville.

ANTHRACNOSE - Pezicula malicorticis (Jacks.) Nannf.
(Cryptosporiopsis malicorticis (Cordley) Nannf.

B.C.- Cox's Orange Pippin was severely infected with anthracnose at Saanichton. The disease is increasing slightly in prevalence in the Salmon Arm district.

CROWN ROT - Non-parasitic

B.C.- Crown rot was reported as follows: Summerland, still prevalent and severe in many orchards; Penticton, no great increase, but still very prevalent; Westbank, increasing in prevalence; North Okanagan, not as prevalent as in the South Okanagan, but still severe.

Ont.- Crown rot was prevalent in a block of Northern Spy in Peel country; the affected trees were dying. In an orchard of Gravenstein, Ontario, McIntosh and Duchess in Lincoln county, 60 per cent of the trees are affected with crown rot. The damage was severe; practically all the Duchess were dead and many trees had one half of three quarters of the trunk girdled.

TWIG BLIGHT - Nectria cinnabarina (Tode) Fr.

N.S.- A light infection of twig blight was found on Rome Beauty and Ben Davis in two orchards at Kentville. The disease is conspicuous, but not serious; it follows, frequently, injury to the fruit spurs at picking time.

SOOTY BLOTCH - Gloeodes pomigena (Schw.) Colby

N.S.- A trace of sooty blotch was present in sprayed orchards in Kings county, while 100 per cent of the fruit were infected on wild trees.

FLY SPECK - Leptothyrium Pomi (Mont. & Fr.)Sacc.

N.S.- In neglected orchards in Kings county, 100 per cent of the fruit were infected, while in sprayed orchards, a trace was present on fruit near the ground.

ROT - Hypholoma appendiculatum (Bull.) Fr.

B.C.- A rot caused by the above species was reported from Penticton.

PINK ROT - Tricothecium roseum Lk.

Ont.- Pink rot was found in Lincoln county in orchards where scab was severe.

P.E.I.- Pink rot heavily infected Fameuse apples that were scabby in Queens county; the damage was severe.

SILVER LEAF - Stereum purpureum (Pers.) Fr.

N.S.- Silver leaf has been very scarce the past few years,

but it is again appearing on occasional trees. It was observed in 3 orchards of 5 to 8 year old trees.

BITTER PIT - Non-parasitic

B.C.- Bitter pit was reported from the southern Okanagan valley.

N.B.- Bitter pit was found scattered throughout the province but it was most prevalent on light soils. In some orchards up to 50 per cent of the apples were affected and on individual trees all fruit was injured; the varieties were Wellington, Stark, Wolf River, Blenheim, Twenty-ounce Pippin and Balwin.

SUN SCALD - Non-parasitic

Ont.- A few of the exposed apples were affected with sun scald in a block of Greening in Lincoln county. The loss was negligible on account of the heavy crop.

BROWN ROT - Sclerotinia americana (Worm.) Nort. & Ezekiel

Ont.- A light infection of brown rot was present in a block of Pippin in Lincoln county. It appeared that the rot followed insect punctures.

JONATHAN SPOT - Non-parasitic

B.C.- Jonatham spot was reported from the south Okanagan valley.

CROWN GALL - Pseudomonas tumefaciens (Sm. & Towns.) Duggar

B.C.- Crown gall was reported to be widespread in an orchard in the south Okanagan valley.

N.S.- A single seedling was found infected with crown gall in Kings county.

PERENNIAL CANKER - Gloeosporium perennans Zeller & Childs

B.C.- Very few new infections of perennial canker developed this year in southern Okanagan valley. In old cankers further spread was controlled to a considerable degree.

FROST INJURY

N.S.- Two moderate to severe frosts were experienced in May.

The first occurred when the buds were at the pre-pink stage and the second when the blossoms were about one third open. These frosts caused a total loss of crop in some orchards; the leaves were curled and the blossoms dropped. Fruit bud formation was good on these trees during the summer.

HAIL INJURY

N.S.- A hail storm caused severe cutting and marking of the fruit on about 100 acres of orchard land in Kings county; the fruit were severely reduced in grade.

APRICOT

BLIGHT - Clasterosporium carpophilum (Lév.) Aderh.
(= Coryneum Beijerinckii Oud.)

B.C.- Fruit were sent in to the Provincial Laboratory profusely spotted with reddish sunken spots from the Lilooet district. The correspondent stated that the fruit had been unsaleable for the past 3 years. Typical spores of the fungus were found in the lesions. This is, I believe, the first authentic record from the interior of British Columbia, although the disease is known at the coast both at Vancouver and near Victoria. It is, however, of negligible importance so far. (J.W. Eastham)

DROUGHT SPOT - Non-parasitic

B.C.- A slight amount of drought spot was present in all districts of the south Okanagan valley. The Blenheim variety was most susceptible.

BLACKBERRY

ORANGE RUST - Gymnoconia Peckiana (Howe) Trotter

Ont.- This disease was frequently found in plantations in Lincoln county; 10 per cent of the young canes were attacked in a plantation of Eldorado.

Que.- Orange rust was observed in Laval, Chateauguay and Rouville counties; the damage was negligible. A specimen was also received from Ste. Agathe des Monts; the spores germinated by a germ tube.

P.E.I.- Wild blackberries infected with orange rust were found in all 3 counties.

BLUEBERRY

CROWN GALL - *Pseudomonas tumefaciens* (Sm. & Towns.) Duggar

B.C.- A specimen affected with what appeared to be crown gall was found on one plant of the Harding variety on Lulu Island. The plants were originally from New Jersey.

CHERRY

SHOT HOLE - *Higginsia hiemalis* (Higg.) Nannf.
(*Cylindrosporium hiemalis* Higgins)

Ont.- Shot hole was very prevalent and severe causing practically complete defoliation of young trees of both sweet and sour varieties in a nursery in Welland county.

N.S.- Shot hole caused severe defoliation of sweet cherry trees in the Bear River district; good control was obtained in sprayed orchards.

P.E.I.- Shot hole caused severe damage to sweet, sour and wild cherries in Queens county. The leaves were decidedly yellowed as well as showing the usual symptoms. (R.R.Hurst.)

BROWN ROT - *Sclerotinia americana* (Worm.) Nort. & Ezekiel

B.C. - In 1928 in the Kootenay Lake district, a consideralbe amount of brown rot was found on sweet cherries, as high as 20 per cent of the fruit being affected on individual trees. This was the first brown rot noticed in this important cherry area. It was recognized that the rot was different from that in the Fraser valley, where the latter is destructive every season. No further specimens were found until this year, when a little was observed although the injury was not important commercially. From a cultural study of the isolated organisms it seems certain that the Kootenay species is *Sclerotinia cinerea* Schroet. *S. cinerea* also causes a destructive blossom blight around Victoria, but this injury has not been noticed in the Kootenays. (J. W. Eastham)

N.S.- Fifteen per cent of the crop was destroyed by brown rot in the Station orchard, Kentville.

BLACK KNOT - *Dibotryon morbosum* (Schw.) Theiss & Syd.

Black knot was reported as common on wild cherries in Quebec, New Brunswick, Nova Scotia in Prince Edward Island.

WILT - *Verticillium* sp.

Ont.- Fifteen per cent of the sweet cherry trees were affected

and dying from wilt in an orchard in Lincoln county.

WINTER INJURY - Non-parasitic

Ont.- Seventy-five per cent of the trees of Schmidt sweet cherry showed winter injury in an orchard in Lincoln county. Sunken areas in the bark were found girdling the trunks and limbs with abundant gumosis. Affected parts were dying or dead, but few trees will succumb. The soil was stoney and damp with a south-west exposure. Black Tartarian showed resistance. The injury probably took place in the winters of 1929 and 1930.

DIE-BACK - Non-parasitic

B.C.- Die-back was more prevalent this year in all the cherry growing districts of the south Okanagan valley.

FRUIT SPLITTING - Non-parasitic

B.C.- The splitting of the fruit at harvest time considerably reduced the amount of marketable fruit in the southern Okanagan valley.

CURRANT

WHITE PINE BLISTER RUST - Cronartium ribicola Fischer

Ont.- White pine blister rust was severe in all plantings of black currants in Lincoln county, causing defoliation. It was also severe in one plantation in Peel county.

Que.- This rust was severe causing defoliation by Sept. 15, at Macdonald College. The rust was found on most wild currant bushes examined in early summer, and severe defoliation of cultivated currant occurred in many places in the Montreal district in the fall.

N.B.- White pine blister rust was widespread on both wild and cultivated species of currants.

N.S.- This rust moderately infected a small plantation in a farm garden in Halifax county.

P.E.I.- White pine blister rust was prevalent in the 3 counties of the province on both cultivated and wild Ribes. It caused moderate to severe defoliation of black currant late in the season.

SEPTORIA LEAF SPOT - Mycosphaerella Grossulariae (Fr.) Lindau
(Septoria Ribis Desm.)

Sask.- A few leaves were moderately infected with Septoria leaf spot in the University gardens, Saskatoon; 40 to 50 per cent of the leaves were similarly affected at the Experimental Farm, Indian Head.

P.E.I.- A very heavy infection of Septoria leaf spot was found in a garden in Queens county, Sept. 11.

ANTHRACNOSE - Depranopeziza Ribis (Kleb.) v. Höhn.
(Gloeosporidiella Ribis (Lib.) Petr.)

Alta.- A heavy infection of anthracnose was observed on red currant in a garden at Edmonton.

Sask.- Anthracnose caused 75 to 90 per cent defoliation of red and white currants by July 22 at the Experimental Farm, Indian Head. Black currants and gooseberries nearby were unaffected.

P.E.I.- Anthracnose caused a trace to moderate infections in Queens and Prince counties.

POWDERY MILDEW - Sphaerotheca mors-uvae (Schw.) Berk. & Curt.

Alta.- Medium to severe damage was caused by powdery mildew in 2 gardens in Edmonton. Light damage was also reported on Viking.

Sask.- A heavy infection of powdery mildew was observed on the upper young leaves and stems of black currant at the University gardens, Saskatoon.

GOOSEBERRY

ANTHRACNOSE - Gloeosporidiella Ribis (Lib.) Petr. f. sp.
Grossulariae (Kleb.) Nannf.

B.C.- Anthracnose was reported from Sorrento.

Sask.- The lower leaves on the bushes were moderately infected with anthracnose causing slight defoliation in the University gardens at Saskatoon.

P.E.I.- Anthracnose moderately infected the gooseberries in a garden in Queens county.

SEPTORIA LEAF SPOT - Mycosphaerella Grossulariae (Fr.) Lindau (Septoria Ribis Desm.)

Sask.- Septoria leaf spot was common, but caused slight damage at Indian Head.

Ont.- This leaf spot was prevalent in one garden in York county.

POWDERY MILDEW - Sphaerotheca mors-uvae (Schw.) Berk. & Curt.

B.C.- Powdery mildew was very destructive in all districts in the southern Okanagan valley, especially on European varieties. It was also reported to be severe at Summerland and Lytton.

Sask.- Powdery mildew was severe at Rosthern. Specimens were received from Gillespie.

CLUSTER CUP RUST - Puccinia Pringsheimiana Kleb.

N.S.- Specimens heavily infected with this rust were sent from Amherst to the Kentville laboratory.

GRAPE

BLACK ROT - Guignardia Bidwellii (Ell.) Viala & Rav.

Ont.- A scattered infection of black rot was observed on the Roger variety in a vineyard in Welland county.

DOWNY MILDEW- Plasmopara viticola (Berk. & Curt.) Berl. & de Toni

Ont.- Downy mildew was prevalent on Agawan, a very susceptible variety, in Lincoln county. The disease is quite general in unsprayed vineyards.

Que.- Downy mildew moderately infected one variety among several at the Macdonald College. It was also noticed at St. Joseph du Lac, Chateauguay and Hemmingford; the leaves were moderately attacked, but the fruit was very seldom affected.

POWDERY MILDEW - Uncinula necator (Schw.) Burr.
Ont.- A scattered infection was reported on Concord in Wentworth county and on Agawan in Lincoln.

DEAD ARM -Fusicoccum viticolum Redd.
Ont.- Scattered, light infections of dead arm were found on Concord in a number of vineyards in Lincoln county. A moderate infection was found also on Concord at Springbank, Middlesex county.

LOGANBERRY

SPUR BLIGHT - Didymella applanata (Niessl.) Sacc.
B.C.- Spur blight was patchy in and caused slight damage to loganberry plantations at Gordon Head, Royal Oak and Saanichton.

SEPTORIA LEAF SPOT - Mycosphaerella Rubi Roark
(Septoria Rubi West)
B.C.- This leaf spot is general and heavily infects loganberry plantations on Vancouver island. No plantation has been found free of the disease and usually every leaf is infected (W. R. Foster).

ANTHER AND STIGMA BLIGHT - Haplosphaeria deformans Syd.
B.C.- Three per cent of the anthers and stigmata were blighted in a patch of loganberry at Royal Oak. The fungus was identified by Dr. Dearness. As far as I know, this is the first report of this fungus on loganberry and also the first of its occurrence in North America. (W. R. Foster)

FRUIT BLIGHT - Cause undetermined
B.C.- Fruit blight caused from 5 to 70 per cent damage in plantations visited on Vancouver island.

PEACH

SCAB - Cladosporium carpophilum Thüm
Ont.- Scab was widespread in Granthan Tp., Lincoln county. In one orchard of Rochester, 50 to 75 per cent of the fruit was scabby.

Que.- Peach leaves affected with scab were sent to the Ottawa laboratory from Laval county.

LEAF CURL - Taphrina deformans (Berk.) Tul.

B.C.- Leaf curl was prevalent at the Experimental Station, Saanichton. According to the prevalence of the disease, the varieties were classified as follows: Rochester, Early Caawford and Hale's Early, very susceptible; White Alexander, Triumph and J.H. Hale, moderately susceptible and Stanwick, slightly susceptible. The disease was also widespread in the southern Okanagan valley, but it was not severe, only occasionally checking tree growth and attacking the fruit.

Ont.- Leaf curl was first found at Vineland Station on May 15. The disease was prevalent throughout Lincoln county, chiefly on trees, which had not been sprayed. Contrary to other years, fruit infection was much more common.

POWDERY MILDEW - Sphaerotheca pannosa (Wallr.) Lév. var. Persicae Woron.

B.C.- For the past two years powdery mildew has been quite serious on both foliage and fruit at Saanichton.

The disease was unusually severe this year at the Experimental Station, Summerland. The clingstone varieties were the most severely diseased, the young shoots and much of the fruit being affected. All the young nursery stock was also affected. In addition, powdery mildew was prevalent on many of the nectarines being grown at the Station. Some of the fruit and many of the terminal shoots were affected.

Ont.- Powdery mildew was prevalent on young peach nursery stock at Cedar Springs, causing stunting of growth.

BROWN ROT - Sclerotinia americana (Worm.) Nort. & Ezekiel

Ont.- At the experimental orchard at St. Catharines the check plots showed the following percentages of affected fruits: less than 5 per cent, Vidette, Valiant; 5-10 per cent, South Hanen, Crawford, J.H. Hale, St. Joyn, June Elberta; 10-20 per cent, Elberta, Rochester.

BLIGHT - Clasterosporium carpophilum (Lév.) Aderh. (=Coryneum Beijerinckii Oud.)

B.C.- Blight was common on the Experimental Station plots at Saanichton and caused moderate damage; Rochester, Early Crawford, Alexander and Hale's Early were the most severely affected, while tanwick, J.H. Hale and Triumph suffered slightly.

WILT - Verticillium sp.

Ont.- Wilt was found in seven different orchards in Lincoln

county. In one block of 2 to 3 year old trees, 25 per cent were affected; in another block of 40 trees interplanted with tomatoes 4 trees were affected on one side.

HEART ROT - Schizophyllum commune Fr.

Ont.- Heart rot caused by Schizophyllum commune, developed on a 5 year old Elberta tree following wounds in Lincoln county.

SPRAY INJURY - Non-parasitic

Ont.- Burning of foliage due to arsenical sprays caused the defoliation of 75 per cent of the leaves in a block of Rochester in Lincoln county.

PEAR

FIRE BLIGHT - Bacillus amylovorus (Burr.) Trev.

B.C.- Fire blight was severe and widespread at Westbank even where care was taken in the application of control measures; trees were lost in many blocks. At Penticton, it was not widespread early in the season, but few pear blocks were free of the disease at the end of the season. At Summerland, fire blight was widespread, but not severe, while at Olive it was found in several orchards.

Ont.-Twig blight was prevalent on 95 per cent of the trees in an orchard of Bartlett and Clapps Favourite in Lincoln county. Damage was severe as 50 per cent of the trees bore large limb cankers. Specimens affected with fire blight were received from Napanee and Willowdale.

Que.- In eastern Quebec fire blight was found only at St. Roch; 50 per cent of the trees were dying.

SCAB - Venturia pyrina Aderh.

Ont.- All the fruit was unmarketable on account of scab in an orchard of Flemish Beauty in Lincoln county; the foliage was also badly scabbed and much twig injury occurred.

Que.- Wherever scab susceptible pears were not sprayed in the Montreal district the fruit was heavily infected and the crop was unmarketable.

N.B.- Scab infections were light in sprayed orchards but some unsprayed trees were found, where the whole crop was scabby.

P.E.I.- Scab caused slight to severe damage on leaves and

fruit on Flemish Beauty in an orchard in Queens county. Some twig injury also occurred.

LEAF SPOT - Mycosphaerella sentina (Fr.) Schroet.
(Septoria piricola Desm.)

Ont.- The leaves were reported to be heavily infected with leaf spot, causing defoliation of the trees at Locust Hill. Specimens affected with leaf spot were also received from Campbellford.

P.E.I.- A moderate infection of leaf spot was reported.

DROUGHT SPOT - Non-parasitic

B.C.- Drought spot was on the increase in the southern Okanagan valley and was quite serious this year. It is usually confined to a few tress in any one orchard.

POWDERY MILDEW - Podosphaera leucotricha (Ell. & Ev.) Salm.

B.C.- Powdery mildew was fairly widespread in the southern Okanagan valley, but it was not serious this year.

PLUM

BLACK KNOT - Dibotryon morbosum (Schw.) Theiss. & Syd.

Ont.- Several trees were reported severely affected with black knot at Locust Hill.

Que.- In eastern Quebec from Montmagny to Rivière du Loup black knot severely affects all the trees in uncared-for orchards, the trees often being killed. In orchards where the trees are being heavily pruned, the disease is gradually disappearing. Wild plums in the Montreal district are also heavily infected.

PLUM POCKETS - Taphrina Pruni (Fuck.) Tul.

Alta.- Plums were lightly to moderately infected with plum pockets at Brooks.

BROWN ROT - Sclerotinia americana (Worm.) Nort. & Ezekiel

B.C.- A very heavy crop of plums on 2 Pound's Seedling trees showed much brown rot at Vancouver in August, although most of the fruit was still green. Fruit on other unidentified varieites were clean. Brown rot due to S. americana is always present on the lower mainland of British Columbia, but it was more severe then usual this year.

Que.- About 60 per cent of fruit on two trees at Chateauguay Basin were affected with brown rot. In eastern Quebec, brown rot was present in all orchards where no spraying was done; sometimes 100 per cent of the fruit being attacked. In sprayed orchards a trace to 25 per cent of the fruit rotted.

N.S.- Brown rot caused slight damage at Kentville.

SHOT HOLE - Higginsia prunophorae (Higg.) Nannf.
(Cylindrosporium prunophorae Higgins)

N.B.- Specimens heavily affected with shot hole were sent from Benoit to the Ottawa laboratory.

SCAB - Cladosporium carpophilum Thüm.

Specimens affected with scab were sent from Medicine Hat, Alta., St. Agapit, Que., and Benoit, N.B., to the Ottawa laboratory.

RUST - Tranzschelia Pruni-spinosae (Pers.) Diet.

B.C.- Plum rust was collected at Victoria; it was not destructive.

WILT - Verticillium sp.

Ont.- A trace of wilt was found in a plum orchard in Wentworth county.

GUM SPOT - Non-parasitic

B.C.- Gum spot appeared to have increased this year in the southern Okanagan valley. Victoria was especially susceptible.

RASPBERRY

SPUR BLIGHT - Didymella applanata (Niessl) Sacc.

Alta.- Spur blight caused 15 per cent damage in a plantation at Red Deer.

Ont.- Scattered infections of spur blight were observed in many plantations inspected in southern Ontario. In one planting in Wentworth county, Viking, Cuthbert and Newman were moderately infected.

Que.- Spur blight was prevalent in all the Herbert plantations throughout the province, from 40 to 60 per cent of the plants being moderately affected. In a few crowded plantings in eastern Quebec it was severe. Traces of the disease were found

in a few plantations of Newman and in one of Viking. In one plantation of Cuthbert, the plants were slightly affected and in one of Count, severely so.

SEPTORIA LEAF SPOT - Mycosphaerella Rubi Roark
(Septoria Rubi West.)

Ont.- Septoria leaf spot was common in many raspberry plantations in southern Ontario. It caused slight defoliation in one plantation of Viking in Norfolk county.

Que.- Septoria leaf spot was common on Herbert throughout Quebec, but no appreciable defoliation took place this year.

MOSAIC - Virus

B.C.- Mosaic was general in most plantations in the Fraser valley. Infections ranged up to 5 per cent. It was also reported from Salmon Arm and Sorrento.

Alta.- A light infection of mosaic was reported from Edmonton and Beaverlodge.

Ont.- Mosaic was widespread in southern Ontario. In some plantations as high as 85 per cent of the plants were affected. The disease was more prevalent in Cuthbert and Viking than in other varieties. In one plantation in Wentworth county near Hamilton, where 80 per cent of the plants were affected with mosaic, the disease seriously stunted the plants.

Que.- A slight amount of mosaic was present in the varieites grown at Macdonald College. Traces were found in almost all plantations of Newman; one showed 30 per cent and 2 contained 50 per cent of mosaic. It was also prevalent in Cuthbert, which is grown chiefly on the Isle of Orleans but one planting in Laprairie county had 50 per cent of the plants affected with mosaic. It was also observed in one plantation of Count and two of Herbert.

N.B.- Raspberries were slightly affected with mosaic in a plantation in York county. The disease is widespread on wild raspberries.

N.S.- One to two per cent of the raspberries were affected with mosaic in a plantation at Cambridge.

LEAF CURL - Virus

Ont.- Small amounts of leaf curl were found in widely scattered areas in southern Ontario, chiefly on the Cuthbert variety. In Ontario county, 2 per cent of the plants were

affected in a plantation of Viking, a variety rarely found diseased.

Que.- One per cent of plants were affected with leaf curl in a plantation of Cuthbert at Vaudreuil and a trace in another of the same variety on the Isle of Orleans.

ANTHRACNOSE - Elsinoe veneta (Burkh.) Jenkins
(Gloeosporium venetum Speg.)

Ont.- A plantation of Viking was moderately infected with anthracnose in Norfolk county.

Que.- Anthracnose was found in almost every plantation of Newman. Infection was as follows: trace in a few, moderate in most and severe in a few. Traces of anthracnose were found on Viking and Cuthbert and a slight infection on Brighton.

CANE BLIGHT - Leptosphaeria Coniothyrium (Fuck.) Sacc.
(Coniothyrium Fuckelii Sacc.)

B.C.- Cane blight was general on Vancouver island and the lower Fraser valley.

Ont.- A plantation of Cuthbert was heavily infected with cane blight in Welland county; 8 per cent of canes were killed.

BLUE STRIPE WILT - Verticillium sp.

Ont.- Blue stripe wilt was widespread and prevalent in many plantations in southern Ontario, up to 50 per cent of plants being affected and many being killed. It was found on both red and black raspberries.

YELLOW RUST - Phragmidium Rubi-idaei (DC.) Karst.

B.C.- Heavily rusted leaves were sent from a plantation of Cuthbert at Slocan City to the Summerland laboratory.

LATE YELLOW RUST - Pucciniastrum americanum (Farl.) Arth.

Ont.- Late yellow rust was general on the leaves in a plantation of Viking in Durham county. It was also found to a limited extent attacking the fruits.

Que.- This rust was found on Herbert, Cuthbert and Viking in a plantation at Cookshire. It was heaviest on Viking, the fruits of which were also rusted.

N.S.- Two to 30 per cent of the fruits were rusted in the Experimental Station plots, Kentville.

POWDERY MILDEW - Sphaerotheca Humuli (DC.) Burr.

Ont.- Powdery mildew generally infected a plantation of Latham in Lincoln county, causing some stunting of growth. This variety appears to be highly susceptible to powdery mildew, but Count and Brighton were also affected.

CROWN GALL - Pseudomonas tumefaciens (Sm. & Towns.) Duggar

Ont.-Crown gall is widespread on raspberries in southern Ontario, but it apparently causes little damage. Ten per cent of the plants were affected in a plantation of Cuthbert in Elgin county. It was also noted on Viking, Latham, Brighton and Count varieties.

N.B.- One specimen affected with crown gall was received from Sussex.

WINTER INJURY - Non-parasitic

Ont.- In a plantation in Lincoln county, 60 per cent of the Viking plants were injured. In the same plantation, Brighton showed no injury, while 30 to 80 per cent of the Cuthbert plants were affected. The addition of nitrate to the plantation in the spring of 1931 resulted in much succulent growth. It is thought that this condition and the presence of mosaic were predisposing factors.

Que.- At Macdonald College from 25 to 35 per cent of the canes suffered from winter injury in a plot of Viking and about 8 per cent were killed to the ground.

STRAWBERRY

LEAF SPOT - Mycosphaerella Fragariae (Schw.) Lindau
(Ramularia Tulasneii Sacc.)

Que.- Leaf spot was first observed at Macdonald College on June 2. Infection was slight to moderate; damage was very slight. In western Quebec the disease was observed in many patches, but the damage was slight.

N.B.- Leaf spot was common in York county, but the damage was slight.

N.S.- Leaf spot infected 75 per cent of the leaves in a field of Senator Dunlop at Masstown, an important strawberry district in recent years, the the owner estimated that the yield was reduced 25 per cent. A portion of the field sprayed with Bordeaux was much cleaner and according to the owner it had yielded more and higher quality fruit. Other fields examined in the district were

similarly affected. At Kentville, leaf spot and drought reduced the strawberry crop by 50 per cent in several plantings.

LEAF SCORCH - Diplocarpon Earliana (Ell. & Ev.) Wolf
(Marssonina Fragariae (Sacc.) Kleb.)

Ont.- Leaf scorch was exceptionally prevalent in Brant, Norfolk, Middlesex and Elgin counties and caused some reduction of crop.

ROOT ROT - Cause undetermined

B.C.- Root rot caused severe damage on a farm in the Gordon Head district. Five species of saprophytic namatodes were found and several fungi were isolated from the diseased tissue, but inoculation experiments with these fungi gave negative results. (R.J. Hastings)

Ont.- Root rot affected 30 per cent of the plants in a planting of Premier in Lincoln county.

N.B.- Root rot was widespread and the damage was severe.

TRANSPORTATION DISEASES

As stated previously these observations were made by Mr. H.A. Cannadine at Saskatoon.

ORANGE - Blue and Green Moulds (Penicillium spp.). Oranges received during the past season have shown some decay due to the common blue and green moulds; some cars have shown considerable shrinkage while others contained high quality fruit and were received at destination in first class condition. The amount of decay is apparently governed, to a large extent, by the condition, age and maturity of the fruit at the time of shipping.

Oranges received during March and April showed considerable spotting at the stem end of the fruit. Samples were sent to Dr. H. S. Fawcett of the University of California, who replied as follows:

"A considerable amount of this spotting at stem end has occurred this year and was probably accentuated by the very wet weather which we had in most of the districts of Southern California during January and part of February. In some cases spots appear to follow very small cracks or rifts in the cuticle of the rind which appear to be most common near the stem end of the fruit. In other cases they may follow slight injuries to the rind at the stem end, due to a little stub or branch standing out close to the fruit. In some cases there

was also hail injury. Into these various injuries a secondary fungus enters, such as Cladosporium, Alternaria, or Colletotrichum and the discolouration results. If the conditions are dry with a small amount of humidity, many of these spots dry and no decay from blue or green mould follows. If, however, the weather is damp and the humidity high, the number of the spots are followed by the appearance of the blue and green mould."

LEMON - The only decay noticed was that caused by the common blue and green moulds (Penicillium spp.).

GRAPEFRUIT - Blue mould (Penicillium sp.) was noted on grapefruit. A stem end rot caused apparently by a fungus was observed on grapefruit.

STRAWBERRY - Black Mould (Rhizopus). Some loss of strawberries resulted from the fruit being over-ripe on arrival or infected with black mould.

APPLE - Apples were cheifly affected with storage troubles such as scald, "soggy breakdown", "internal breakdown" and "internal browning". Badly affected fruits were sometimes rotting with blue mould (Penicillium sp.). Some water core and core rot also occurred.

PEACH and PLUM - Shrinkage in peaches and plums was chiefly due to the fruit being over-ripe, soft and leaky followed by black mould (Rhizopus). For some unknown reason peaches, plums and pears were exceptionally free of brown rot (Sclerotinia americana) this season.

No diseases were noted in pineapples, bananas, prunes, carnberries and grapes.

V. DISEASES OF FOREST AND SHADE TREES

ASH (Fraxinus)

RUST - Puccinia sparganioides Ell. & Barth.
A small tree of white ash growing near a marsh was killed by rust in Kings county, N.S.

A leaf spot (Phyllosticta viridis Ell. & Kell.) caused slight to moderate damage to the leaves of ash at Lumsdom, Sask. Piggotia Fraxini Berk. & Curt. was also present on the leaves.

BALSAM FIR (Abies balsamea)

WITCHES' BROOM - Melampsora Caryophyllacearum Schroet.
N.B.- Witches' broom was common in York county.

N.S.- Two per cent of the balsam in a pasture were affected with witches' broom in Annapolis county.

P.E.I.- The disease was noticed first at Brackley Point. A survey made later in the year indicated that it was common in Prince Edward Island wherever balsam was growing.

BASSWOOD (Tilia)

A leaf spot (Cercospora microsora Sacc.) slightly to moderately infected basswood in Queens county. P.E.I.

BEECH (Fagus)

Ehrlich (Phytopath. 23:10, 1933) reports the occurrence of a destructive disease of beech in stands of this tree in the Maritime provinces of Canada. A survey of the afflicted regions disclosed that 90 per cent of the trees over 3 inches in diam, at breast height in forest stands are infected and 50 per cent of the trees that had been diseased for several years were dead. The disease is caused by Creonectria coccinia (Pers.) Seaver. following attacks by the beech scale, Cryptococcus fagi.

CHESTNUT (Castanea)

BLIGHT - Endothia parasitic (Murr.) Anders. & Anders.
Ont.- Trees dying from blight were found in Norfolk county.

ELM (Ulmus)

BLACK SPOT - Gnomonia ulmea (Schw.) Thüm.

Black spot waw observed on elms in 9 countries about Montreal. It was estimated that 95 per cent of the trees showed the disease, and on some trees nearby, 100 per cent of the leaves on the lower branches were affected.

FIRETHORN (Pyracantha)

SCAB - Fusicladium Pyracanthae (Otth.) Fuckel

A low percentage of firethorn were infected with scab in the Fraser valley; some bushes were severely infected.

HAWTHORN (Crataegus)

FIRE BLIGHT - Bacillus amylovorus (Burr.) Trev.

B.C.- A specimen of English hawthorn affected with fire blight was sent from Whonnock to the Ottawa laboratory by Dr. Wm. Newton.

P.E.I.- Some fire blight was present on C. Oxyacantha at Charlottetown, although the bushes had been carefully pruned to remove diseased wood in 1931.

HORSECHESNUT (Aesculus)

LEAF BLIGHT - Guignardia Aesculi (Pk.) Stewart
(Phyllosticta Paviae Desm.)

Leaf blight was prevalent along the highways in Halton county, Ont. Diseased specimens were also received from Hemmingford, Que., and it was reported to have caused moderate to severe damage in all 3 counties in Prince Edward Island.

MAPLE (Acer)

A heavy infection of tar spot (Rhytisma acerinum (Pers.) Fr.) was found at Drumheller, Alta. Tar spot was also reported on silver maple (A. saccharinum) as follows: 2 or 3 localities in western Quebec; trace in York county, N.B.; trace at Highbury, N.S.; 25 per cent of the leaves affected on several trees at Charlottetown, P.E.I.

Sugar maple (A. saccharum) was slightly infected with leaf spot (Phyllosticta minima (Berk. & Curt.) Ell. & Ev.) at Macdonald College, Que. It occurred principally on the leaves of young

trees, which were shaded by older and larger ones.

Blight due to Cytospora chrysosperma (Pers.) Fr., was found affecting 7 young maples, two of which were killed in Kamouraska county, Que.

MOUNTAIN ASH (Sorbus)

A leaf spot apparently caused by bacteria was common on mountain ash at the Experimental Farm, Indian Head, Sask.

Five mountain ash trees about 25 years old were killed by fire blight in a grove at Macdonald College. Several other trees were severely affected. Mountain ash and rowan trees were slightly to severely affected by fire blight at Charlottetown, Summerside and Souris, P.E.I. Many of these ornamentals are dying or are so severely diseased that they are being removed.

One canker caused by Nectria cinnabarina (Tode) Fr., was found on mountain ash at Kentville.

OAK (Quercus)

Leaf curl (Taphrina caerulescens (Desm. & Mont.) Tul.) heavily infected all the leaves on about 200 trees at Beaverlodge, Alta.

PINE (Pinus)

WHITE PINE BLISTER RUST - Cronartium ribicola Fischer

Ont.- Scattered infections of rust were shedding aecios pores in an old stand of white pine in Lincoln county, on May 18. Twenty to 30 per cent of the young trees were found diseased in a stand, where there was considerable reproduction, near Morton. Aeciospores were still being shed on June 6. Some trees had been killed and others bore cankers on the trunk. Ribes were already showing well developed uredinia.

Que.- Blister rust was found on young trees on the Mountain road near Wrightville. The blisters were showing, but had not yet opened (I.L. Conners).

In addition to the outbreaks of blister rust reported from Chateauguay and Oka last year, it was observed on about 10 trees 6 to 8 inches in diam. growing in a pasture near Hemmingford.

N.B.- Blister rust appears to be spreading in the province although it causes slight damage.

N.S.- Open aecia of blister rust were abundant on limbs of large trees at the Experimental Station, Kentville, on May 12.

P.E.I.- Blister rust has definitely increased in prevalence in the past 3 years in Queens county. It has heavily infected trees in woods and frequently may be found on ornamental plantings; the damage is severe.

POPLAR (Populus)

CANKER - Cytospora chrysosperma (Pers.) Fr.

Que.- Ten per cent of the 4 year old Carolina poplar trees were infected with canker in a block in Kamouraska county; badly diseased trees were killed.

LEAF BLIGHT - Sclerotium bifrons Ell. & Ev.

Ont.- Leaves of P. deltoides affected with leaf blight were sent in from Orillia to the Ottawa laboratory.

POWDERY MILDEW - Uncinula Salicis (DC.) Wint.

Que.- Leaves of young poplars only were heavily infected with powdery mildew near Hemmingford.

CANKER - Hypoxylon pruinatum (Klotzsch) Cke.

Man.- This canker causes the death of many trees of P. tremuloides in poplar bluffs.

SPRUCE (Picea)

NEEDLE RUST - Peridermium sp.

Sask.- Needle rust caused by Chrysomyxa sp. was common and serious on spruce between Prince Albert and the Prince Albert National Park. Heavy infection has resulted in the death of the majority of the needles on young twigs (W.P. Fraser, R.C. Russell and W.L. Kerr).

P.E.I.- Needle rust was widespread and moderately to heavily infected the leaves of native spruce, being especially severe in Prince county. A light infection was also observed on Picea pungens at the Experimental Station, Charlottetown.

CANKER - Cytospora sp.

A canker caused by Cytospora has been found in 3 localities in the Niagara peninsula: Vineland, Beamsville and Winona, Ont.

The disease first appears in the branches and extends from there down into the trunk causing cankers. The cortical region is involved primarily and if superficial cuts are made into dead or dying branches, black stromatic masses are laid bare. The disease is most easily recognized after rains in the spring, when striking orange tendrils of spores exude abundantly. Inoculation studies have been undertaken. This is apparently the first report of this disease for Canada (D. L. Bailey)

A similar, if not the same disease, is reported by Gilcut and Boyd, (Phytopath. 23:11. 1933).

TULIP TREE (Liriodendron)

TAR SPOT - Rhytisma Liriodendri Wallr.
Que.- The leaves were moderately infected with tar spot at Macdonald College.

WILLOW (Salix)

Tar spot (Rhytisma salicinum (Pers.) Fr.) moderately infected narrow leaved willows at several places in western Quebec.

Powdery mildew (Uncinula salicis (DC.) Wint.) was reported from Summerland, B.C. It was common in Quebec. Narrow-leaved willows in a swamp near Hemmingford were moderately infected. In Queens county, P.E.I., swamp willows were slightly to heavily infected.

SCAB - Fusicladium saliciperdum (All. & Tub.) Tub.
Que.- Fifty per cent of the trees between Levis and Rimouski are affected with scab. Where the disease is well established the trees were completely killed. A moderate infection of scab was also observed at Bowker Lake, Lennoxville, Waterville and Compton.

N.B.- Scab was widespread; the damage was severe.

N.S.- At Grand Pré, 10 per cent of the twigs were diseased on Salix vitellina.

P.E.I.- Scab caused slight damage in all 3 counties in 1932, but it was very injurious in 1931.

BLACK CANKER - Physalospora Miyabeana Fukushi
N.S.- It was estimated that black canker caused 2 to 3 per cent damage on Salix vitellina at Grand Pré. This disease was not so noticeable this year.

VI. DISEASES OF ORNAMENTAL PLANTS

AZALEA

Three hundred plants were unmarketable on account of red leaf (Exobasidium Vaccinii (Fuck.) Woron.) in a greenhouse at Etobicoke, Ont. Only a few malformed blooms were formed.

BALSAM (Impatiens Balsamina)

Wilt infected 30 per cent of the plants in a planting in Lincoln county, Ont. The plants were grown on ground previously cropped with tomatoes. Verticillium sp. was isolated from diseased plants.

CALLA (Zantedeschia)

Bulbs of Calla imported from New York State were planted in pots at Kingston, Ont. Some of the bulbs grew and produced healthy plants; others rotted with bacterial soft rot (Bacillus carotovorus L.R. Jones). It appears that the bulbs were diseased when imported.

CAMELLIA

Leptosphaeria Camelliae Cke. & Massee caused small lesions on the twigs of camellia at North Saanichton. (J.E. Bosher)

CAMPANULA

Five per cent of the flower stalks were killed at the base by wilt (Sclerotinia Sclerotiorum (Lib.) de Bary) in a garden at Saanichton, B.C.

CARAGANA

Leaf spot (Septoria Caraganea (Jacz.) Died.) lightly to heavily infected the leaves on many hedges at Edmonton, Alta. It caused some leaf drop.

As early as July 18, pycnidia were extruding mature spores on a fairly heavily infected hedge at Saskatoon, Sask. Later in the season severe premature defoliation was widespread, which was quite as heavy as in 1928. From one hedge 75 per cent of the leaves had fallen by Sept. 5.

CANNATION (Dianthus)

Rust was widespread on carnation in New Brunswick, but the damage was slight. It was also observed on a few plants in Kings county, N.S.

CHINA ASTER (Callistephus)

Wilt (Fusarium conglutinans Woll. var. Callistephi Beach) was

prevalent at many places on Vancouver island; the plants died before or during blooming.

Wilt caused medium damage at Edmonton, Alta.

This disease was severe in one garden at Melville, Sask.

A light infection of wilt was found in a garden in Lincoln county, Ont. Two-thirds of the plants were affected with wilt in a garden near Ottawa. The disease was also reported from Mattawa.

Wilt infected 5 and 8 per cent of the plants respectiveey in 2 gardens at Ste. Anne de la Pocatière, Que.

Yellows (Virus) affected 4 to 5 per cent of the plants on one seed farm at Westholme, B.C.

Yellows was widespread and severe at Saskatoon, Sask. It was observed in practically every planting of asters and severely damaged many beds.

This disease was worse than usual in Manitoba. It has practically ruined aster culture.

Yellows was widespread and destructive in New Brunswick. At the Experimental Station, Fredericton, infection ranged from 85 to 100 per cent on the 14 aster varieties (600 plants) grown. Several perennials were also grown in test plots to determine their susceptibility to yellows. The results reported by Mr. D.J. MacLeod are as follows: Coreopsis, Scabiosa, Everlasting (Helichrysum), Sweet Sultan (Centaurea moschata) and Marigold (Tagetes), 100 per cent of the plants infected and common in York county; Calendula, 100 per cent, disease widespread and destructive; Chrysanthemum and Thrift (Statice) 100 per cent; Bartonia (Mentzelia aurea), 5 per cent, severe; Gaillardia, 5 per cent; Butterfly flower (Schizanthus) and Zinnia, 2 per cent. In addition, 90 per cent of the plants of Sonchus arvensis were affected in the test plot and the disease was widespread and destructive on this host and Leontodon autumnalis.

Yellows is very common on cultivated asters in Prince Edward Island and it is so destructive that it is now considered useless to attempt their culture. This disease was also observed on several other ornamentals as follows: Calendula, one per cent of the plants were affected in a garden at Charlottetown, the diseased plants being severely damaged; Dahlia, destructive on Jane Cowl, Jersey Beauty and Ambassador varieties; Larkspur (Delphinium), one plant yellowed at the Experimental Station; Marigold (Tagetes) 2 and 25 per cent of the plants affected at the Station and in a city garden respectively; Zinnia, 15 per cent of the plants affected in a city garden, Charlottetown.

CHRYSANTHEMUM

Powdery mildew (Oidium Chrysanthemi Rabh.) was common on plants at the Experimental Station, Fredericton, N.B.

CLEMATIS

Yellows (?Virus). Some ornamental Clematis plants at the

Agricultural College, Winnipeg, developed spindly yellow leaves and branches.

Septoria leaf spot (S. Clematidis Rabh.) was severe on the lower leaves of Clematis vines at the Experimental Farm, Indian Head, Sask.

DAHLIA

Crown gall (Pseudomonas tumefaciens (Sm. & Towns.) Duggar) was observed on dahlia plants sent from Scotland, Ont., to the Ottawa laboratory.

A tuber rot of bacterial origin was widespread on several varieties of dahlia in New Brunswick; the damage was severe.

GERANIUM (Pelargonium)

Grey mould (Botrytis cinerea Pers.) was destructive in a greenhouse at Charlottetown. Occasional outbreaks of this disease occur in local greenhouses (R. R. Hurst).

GLADIOLUS

Infection by hard rot (Septoria Gladioli Pass.) was general but light on Vancouver island and in the lower Fraser valley, B.C.

Hard rot caused a trace to moderate infection in Queens county, P.E.I.; the damage was slight to moderate. This is the first report of hard rot from this province.

Specimens affected with dry rot (Sclerotium Gladioli Massey) were received from Saanichton, B.C.

Scab (Bacterium marginatum McCull.) infection was slight, but affected plants died at Saanichton, B.C.

Scab was found at Vermilion, Alta.

Two specimens affected with scab were found at Fredericton, N.B.

Scab was common and destructive in 1930 in Queens county, P.E.I. The damage was slight to severe.

HOLLY (Ilex)

An unknown trouble, which causes the normal red berries to turn black, has been found at 3 different places in the Victoria district, B.C. (W.R. Foster)

HOLLYHOCK (Althaea)

Rust was general and caused severe damage at Saanichton, B.C. It was also reported from Summerland and Penticton.

Rust blighted the blossoms of hollyhock in a garden in Victoria county and severely defoliated the plants in a garden at Gananoque. It was also very general in Lincoln county.

Hollyhock rust was general in the Montreal district, Que. Damage is generally slight as the plants do not become rusted until the end of the summer. It was also reported from Macdonald College and Lennoxville, Que.

About 2 dozen plants were found heavily infected in a garden in Annapolis county, N.S.

Hollyhock rust slightly to severely damaged the plants in Queens county. Lime sulphur and sulphur used to control the rust were injurious to the plants.

HONEYSUCKLE (Lonicera)

Powdery mildes (Microsphaera Alni (Wallr.) Salm. var Lonicera (Schlecht.) Salm.) slightly infected L. tatarica on Sept. 25 in Queens county, P.E.I.

IRIS

Leaf spot (Didymellina macrospora Kleb. (Heterosporium gracile Sacc.) was reported as follows: Saanichton, B.C., general, causing severe damage; University gardens, Saskatoon, Sask., severe late in the season; Winnipeg, Man., prevalent as usual on iris; Lincoln county, Ont., moderate infection on iris; Macdonald College, Que., slight infection; first observed on June 16; Queens county, P.E.I. every garden slightly to heavily infected, some damage usually after the blooms have faded.

Rhizome rot (Bacillus carotovorus L. R. Jones), along with damage caused by an "iris root borer" caused moderate damage in the horticultural plots, Rosthern, Sask. Rhizome rot caused considerable damage at the Manitoba Agricultural College in 1932. It also caused slight damage in Lincoln county and at Brampton, Ont., and in gardens at Charlottetown, P.E.I.

Leaf spot (Phyllosticta Iridis Cke.) was reported from Saanichton, B.C.

Bulb nematode (Tylenchus dipsaci Kühn) was found in several rotted bulbs at Saanichton, B.C. (See Phytopath, 23:103-106. 1933)

Mosaic (virus) was found on iris in a garden and greenhouse at Edmonton, Alta.

Storage rot (Penicillium sp.) was noticed at Saanichton, B.C. in shipments of bulbs from Washington state. Six per cent of the bulbs were destroyed.

LADYSLIPPER (Cypripedium)

Streak (Virus). Ladyslippers in the gardens of J.C. Bennett, a specialist in the production of rare plants, were found to be affected with what appears to be an infectious virus disease. The leaves of infected plants first show pale green streaks and are somewhat stiff and harsh in texture, later reddish brown streaks appear. Only yellow flowering species were found diseased (Wm. Newton).

LARKSPUR (Delphinium)

Powdery mildew (Erysiphe Polygoni DC.) was general and caused severe damage to white varieties, resulting in defoliation of some plants, at Saanichton, B.C. Some blue varieties were definitely resistant. This disease was also reported from Penticton.

Ninety per cent of the plants were affected with powdery mildew at the Experimental Station, Fredericton, N.B.

Bacterial blight (Pseudomonas Delphinii (E.F. Sm.) Stapp) caused severe damage to 90 per cent of the plants at the Experimental Station, Fredericton, B.C. This disease was found in several gardens at Kentville, N.S. It is apperently on the increase. Bacterial blight caused severe damage at the Experimental Farm, and slight to severe damage in city gardens, Charlottetown, P.E.I.

LILAC (Syringa)

Powdery mildew (Microsphaera Alni (Wallr.) Salm.) moderately infected the lilacs at Macdonald College, Que. It was general in the Montreal district. Traces of mildew were also found in the 3 counties of Prince Edward Island.

LILY (Lilium)

Mosaic (Virus) was reported on L. auratum at Saanichton, B.C. The leaves showed brown streaks and were much twisted.

Blight (Botrytis ellipticta (Berk.) Cke.) was less prevalent than last year at Saanichton, B.C. The following species were attacked: severely, L. Chalcedonicum and L. Hansonii; slightly, L. martagon, L. Baryi, L. canadense rubrum and L. Grayi.

LOBELIA

The root knot nematode (Caconema radicicola) was found infecting lobelia, which was growing along with the common geranium (Pelargonium hortorum) the ivy-leaf geranium (P. peltatum), marguerites (Chrysanthemum frutescens) and Nepeta glechoma in window boxes at Saanichton, B.C. The characteristic knots or

galls were abundant on the roots of the lobelia, but no root knots or other symptoms were found on the other plant species in spite of their intimate association. Evidently the nematode species was not a specialized form for inoculum from the lobelia roots transferred to healthy tomato seedlings resulted in the development of the characteristic symptoms of root knot on the tomatoes. (J. E. Bosher & Wm. Newton)

LUPINE (Lupinus)

Powdery mildew (Erysiphe Polygoni DC.) was reported on lupine from Summerland, B.C.

NARCISSUS

Blight (Ramularia Vallisumbrosae Cav.) was very destructive about Cowichan Station, B.C. The leaves were killed from the tips to the ground. The disease was observed at Saanichton in a number of private gardens where the bulbs had not been dug and plants were growing in large clumps. It was very rare in commercial plantings. It was also reported from Abbotsford, B.C. This is the first report of this disease in Canada.

Leaf scorch (Stagonospora Curtisii (Berk.) Sacc. (=S. Narcissi Hollós) was very general in the Saanichton district, B.C., but it caused no significant damage. It was also found at Whonnock, B.C.

Smoulder (Botrytis narcissicola Kleb.). Infection from smoulder was general, but little damage occurred except in weedy patches or among closely planted bulbs at Saanichton, B.C.

Root decline (Tylenchus pratensis) was observed in two plantings in the Gordon Head district, B.C. The nematode is considered to be the cause of the root rot, but associated with it is a Cylindrocarpon sp., which is reported as the cause of root decline in Europe. This is the first record of Tylenchus pratensis on narcissus roots (see U.S. Plant Disease Reporter, vol. 16, No. 11, Aug. 1, 1932)

Ring disease (Tylenchus dipsaci (Kühn) Bast.) was found in 6 out of 11 plantations examined in the Saanichton district. The losses are heavy. The following varieties were attacked: Spring Glory, L. Koster, Henry Irving, Elvira, King Alfred, Emperor, Golden Spur, Glory of Sassenheim, Madame de Graaf, Victoria, Sir Watkin, Ornatus and Mrs. Langtry.

NASTURTIUM (Tropaeolum)

Blight (Pseudomonas aptata (Br. & Jamies.) Stapp) moderately

infected nasturtium at Lethbridge, Alta., causing browning and death of the plants.

PANSY (Viola)

Rust (Puccinia Violae (Schum.) DC.) was recorded on pansy from Victoria, B.C.

PEONY (Paeonia)

Blight (Botrytis Paeoniae Oud.) was recorded on peony at Saanichton, B.C. as follows: severely infected, Jeanne Gaudechau, Marie Jacquin and Galatea; moderately, Splendida; slightly, Adolphe Rousseau, L'Etincelante, Sarah Bernhardt, Lamartine and Venus. It was probable that the heavy dressing of leaf mould on the beds and wet weather favoured the disease. (R. J. Hastings)

Blight occurred in almost epidemic form on peonies at Winnipeg, Man., causing much rotting of the lower stems.

Although blight was severe in 1931, only a small amount was present this year at Macdonald College, Que. Rotation and burning of the dead tops last year was apparently beneficial. Diseased specimens were also received at the Ottawa laboratory from Chateauguay, Que.

The disease was widespread, but the damage was slight in New Brunswick, while it caused moderate damage in all 3 counties in Prince Edward Island.

Ring spot (?Virus). A very few plants were seen in 1931 with the striking leaf markings of ring spot at Man. Agricultural College. In 1932 the disease appeared on many adjacent plants.

PETUNIA

Stem rot (Sclerotinia Sclerotiorum (Lib.) de Bary) was destructive in several flower beds in Jacques Cartier county; wherever the disease was observed the damage was severe.

Late blight (Phytophthora infestans (Mont.) de Bary) was present in a number of gardens in Charlottetown. In one, 22 per cent of the plants were infected and moderately damaged. This is the first time it has been observed on petunia in Prince Edward Island (R. R. Hurst).

PHLOX

Leaf spot (Cercospora omphakodes Ell. & Holw.) was destructive to P. divaricata in a garden in Ottawa. Dr. Charles Chupp kindly verified the determination of the causal organism (I. L. Conners).

Powdery mildew (Erysiphe Cichoracearum DC.) was very prevalent in several gardens in Lincoln county, Ont., stunting and weakening the plants. It was also destructive in one garden in Ottawa.

Traces of powdery mildew were reported in a garden in Queens county, P.E.I.

RHODODENDRON

Leaf spot (Pestallozia Rhodendri (D. Sacc.) Guba) caused a trace of damage on rhodendron at Sardis, B.C;

ROSE (Rosa)

Black spot (Diplocarpon Rosae Wolf. (Marssonina Rosae (Lib.) Died.). Infection was general on Vancouver island and in the lower Fraser valley. The fungus was already fruiting on leaves collected April 28 at Saanichton.

Black spot heavily infected certain yellow flowered varieties in the University garden, Saskatoon, Sask. It was especially heavy on Persian Yellow and Austrian Yellow.

This disease was prevalent, causing partial defoliation on Daily Mail, Frau Karl Druschki, Pernet, Talisman and Shot Silk in a garden in Lincoln county, Ont.

Black spot is often observed on roses in the Montreal district, Que.

Black spot was widespread in New Brunswick; the damage was slight.

This spot moderately infected Frau Karl Drushki and Persian Yellow and slightly infected Lady Astor, Alfred Colomb and A. E. Williams at the Experimental Station, Charlottetown, P.E.I.

Powdery mildew (Sphaerotheca pannosa (Wallr.) Lév.) was general on Talisman, Pernet and Mrs. Van Rossem, in a garden in Lincoln county, Ont.

It caused slight damage at Macdonald College, Que., and in New Brunswick.

Powdery mildew caused severe damage, chiefly on climbing roses, in the 3 counties of Prince Edward Island. Dusting the plants was useless in controlling the disease.

Rust (Phragmidium spp.) was reported on Pauls Scarlet Climber at Saanichton, B.C. It was also reported from Kelowna.

Rose rust was widespread in New Brunswick, but the damage was slight.

The aecial stage of Phragmidium americanum caused up to 5 per

cent damage in a garden at Kentville.

Rust infections varied widely on cultivated roses at Charlottetown, P.E.I. It was heavy on Duke of Edinburgh, Star of Waltham, Margaret Dickson, and Louise Crette. Moderate on Lady Astor, General Jacqueminot, Frau Karl Druschki and A. E. Williams; and light on Edith Cavell, Crimson Rambler and Captain Hayward. It caused some damage where the leaves were heavily infected. Rust was also abundant on wild roses.

ROSE OF SHARON (Hibiscus)

A leaf spot severely affected the bushes in a garden in St. Catharines. The leaves were spotted and turned yellow. Alternaria sp. was isolated from the diseased spots.

SNAPDRAGON (Antirrhinum)

Rust (Puccinia Antirrhini Diet. & Holw.) infection was general at Saanichton, B.C. in Sept. 1932.

Snapdragons were moderately rusted at Saskatoon, Sask., late in the season. Rusted specimens were also received from Regina,

Rust was severe on snapdragons at Souris, Manitoba.

Rust was prevalent on snapdragons in August in Lincoln county. Rusted plants were also sent to the Ottawa laboratory from East Windsor.

Rust was present in a greenhouse at Macdonald College, Que. It spread to gardens in the vicinity by the sale of diseased young plants. The period of profitable bloom was reduced about 35 per cent.

Verticillium wilt (Verticillium sp.) appeared on young plants in a greenhouse in Lincoln county, Ont. on Jan. 11, shortly after they had been transplanted.

A root rot (Fusarium sp.) caused some damage in Winnipeg, Man.

One large bed of snapdragons in a greenhouse on the Island of Montreal was a total loss on account of root knot (Caconema radicicola (Greef) Cobb).

SNOWBERRY (Symphoricarpos)

Traces of powdery mildew (Microsphaera diffusa Cke. & Pk.) was observed in Queens county, P.E.I.

STOCK (Matthiola)

Stocks affected with root rot (Rhizoctonia sp.) was sent to the University, Saskatoon from a garden at Canora, Sask. The stocks had been grown in the same location for several years.

SWEET PEA (Lathyrus)

Powdery mildew (Microsphaera diffusa Cke. & Pk.) was found in a garden at the Experimental Farm, Fredericton, N.B.

Sweet pea was slightly affected with powdery mildew in a garden in Queens county, P.E.I.

Leaf spot (Ascochyta Lathyri Trail) caused slight damage at Saanichton, B.C.

White mould (Erostotheca multiformis Martin & Charles (Cladosporium album Dows.) severely infected sweet peas here and there at North Cowichan, B.C. and caused considerable damage. White mould was heavy, but the damage was slight at Westholme.

A heavy infection of streak (Bacillus Lathyri Manns. & Taub.) was present in a garden in Edmonton, Alta. It was also observed in several other gardens.

Black root rot (Thielavia basicola Zopf caused moderate to severe damage to sweet peas in a city garden, Saskatoon, Sask. The root system was extensive, but blackened. The dark brown chlamydospores were present in abundance. The trouble developed some time after an excessively heavy application of superphosphate.

A stem and root rot due to Rhizoctonia sp. caused moderate damage to sweet peas in the University garden, Saskatoon, Sask. A trace of Thielavia basicola was also present.

A root rot due to Fusarium sp. caused moderate damage in many gardens in Saskatoon, Sask. The flowers dropped off before being fully formed and the diseased plants were slightly shorter than healthy ones. Climatic conditions appeared to be unfavourable for sweet peas in 1932 and the weakened plants were attacked by Fusarium or Rhizoctonia.

Wilt caused by Fusarium Solani (Mart) App. & Wol. var. Martii (App. & Wol.) Wol. and possibly other species of Fusarium caused severe damage to sweet peas at Morden and Winnipeg, Man. and Keewatin, Ont. (W.L. Gordon)

Bud drop (cause undetermined) was common at Fredericton, N.B.; the damage was moderate.

TULIP (Tulipa)

Blight (Botrytis Tulipae (Lib.) Lind) was very general at Saanichton, B.C. and caused severe damage. The sclerotia on dead flower stalks germinated and produced spores by Feb. 10. Soil infected shoots were noticed on March 1. (R.J. Hastings)

Blight caused severe damage to late varieties in a garden in Lincoln county, Ont.

Blight caused slight to severe damage in gardens and at the Experimental Farm, Charlottetown, P.E.I. From a few to 50 per cent of the plants were affected.

Storage rots mainly due to Penicillium spp. caused heavy losses again this year at Saanichton, B.C.

ZINNIA

Wilt (cause undetermined) caused the death of about 35 per cent of the plants in a breeding block at the Experimental Station Summerland.

Stem rot (Sclerotinia Sclerotiorum (Lib.) de Bary) was reported on zinnia in Manitoba.

In one large bed of zinnias all the plants were killed by stem rot at Macdonald College, Que.

VII. DISEASES OF MISCELLANEOUS PLANTS

Most of the records reported in this section were contributed by Messrs. R. C. Russell and René Pomerleau, who are located at Saskatoon, Saskatchewan and Berthier, Quebec, respectively. It was impossible to add many reports from specimens collected at Ottawa during the past season, as most of this material is awaiting determination. It would have been preferable to have placed certain items in the preceeding sections, but it was noticed that they were out of place after the manuscript of those sections were complete. When the year is not mentioned it is to be understood that the collection was made in 1932.

Abies balsamea (L.) Mill
Melampsorella Caryophyllacearum Schroet. July 1, Lanoraie, Que.
Peridermium balsameum Pk. July 17, Quebec.

Acer pennsylvanicum L.
Rhytisma punctatum (Pers.) Fr. Lavaltrie, Que.

Acer saccharinum L.
Uncinula circinata Cke. & Pk. Sept. 28, 1930, Que.
Rhytisma acerinum Sept. 19, 1930, Berthier, Que.
Phyllisticta acericola Cke. & Ell. July 21, Berthier, Que.

Acer saccharum Marsh
Rhytisma acerinum Sept. 2, 1930, Berthier, Que.

Acer spicatum Lam.
Rhytisma punctatum (Pers.) Fr. Sept. 16, 1930, St. Gabriel, Que.

Actaea rubra (Ait.) Willd.
Puccinia Clematidis (DC.) Lagerh, June 18, Berthier, Que.

Aesculus Hippocastanum L.
Phyllosticta Paviae Desm. Sept. 2, 1930, Berthier, Que.

Agropyron repens (L.) Beauv.
Claviceps purpurea (Fr.) Tul. Four per cent of the heads infected Aug. 15, on one farm in Temiscouata county, Que. Very slight infection, Sept. 14, Experimental Station, Charlottetown, P.E.I.
Erysiphe graminis DC. Moderate infection July 18, Macdonald College, Que.
Lagena radicicola Vant. & Ledingham, Fairly heavy infection May 28, Vineland station, Ont. (G. A. Ledingham)
Polymyxa graminis Ledingham. Heavy infection May 29, Lincoln county, Ont. First report of this fungus on grasses other than

wheat, rye or barley (G. A. Ledingham). This obligate parasite was discovered at Toronto in 1930 in the roots of Marquis wheat seedlings grown in Ontario soil (Ledingham, Phytopath. 23:20. 1933).

Puccinia Clematidis (DC.) Lagerh. July 18 Macdonald College, Que.

Ustilago hypodytes (Schl.) Fr. This smut fairly heavily infected the grass in a vacant lot at Thamesvalle, Ont. The host was not identified with certainty.

Agropyron Smithii Rydb.

Claviceps purpurea (Fr.) Tul. Trace August 2, Kerdersley, Sask.

Agrostis canina L.

Claviceps purpurea (Fr.) Tul. July 15, St. Ferdinand, Que.

Agrimonia gryposepala Wallr.

Pucciniastrum Agrimoniae (Schw.) Tranz. Oct. 9, 1931. Lanoraie, Que.

Alnus incana (L.) Moench.

Taphrina Robinsoniana Gies. July, Berthier, Que. Although I have not critically examined the specimens of Taphrina, which Mr. Pomerleau kindly sent me in support of this determination, I am certain that the Farmers Rapids, Que., collection (1094) reported last year in the Can. Plant Disease Survey p. 117 as T. Alni-incanae fits exactly Giesenhagen's description of T. Robinsoniana. It is possible that T. Alni-incanae also occurs in North America, but as far as I am aware no one has critically examined a large number of collections and shown that the two species intergrade into each other, the only justification of uniting them as done by Seymour (Host Index p. 231). In the Farmers Rapids collection it was clearly demonstrated that the asci possess stalk cells and the mycelium forms a compact subcuticular hymenium. (I. L. Conners)

Alnus sitchensis Sarg.

Phyllactinia corylea (Pers.) Karst. Oct. 9, Summerland, B.C.

Ameranthus retroflexus L.

Cystopus Bliti (Biv.-Bern.) Lév. Sept. 2, Indian Head, Sask., common; Aug. 6, Berthier, Que.

Amelanchier sp.

Aprosporina Collinsii (Schw.) v. Höhn. June 12, Otterburne, Man.

Andromeda polifolia L.
Rhytisma Andromedae June 12, Prince Albert, Sask., May 22, Lanoraie, Que.

Apocynum cannabinum L.
Puccinia Seymouriana Arth. July 4, Ile Dupas, Que.

Aralia nudicaulis L.
Nyssopsora clavellosa (Berk.) Arth. July 21, Emma and Waskesiu Lakes. (J. P. Fraser and R.C. Russell)

Arctostaphylos rubra (Rehder & Wilson) Fernald
Thekaspsora sparsa (Wint.) P. Magn. June 19, Point Churchill, Man. (Wm. C. Gussow).

Arctostaphylos Uva-ursi (L.) Spreng.
Chrysomyxa Arctostaphyli Diet. June 4, Duck Lake, Sask. Heavy infection, but of rare occurrence. Apparently first record in Saskatchewan. (W.P. Fraser)

Arisaema triphyllum (L.) Schott.
Uromyces Caladii (Schw.) Farl. Aug. 15, Lavaltrie, Que.

Aster cordifolius L.
Puccinia extensicola Plowr. July 4, St. Ignace, Que.

Aster novi-belgii L.
Coleosporium Solidaginis (Schw.) Thüm. July 30, 1931, Berthier, Que.

Aster umbellatus Mill.
Erysiphe Cichoracearum DC. Aug. 2, 1931, St. Cuthbert, Que.

Astragalus ?striatus Nutt.
Physalospora aurantia Ell. & Ev. Aug. 10, Dubuc, Sask. Several plants infected in a small area.

Berberis vulgaris L. var. purpurea
Pucoinia graminis Pers. July 1, Berthier, Que. A heavy infection was found this year on cultivated common barberries in the nursery. Every leaf was so heavily covered with aecia that the shrubs were considerably disfigured. The seed came from France.

Bidens frondosa L.
Sphaerotheca Humuli (DC.) Burr. var. fuliginea (Schlecht.) Salm. Sept. 3, 1931, Ste. Elizabeth, Que.

Calamagrostic canadensis (Michx.) Beauv.
Phyllachora graminis (Pers.) Fockl. Aug. 20, Ste.Elizabeth, Que.

Caltha palustris L.
Puccinia calthaecola Schroet. July 24, Waskesiu Lake, Sask.

Capsella Bursa-pastoris (L.) Medic
Cystopus candidus (Pers.) de Bary, Sept. 18, Queens county, P.E.I.

Carex aquatilis Wahl
Cintractia Caricis (Pers.) Magn. July 24, Prince Albert National Park. Eighty to 90 per cent of the heads were more or less smutty.

Chenopodium album L.
Puccinia subnitens Diet. July 1, Quill Lake, Sask. (T. Arnason). First collection on this host in Saskatchewan.

Chelone glabra L.
Septoria Wilsonii Clinton, Sept. 8, 1931, Lanoraie, Que.

Chrysanthemum Leucanthemum L.
Yellows (Virus). One hundred per cent of the plants of this weed and Erigeron canadensis L. were diseased in test plots at Fredericton, N.B. The disease was widespread and destructive on them. Also 10 per cent of the plants of Cirsium arvense (L.) Scop. were affected at the Experimental Farm, Fredericton. (See China Aster Yellows)

Cicuta occidentalis Greene
Puccinia Cicutae Lasch. Sept. 12, Saskatoon, Sask. (W. P. Fraser). Probably the first collection in Saskatchewan.

Clematidis virginiana L.
Puccinia Clematidis (DC.) Lag. July 15, St. Ferdinand, Que.

Comandra pallida A. DC.
Cronartium Comandrae Pk. July 24, Turtle Lake, Sask. (W.P. Fraser).
Puccinia Comandrae Pk. July 24, Turtle Lake, Sask. (W. P. Fraser). (First record of this species in Saskatchewan.)

Conringia orientalis (L.) Dumort.
Plasmodiophora Brassicae Woron. Sept. 30, Queens county.

P.E.I. Very severe. (R. R. Hurst)

Cornus stolonifera Michx.
Phyllactinia corylea (Pers.) Karst. Oct. 9, Summerland, B.C.

Corylus americana Walt.
Gnomoniella Coryli (Batsch.) Sacc. July 15, 1931, Lake Beauport, Que.
Phyllactinia corylea (Pers.) Karst. Sept. 15, 1931, L'Assomption, Que.

Dulichium arundinaceum (L.) Britt.
Puccinia Dulichii Syd. (=*P. extensicola* Plowr.) Sept. 24, Berthier, Que.

Elymus innovatus Beal
Claviceps purpurea (Fr.) Tul. July 25, Prince Albert National Park, Sask.

Eupatorium purpureum L.
Erysiphe Cichoracearum DC. Sept. 8, 1931, Lanorie, Que.

Fragaria virginiana L.
Marssonina Potentillae (Desm.) Magn. July 4, Berthier, Que.

Fraxinus americana L.
Puccinia sparganoides Ell. & Barth. June 24, 1931, Berthier, Que.

Gaura coccinea Pursh
Uromyces plumbarius Pk. June 16, Saskatoon, Sask.; June 9, Wawenesa, Man. (1900).

Helianthus annuus L.
Puccinia Helianthi Schw. Sept. 27, Berthier, Que.

Hieracium canadense Michx.
Puccinia Hieracii (Schum.) H. Mart. Aug. 25, Berthier, Que.

Hordeum jubatum L.
Puccinia graminis Pers. July 28, Indian Head, Sask.
Ustilato Lorentziana Thüm. June 29, Saskatoon, Sask.

Houstonia longifolia Gaertn.
Uromyces houstoniatus J.L. Sheldon, June 11, Macdowall, Sask.

Ilex verticillata (L.) Gray
Rhytisma Ilicis-canadensis Schw. July 23, 1931, Berthier, Que.

Iris versicolor L.
Heterosporium gracile (Wallr.) Sacc. Sept. 15, 1931, Joliette, Que.

Iris sp. (cult.)
Heterosporium gracile (Wallr.) Sacc. Aug. 15, Lavaltrie, Que.

Juglans cinerea L.
Marssonina Juglandis (Lib.) Magn. Sept. 2, 1930, Berthier, Que.

Juniperus communis L. var. depressa Pursh.
Gymnosporangium clavariaeforme (Jacq.) DC. Annapolis county, N.S. Trace

Kalmia angustifolia L.
Mycosphaerella colorata (Pk.) Earle, Apr. 21, 1931, Berthier, Que., July 5, Franklin, Que.

Lawn Grass
Erysiphe graminis DC. Sept. 23, 1930, Berthier, Que.

Ledum groenlandicum Oeder
Chrysomyxa ledicola Lagerh. June 27, Berthier, Que.
Gloeosporium Ledi Schroet. July 1, Berthier, Que.

Lepidium densiflorum Schrad.
Cystopus candidus (Pers.) Lév. June 21, Saskatoon, Sask.

Lonicera (cult.)
Microsphaera Alni (DC.) Salm. Sept. 4, 1930, Berthier, Que.

Lycopus uniflorus Michx.
Puccinia angustata Pk. July 1, Berthier, Que.

Malva rotundifolia L.
Septoria malvicola Ell. & Mart. Aug. 7, Lanoraie, Que.

Malva sp. (cult.)
Puccinia malvacearum Berk. Aug. 28, Berthier, Que.

Mentha canadensis L.
Puccinia angustata Pk. Sept. 1931, Berthier, Que.

Mitella nuda L.
Puccinia Heucherae July 24, Waskesiu Lake, Sask.

Myrica Gale L.
Cronartium Comptoniae Arth. Sept. 6, 1931, Berthier, Que.

Nemopanthus mucronata (L.) Trel.
Microsphaera Alni (DC.) Salm. Sept. 29, 1930, Berthier, Que.
Rhytisma Ilicis-canadensis, Sept. 8, 1931, Lanoraie, Que.

Oenothera pumila L.
Septoria Oenotherae Westd. June 21, Berthier, Que.

Oenothera Victorinii Gates
Erysiphe Polygoni DC. Oct. 8, 1930, St. Clet, Que.

Onoclea sensibilis L.
Uredinopsis americana Syd. Aug. 15, 1931, Berthier, Que.

Orysopsis asperifolia Michx.
Phyllachora graminis (Pers.) Fckl. Oct. 5, Berthier, Que.

Osmorrhiza longistylis (Torr.) DC.
Puccinia Pimpinellae Aug. 8, Pike Lake, Sask. (W.P. Fraser). First report of this rust from Saskatchewan.

Osmunda cinnamomea L.
Uredinopsis Osmundae Magn. Aug. 9, Lanoraie, Que.

Osmunda regalis L.
Uredinopsis Osmundae Magn. Sept. 2, 1931, St. Cuthbert, Que.

Petasites palmata (Ait.) Gray
Puccinia conglomerata (Strauss) Schmidt. & Kunze. July 24, Waskesiu Lake, Sask.

Phalaris arundinacea L.
Claviceps purpurea (Fr.) Tul. July 23, Berthier, Que.

Picea mariana (Mill.) BSP.
Chrysomyxa ledicola Lagerh. Aug. 8, Berthier, Que.

Pinus Banksiana Lamb.
Coleosporium solidaginis (Schw.) Thum. June 4, Duck Lake, Sask. (W.P. Fraser) Infection heavy, common.

Pinus resinosa Ait.
Coleosporum Solidaginis (Schw.) Thüm. June 23, Berthier, Que.

Pinus Strobus L.
Cronartium ribicola Dietrich, May 1, 1931, Berthier, Que. For the distribution and importance of white pine blister rust in Quebec see the Can. Plant Disease Survey for 1931 p. 104.

Pinus sylvestris L.
Peridermium sp. (Woodgate rust) May 15, Berthier, Que. Many trees were found bearing aecia during the spring of 1932.

Plantago major L.
Erysiphe Cichoracearum DC. Sept. 2, 1931, Berthier, Que. Oct. 31, Charlottetown, P.E.I. Heavy.
Yellows (Virus) 2 per cent of the plants in the test plots at Fredericton, N.B. The disease is widespread on this weed.

Polygonum aviculare L.
Erysiphe Polygoni DC. Aug. 1, Queens county, P.E.I. Heavy.
Uromyces Polygoni (Pers.) Fuck. Aug. 20, Prince county, P.E.I. Heavy.

Polygonum ?Hydropiper L.
Sphacelotheca Hydropiperis (Schum.) de Bary Sept. 9, Berthier, Que.

Polygonum Persicaria L.
Puccinia Polygoni-amphibii Pers. Sept. 6, 1931, Berthier, Que.

Polygonum virginianum L.
Ustilago anomala J. Kunze. Sept. 8, Berthier, Que.

Populus balsamifera L.
Fusicladium radiosum (Lib.) Lindr. July 9, 1931, Berthier, Que.

Populus deltoides Marsh.
Fusicladium radiosum (Lib.) Lindr. July 9, 1931, Berthier, Que.
Melampsora medusae Thüm. Aug. 25, 1930, Berthier, Que.

Populus nigra L. var. italica Du Roi
Sclerotium bifrons Ell. & Ev. June 24, Lavaltrie, Que.

Populus tremuloides Michx.
Fusicladium radiosum (Lib.) Lindr. June 22, Berthier, Que.

Hypoxylon pruinatum (Klotzsh) Cke. Aug. 5, Blucher, Sask. Ten per cent of the trees in one bluff in the "bleeding" stage.

Portulaca oleracea L.
Cystopus Portulacae (DC.) Lév. July 15, Saskatoon, Sask. Heavy and common on this weed, wherever it is abundant, Queens county, Aug. 5, Heavy.

Prenanthes alba L.
Sphaerotheca Humuli (DC.) Burr. var. fuliginea (Schl.) Salm. Aug. 18, 1931. St. Joseph de Sorel, Que.

Prunus pennsylvanica L.f.
Cylindrosporium hiemale Higg. Aug. 21, Berthier, Que.

Prunus virginiana L.
Cylindrosporium lutescens Higg. Sept. 2, 1930, Berthier, Que.

Psedera quinquefolia (L.) Greene
Uncinula necator (Schw.) Burr. Sept. 28, 1931, St. Ferdinand, Que.

Psoralea Argophyllae Pursh.
Uromyces Argophyllae Seym. I. June 29, Saskatoon, Sask.

Pteridium latiusculum (Desv.) Maxon
Cryptomyces Pteridis (Reb.) Rehm. Aug. 15, 1931, Berthier, Que.

Quercus rubra L.
Septoria querceti Thüm. Sept. 2, 1930, Berthier, Que.

Ranunculus acris L.
Erysiphe Polygoni Aug. 16, St. Eleanors, P.E.I.

Raphanus Raphanistrum L.
Erysiphe Polygoni DC. Sept. 15, greenhouse, Charlottetown, P.E.I.

Rhamnus alnifolia L'Her
Puccinia coronata Corda, June 22, Berthier, Que.

Rhamnus cathartica L.
Puccinia coronata Corda, June 22, Berthier, Que.

Rhododendron canadense (L.) BSP.
Thekapsora minima (Arth.) Syd. Aug. 9, Lanoraie, Que.

Rhus Toxicodendron L.
Pileolaria Toxicodendri (Br. & Rav.) Arth. Sept. 20, Lanoraie, Que.

Ribes Cynosbati L.
Cronartium ribicola Dietrich, Sept. 17, 1931, Berthier, Que.

Ribes glandulosum Weber (R. prostratum L'Her.)
Cronartium ribicola June 1, 1932, Berthier, Que.
Puccinia Pringsheimiana Lagerh. June 14, Berthier, Que.

Ribes Grossularia L.
Cronartium ribicola, Aug. 18, St. Alexis, Que.

Ribes lacustre (Pers.) Poir.
Cronartium ribicola, Nov. 1, 1931, St. Alexis, Que.

Ribes nigrum L.
Cronartium ribicola, Aug. 29, 1931, Berthier, Que.

Ribes sp. (wild)
Puccinia Ribis DC. July 24, Prince Albert National Park, Sask.

Rosa blanda Ait.
Phragmidium americana Diet. Sept. 27, Berthier, Que.
Sphaerotheca pannosa (Wallr.) Lév. Sept. 8, 1930, Berthier. Que.

Rosa sp. (cult.)
Marssonina Rosae (Lib.) Died. Very common in the region especially in nurseries. Sept. 21, 1931, Berthier, Que.
Phragmidium americanum Diet. Aug. 15, Berthier, Que.

Rubus idaeus L.
Pucciniastrum americanum (Farl.) Arth. Sept. 19, St. Gabriel, Que.

Rubus triflorus Richards
Gymnoconia Peckiana (Howe) Trotter, May 20, 1931, Berthier, Que.

Rubus sp. " Wild
Pucciniastrum americanum (Farl.) Arth. Sept. 1, Queens county, P.E.I. Common.

Rumex crispus L.
Olpidium sp. May 29, Vineland Station, Ont. Infection heavy. Plants along bank of stream. (G.A. Ledingham)

Salix discolor Muhl.
Rhytisma salicinum (Pers.) Fr. Aug. 14, 1931, Berthier, Que.
Uncinula Salicis (DC.) Wint. Sept. 28, 1930, Lanoraie, Que.

Salix sp.
Fusicladium saliciperdum (All. & Tub.) Tub. July 1, Ste. Anne de la Pocatière, Que.
Melampsora Biglowii Thüm. Sept. 15, 1931, Lanoraie, Que.
Melampsora Humboldtiana Speg. Sept. 8, Lanoraie, Que.

Sambucus canadensis L.
Microsphaera Alni (DC.) Salm. Sept. 17, 1930, Berthier, Que.

Sanguisorba canadensis L.
Gloeosporium Sanguisorbae Fckl. Aug. 21, Ste. Elizabeth, Que.

Scirpus paludosus A. Nels.
Uromyces Scirpi (Cast.) Burr. Sept. 16, Vonda, Sask.

Scirpus validis Vahl.
Puccinia angustata Pk. Aug. 26, Pike Lake, Sask. (W.P. Fraser).

Scirpus sp.
Puccinia angustata Pk. Sept. 8, 1931, Lanoraie, Que.

Scrophularia leporella Bicknell
Septoria Scorphulariae Pk. Aug. 24, Berthier, Que.

Setaria glauca (L.) Beauv.
Ustilago neglecta (L.) Beauv. Sample received from the Dominion Seed Branch Dec. 22, 1931. Origin not reported. Green seeds of this host smutted with U. neglecta were present in clover seed. (I. L. Conners)

Setaria viridis (L.) Beauv.
Sclerospora graminicola (Sacc.) Schroet. Aug. 8, Oxbow, Sask. Four per cent of the plants affected in one field.

Sium cicutaefolium Schrank
Uromyces Scirpi (Cast.) Burr.. July 4, Berthier, Que.

Solidago canadensis L.
Coleosporium Solidaginis (Schw.) Thüm.

Solidago humilis Pursh.
Coleosporium Solidaginis Sept. 8, 1931, Lanoraie, Que.

Solidago Randii (Porter) Britt.
Puccinia ?Virgaureae (DC.) Lib. June 29, Lanoraie, Que.

Solidago rugosa Mill.
Coleosporium Solidaginis (Schw.) Thüm. Aug. 10, Beatty, Sask. Sept. 5, 1930, Berthier, Que.
Erysiphe Cichoracearum DC. Sept. 2, 1931, St. Cuthbert, Que.

Solidago sp.
Erysiphe Cichoracearum DC. Aug. 1, Queens county, P.E.I.

Sorbus americana Marsh
Entomosporium maculatum Lév. Sept. 2, 1930, Berthier, Que.

Spartina Michauxiana Hitchc.
Puccinia spargnioides Ell. & Barth. Sept. 6, 1931, Berthier, Que.

Strophostyles helvola (L.) Britt.
Uromyces appendiculatus (Pers.) Link, Sept. 20, Lanoraie, Que.

Taraxacum officinale Weber
Puccinia Hieracii (Schum.) Mart. July 22, Indian Head, Sask. Common.
Sphaerotheca Humuli (DC.) Burr. var fuliginea (Schlecht.) Salm. July 22, Indian Head, Sask. Common.

Tragopogon porrifolius L. (Cult.)
Cystopus cubicus (Strauss) Lév. Aug. 4, Berthier, Que. Infection quite heavy in gardens.

Trifolium hybridum L.
Uromyces Trifolii (Hedw.f.) Lév. Sept. 3, 1931, Ste. Elizabeth, Que.

Ulmus americana L.
Gnomonia ulmea (Schw.) Thum. Aug. 25, 1931, Deschambault, Que.
Taphrina Ulmi (Fckl.) Johans. May 9, 1931, Berthier, Que.
Disease quite widespread in spring, causing damage in the nurseries.

Urtica gracilis Ait.
Puccinia Urticae Lagerh. June 19, Berthier, Que.; June 19,

Point Churchill, Man. (Wm. C. Güssow)

Urtica Lyallii Wats.
Puccinia Urticae Lagerh. Macdowall, Sask.

Veratrum viride Ait.
Puccinia Veratri Duby July 15, St. Ferdinand, Que.

Verbena hastata L.
Septoria Verbenae Gerard, Sept. 20, Lanoraie, Que.

Viburnum eradiatum (Oakes) House (= V. pauciflorum Pylaie)
Puccinia Linkii Klotzsch, July 24, Waskesiu Lake, Sask. (W. P. Fraser and R. C. Russell)

Vicia Cracca L.
Uromyces Fabae (Pers.) de Bary, Aug. 20, Berthier, Que.

Viola nephrophylla Greene
Puccinia Violae DC. Sept. 2, Berthier, Que.

Woodwardia virginica (L.) Smith
Uredinopsis Struthiopteridis Strömer. Sept. 1, Berthier, Que.

Xanthium commune Britt.
Puccinia Xanthii Schw. July 1, Berthier, Que.

Weeds:
The following weeds were found infected with root knot (Cacomema radicola (Greef.) Cobb) when growing among infected tomatoes in greenhouses at Victoria, B.C. Plantago major, P. lanceolata, Leontodon autumnalis, Sonchus oleraceus, Senecio vulgaris, Cirsium arvense, Amaranthus retroflexus, Chenopodium album and cultivated lettuce. (J.E. Bosher)

Grasshoppers:
Entomophthora Grylli Fres. Many grasshoppers were attacked during the past summer in Manitoba. (G. R. Bisby)
Entomophora Grylli was found on dead Arctiid caterpillars sent from the Entomological Laboratory, Chatham, Ont. The caterpillars were being reared in the laboratory when they succumbed. (E.S. Dowding)

INDEX OF HOSTS

Only the names of the cultivated plants have been included in this index. For diseases on plants not under cultivation the section on "Diseases of Miscellaneous Plants" may be consulted.