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DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

EXPERIMENTAL FARMS BRANCH

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F O U R T E E N T H A N N U A L

R E P O R T

O F T H E

C A N A D I A N

P L A N T D I S E A S E S U R V E Y

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Compiled by

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FOREWORD

The present annual report of the Canadian Plant Disease Survey is the fourteenth to be issued and the sixth compiled by the present writer. As a separate annual report was not issued for 1924, the Survery has now been in operation 15 years, the first report being for the year 1920. In anticipation of the completion of this 15 year period the aims and accomplishments were reviewed in this place last year. I can only repeat that the remarks made there are equally applicable to-day.

The Survey gives a fairly adequate review of cereal diseases as they occur each year in the three prairie provinces, where definite trips are made annually to observe and record the prevalence of disease. The diseases that are present on tobacco are also well reported. Diseases affecting other crops are not as well known, for the reports are usually miscellaneous observations jotted down during the course of other duties. At the present time very little information is available concerning the prevalence of diseases in the market garden or canning crop sections of Canada.

During the past year plant pathologists at the Dominion Laboratories have undertaken to conduct a special survey of the crops being grown at the Dominion Experimental Farms and Stations. The main aim of this undertaking is to insure that all seeds and plants being distributed by the Experimental Farm system are reasonably free from disease.

This year an index of all previous reports has been prepared and it is now a simple matter to refer to all previous reports on a given disease. The absence of any report indicates that the disease has not been previously reported to the Survey on that host for Canada.

April 1, 1935.
Division of Botany,
Central Experimental Farm,
Ottawa, Canada.

I. L. Conners,
Plant Pathologist.

New or Noteworthy Diseases

The number of new diseases found in Canada in any one year is naturally small and 1934 was not unlike other years in the discovery of some plant diseases previously unrecognized in the Dominion. Besides the limited number of new diseases, many previously reported, were recorded in additional provinces or on new hosts. As nearly one hundred such extensions were located by consulting the recently completed index to past reports, only those of special interest will be dealt with here.

The eel-worm disease (Heterodera schachtii) was evidently the most important cereal disease discovered in 1934. Putnam found an area of about 30 square miles in south Simcoe county, Ont., and a smaller one in Ontario county. This is the first record of H. schachtii on oats in United States or Canada according to Dr. G. Thorne, U.S. Department of Agriculture, Washington, D.C., although it is frequently reported as a serious parasite in Europe.

Since last year Sanford has found that the new foot rot of oats described by him is caused by Colletotrichum graminicolum. As a pathogen on the above ground parts of the plant, the fungus has been reported from Alberta, Saskatchewan, and Prince Edward Island, but it has never been previously associated with a foot rot. Anthracnose was also found on wheat for the first time in Canada when it was collected in Alberta this year.

Bacterial blight of barley is usually attributed to Pseudomonas translucens, but Hagborg found that out of 10 collections of the disease in 1933, one was due to P. translucens var. undulosa, the cause of black chaff on wheat. Bacterial blight (P. translucens var. Secalis) of rye was reported in Manitoba for the first time, being known previously from Alberta and Saskatchewan.

Vanterpool has shown that Pythium arrhenomanes, probably the chief causal agent of browning root rot of wheat, may attack many of the commonly cultivated grasses.

Although powdery mildew (Erysiphe graminis) is occasionally injurious on wheat and is not uncommon on barley, it is rarely reported on oats; it affected oats growing in the greenhouse at Edmonton, Alta., this year.

Last year attention was called to the prevalence of downy mildew (Peronospora aestivalis) on the Lytton strain of alfalfa when it was grown at 11 stations scattered from Alberta to Quebec. A special survey by Mr. J.W. Eastham in July showed that the Lytton strain was singularly free from downy mildew under the dry conditions.

prevailing in the Lytton district, B.C. Nevertheless, he noticed that along the irrigation ditches and in spots where moisture was excessive, downy mildew was quite severe. As Mr. Eastham correctly observes it is understandable that under other climatic conditions this disease might be serious. In the Lytton district the average rainfall from April to September inclusive in the past 12 years has been 4.09 inches making irrigation an absolute necessity. Under these conditions the Lytton strain appears to be much longer lived than others.

As a result of Mr. Eastham's survey yellow leaf blotch (Pseudopziza Jonesii) was definitely recorded for the first time in British Columbia. Mosaic (virus) previously unreported on alfalfa from Canada was found causing slight damage in Alberta. Although clover mosaic (virus) had not been previously reported in Ontario, it was unusually prevalent in the breeding plots of red clover at the Central Experimental Farm, Ottawa. Another new disease in Canada was mosaic (virus) on mangels being grown for seed on Lulu Island near Vancouver, B.C.; it has been of considerable importance on garden beets in Washington State in recent years. This mosaic was also reported on swiss chard in Saskatchewan in 1934.

Although Septoria bromigena is common on awnless brome grass in western Canada it is unknown outside of this general region. The collecting of the pathogen on Elymus Macounii (see p. 101) suggests that it may have occurred originally on this and possibly other species of Elymus and that afterwards it found the introduced brome grass a congenial host.

Crested wheat grass has been attracting considerable attention of late on account of its drought resistance. It appears, however, to be susceptible to the diseases usually present on Agropyron; ergot was reported on this host from British Columbia and Manitoba for the first time and a plot at Ottawa, Ont., was affected by a foot rot caused by Helminthosporium sativum.

Among the vegetable diseases black leg (Phoma Lingam) was found attacking severely the seed pods of cabbage in British Columbia. The crop was destroyed to prevent the disease becoming established in the province as inspection failed to reveal the presence of the disease in all known cruciferous crops being grown for seed. Black leaf spot (Alternaria circinans) was found on cauliflower in British Columbia and Manitoba and both the black and the grey leaf spots (A. herculea) were reported on broccoli from British Columbia for the first time.

Two diseases new to the cultivated mushroom in Canada were reported in 1934; they were the truffle disease (Pseudobalsamea microspora) found at Winnipeg, Man., and white plaster mould

(Oospora fimicola) present in Welland county, Ont. Both diseases were destructive where present.

Another new disease, which deserves mention, is a suspected mosaic of sweet cherry in the Nelson district, B.C. This disease was drawn to the attention of Dr. H.R. McLarty in October, 1932, by Mr. J.W. Eastham. The outstanding symptoms are a mottling and crinkling of the leaves frequently accompanied by shot-hole and a stunting of twig growth. The fruit of affected trees was reported to be small in size and of poor quality. In a survey of the Nelson district in 1934 the disease was found on trees in 4 city lots in the city of Nelson and at Boswell and Creston in 2 commercial plantings. The trouble has not been found in the Okanagan district. No infection resulted in inoculations with expressed sap from diseased twigs according to McLarty, but on a tree, on which diseased scions were grafted in 1933, there developed typical symptoms of the disease in 1934. This report was received too late for inclusion in the main body of the Survey.

Although it is not claimed to be the cause of the cankers on apple trees, Phomopsis ?Mali was recorded from both eastern and western Quebec for the first time. Extensions worthy of mention are: powdery mildew (Sphaerotheca Humuli) on raspberry in Quebec and leaf scorch (Diplocarpon Earliana) on strawberry in British Columbia.

Some of the more important ornamental diseases recorded for the first time in Canada are: bacterial leaf spot of century plant, Alberta; leaf spot (Septoria Hepaticae) on Hepatica triloba, Que.; smut (Urocystis Colchici) on Colchicum, Ontario; mosaic (?virus) on lilac, Nova Scotia; and leaf spot (Phyllosticta Lychnidis) on Maltese cross, Quebec.

The Weather and Its Influence on Plant Diseases

The winter of 1933-34 will long be remembered on account of its long duration and the extreme sub-zero temperatures experienced throughout all the provinces from Manitoba eastward. As a consequence fruit trees, as well as ornamental trees and shrubs, suffered severe winter injury, especially in Ontario and Quebec, where winter began in late October before the trees had lost their leaves and become fully dormant. Snow and ice storms were also unusually severe causing more than the ordinary amount of damage. In contrast the winter was one of the mildest experienced in British Columbia.

At Saanichton, B.C., growth began approximately two weeks earlier than usual in the spring of 1934 on account of the previous mild winter and this early start was reflected in a similar advance in the blooming date of the fruit trees. This phenonemon appeared to favour some diseases. Shot hole (Cylindrosporium hiemalis) and blossom blight (Sclerotinia cinerea) were more severe on cherries than in the previous year. The former disease formed lesions not only on the leaves and pedicels, but even on the fruit, which are rarely attacked. Raspberries suffered considerable root injury and many plants were killed on Vancouver island as a result, it is believed, of the soil becoming water logged during the heavy rains in December and January.

Tulip fire (Botrytis Tulipae) was not serious this year; initial infection was slight and dry weather in April was unfavourable for its spread. Among the potato diseases early blight (Alternaria Solani) was very prevalent and more serious than usual. In some fields many plants wilted prematurely while in previous years merely the leaves were spotted. Late blight (Phytophthora infestans) also occurred in epidemic form causing a 30% reduction of the crop; it appeared about two weeks earlier than usual. Diseases were checked by dry weather in the summer months, but they had already caused considerable crop damage.

In the Okanagan valley precipitation was approximately normal and temperatures were slightly above average during the winter. In consequence insects overwintered in larger numbers, but damage caused by perennial canker (Gloeosporium perennans) was lessened. The season was about three weeks earlier than usual and fruit trees developed so rapidly, especially in the northern part of the district, that growers found it difficult to spray their apple trees for scab (Venturia inaequalis) at the proper time. In the Lavington district poor scab control was the result. The weather was extraordinarily favourable for the development of powdery mildew (Podosphaera leucotricha) and heavy losses occurred in unsprayed orchards. Lack of rains during the blossoming period prevented any serious outbreak of fire blight (Bacillus amylovorus).

Throughout central and southern Alberta the spring season began at least 10 days earlier than usual, the month of May being exceptionally warm. In general cereal crops made an excellent start, prospects being particularly good in the northern parts of zones 9 and 10 and in the Peace River area, where frequent showers were received during June and July. Rainfall was scant over practically all of southern Alberta and the soil became dry during July so that prospects for a reasonably good yield were greatly reduced. On August 23 a heavy frost severely damaged the late crops in north central Alberta as far south as Calgary. Although the Peace River district escaped this early frost, the season was too cool to mature the heavy growth of cereals before the early September frosts and much of the grain was immature when harvested.

No statement of the general weather conditions prevailing over Saskatchewan was supplied. At Saskatoon May was hot and dry with high winds and numerous dust storms. During June the weather was cool and the rainfall was well distributed over the month. It was greatly needed following the dry May and at the end of June the crops looked extremely promising. But it was hot and dry during July and the first two weeks of August which resulted in a shortage of moisture for several weeks before harvest. The last two weeks of August were very cool with scattered showers. Both hail and frost damage was severe in that part of the province. The weather conditions at Indian Head were similar. Crops on summer fallow with a good reserve of sub-soil moisture were fairly good in the district, but crops on stubble land were very poor due to the lack of sufficient rainfall during the growing season. Conditions appeared to favour the incidence of common foot rot, but to be unfavourable for rusts and leaf spots.

In the Niagara peninsula the prolonged period of cold weather in February caused much bud killing on peach trees of all ages and considerable injury to the wood in the older trees. March continued cold delaying early growth. However, the buds developed rapidly towards the end of April during fair mild weather, under conditions unfavourable for leaf curl infection. May was unusually dry, warm and sunny, the rainfall being only 0.52 inches compared with the previous 5-year average of 2.65 inches. As a result, primary scab infection was very light and fire blight of apple and pear was at a low ebb although it was epidemic in 1933. The dry weather probably accentuated the strawberry root rot, which was very evident early in the season. The absence of black knot in the plum orchard at the St. Catharines Laboratory was likewise due to the weather conditions in May, which is the critical month for infection. Drought conditions accompanied by high temperatures continued into June and July, although the rainfall was approximately normal. Trees affected by winter injury were unable to produce vigorous new growth on account of drought. Tobacco was also noticeably affected and blossom-end rot of tomato was prevalent. The widespread occurrence of yellowing of grape vines was probably in part due to

drought, as it disappeared later when the rainfall became normal. Wilt diseases, particularly Verticillium wilt of raspberry, were quite prevalent. August was cool and the rainfall normal, which favoured the development of late apple scab infection. On the other hand the cool temperatures were unfavourable for brown rot in stone fruits, which was epidemic in 1933. In this same period badly infected strawberry beds made good recovery from root rot.

In New Brunswick April was mild and the unusual depth of snow wasted away rapidly with the result that low-lying lands and river valleys were flooded by the highest freshet since 1923.

The first three weeks of May were cool and favoured a severe outbreak of damping off (Rhizoctonia Solani) in potatoes in Victoria, Carleton and York counties, the crop being reduced 20%. June was cool with frequent showers and crops made good growth. A heavy frost on June 7 caused considerable damage to vegetables and small fruits. July and the first three weeks of August were very hot and dry, masking the symptoms of potato mosaic, expecially in the Saint John valley. Heavy rains fell the last week of August and were followed by cool weather the first two weeks of September. These conditions resulted in a severe outbreak of late blight of potato in Carleton and Victoria counties. The remainder of September was dry and warm. October was cold and a heavy fall of smow in Victoria and Carleton counties resulted in considerable frosting of potatoes in the field. Wet weather during the balance of the month made it difficult to complete the digging of potatoes and turnips.

In Prince Edward Island the growing season was rather dry, the total rainfall being 19.21 inches; however, it was more evenly distributed than in 1933 when it was very dry in the summer and exceptionally wet in September and October. Late blight and rot of potatoes were fairly prevalent, especially in unsprayed fields. Stem rust (Puccinia graminis) of wheat was destructive, primary infection taking place earlier than usual. Smuts of wheat, oats and barley were widespread and caused heavy losses. Wheat bunt, an uncommon disease in Prince Edward Island, was found throughout the province in 1934.

I. DISEASES OF CEREAL CROPS

WHEAT

STEM RUST - Puccinia graminis Pers.

B.C. - A slight infection of stem rust was found on wheat on Vancouver island and in the lower Fraser valley.

Alta.- Stem rust was found in 7 fields out of 174 examined. Infections varying from a trace to light were present beginning August 15 on late stands of wheat in southern Alberta. It was extremely scarce in northern and central Alberta. Rusted plants were received from Raymond (2063).

Sask.- Stem rust was found on wheat at Indian Head on July 16, at Saskatoon on July 24, and at Swift Current on August 8. Infection was light and the damage was nil or slight in the southern part of the province, but in late fields in zones 8, 10, 11 and the northern part of 7 (see 1930 Report for description of these zones) damage was moderate to severe.

Man.- Stem rust of wheat was present throughout the province. It was first observed at Morris on July 5 and at Morden on July 6. The heaviest infection was in the Red River valley, particularly in the eastern part, where it ranged from 3 to 5 per cent on Ceres and 5 to 25 per cent on Marquis and the durum wheats, while in a few late fields it reached 60 per cent. Infection was lighter in the rest of the province, particularly in the south-west, where only a trace of rust occurred. The extremely dry weather during July and the first week of August caused grain crops to ripen rapidly. By August 10, the crop was ripe and was being harvested, except in some late-sown fields and in the more northerly sections of the province (B. Peturson).

Ont.- In an experimental plot of winter wheat at Ottawa, no stem rust was present at harvest time.

Que.- Stem rust infection varied from 4 to 20 per cent in fields of Huron wheat in Kamouraska county, while a 75 per cent infection caused moderate damage to one field at Cap Rouge. Infections noted earlier were 75 per cent on Garnet and a trace on Brock at Lennoxville, and 15 per cent on Garnet, 5 per cent on Reward, and none on other spring wheats at Ste. Anne de la Pocatière.

N.B.- Stem rust was severe in Sunbury, Westmoreland, York and St. John counties. It also caused slight damage to Federation and severe damage to Filler Garnet 22-17 in the experimental plots at Fredericton.

P.E.I.- Damage from stem rust varied from slight to severe in the three counties of Prince Edward Island.

LEAF RUST - Puccinia triticina Erikss.

B.C.- Leaf rust infections ranged from 20 to 80 per cent in

the Fraser valley and on Vancouver island. Of the 11 winter varieties in the experimental plots at Agassiz, Panson 11 was the most severely affected.

Alta.- Leaf rust was unusually rare this year, being observed in 7 fields out of 174 examined. Only light infections were observed in the south and it was seldom seen in northern and central Alberta.

Sask.- Only slight amounts of leaf rust were recorded this year, chiefly in zones 7, 8, 10, and 11; the damage was a trace.

Man.- Leaf rust of wheat was less prevalent this year than in any other year since 1925. Only slight traces of rust were present on the durums and about 5 per cent on common wheat varieties.

Ont.- In an experimental plot of winter wheat a 60 per cent leaf rust infection was present on August 1. (3721)

Que.- Infection from leaf rust ranged from 8 to 25% in six fields of Huron wheat examined in Kamouraska county. It was less abundant in certain dry fields, where the leaves dried up early in August. At Cap Rouge the infection was about 60%. Further observations were: spring wheat varieties from 5 to 65% of leaf rust at Macdonald College; Garnet 75%, Huron 25%, at Lennoxville; Garnet 20%, Huron 5%, Red Fife trace, at Ste. Anne de la Pocatière.

N.B.- In the rod row plots, Experimental Station, Fredericton, the following leaf rust infections were recorded: heavy, 24-1316-MxG, 24-1320-MxG, 8/24-1320-MxG, Filler Garnet 22-17; heavy at ends, Early Red Fife Ottawa 16; moderate, Marquis Ottawa 15; slight, Ceres, Reliance, Red Fife Ottawa 17, Reward Ottawa 928; very slight, Huron Ottawa 3, Garnet.

N.S.- Leaf rust infection varied from 5 to 30% in the rod row plots of the Experimental Station, Kentville.

P.E.I.- Leaf rust caused slight to moderate damage to wheat in all 3 counties.

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

Alta.- Stripe rust was not reported on wheat, but light infections of this rust were found on Hordeum jubatum in moist locations in zone 2 in southern Alberta.

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

Besides the field reports from the individual provinces, Dr. W.F. Hanna has kindly supplied a summary of the data, which were collected from the records of the Western Grain Inspection Division.

Table 1. Wheat Bunt in Western Canada
Inspections from August 1, to October 31, 1934

Classes of Wheat	Cars Inspected	Cars Graded Smutty	per cent Graded Smutty
Hard Red Spring	60,269	420	0.7
White Spring	68	0	0.0
Alberta Red Winter	246	30	12.2
Amber Durum	4,351	23	0.5
All Classes	64,977	480	0.7

If the figures given in Table 1 are compared with those recorded for previous years (see summary in Ann. Rept. Can. Plant Dis. Survey 13:2-3) wheat bunt is now being controlled equally well, if not better, in durum wheat than it is in common. On the other hand, bunt was more prevalent in Western Canada in 1934 than it has been for the past two years as the following figures show:- percentage of cars graded smutty for all classes of wheat: 1931, 1.4%; 1932, 0.6%; 1933, 0.3%; 1934, 0.7%.

B.C.- Bunt was found causing slight damage in a few fields in the Fraser valley and on Vancouver island.

Alta.- Bunt was found in 6.3% or 11 fields out of 174 examined. The damage was a trace to light, except in one field near Barons in zone 3, where it was 20%.

Sask.- Wheat bunt caused a trace of damage in 7 fields out of 146 examined. For 4 locations the causal organism was recorded: Tilletia foetens at Yorkton, Gull Lake, and Webb (2164) and T. Caries at Indian Head.

Ont.- In a smut treatment experiment at Ottawa, 4.2% of bunt (T. foetens) developed in a check plot of winter wheat (3681).

Que.- A trace of bunt was found in Huron wheat at Cap Rouge, Beaumont, and Rivière Ouelle.

P.E.I.- Infections caused by Tilletia foetens ranged from a trace to 1.5%. This is the first time that more than a trace of bunt has been found in Prince Edward Island in the observers' experience (R.R. Hurst and E.B. McLaren).

LOOSE SMUT - Ustilago Tritici (Pers.) Jens.

B.C.- Loose smut was found in a few fields of imported seed on Vancouver island. Infection varied from a trace to 10%.

Alta.- Loose smut was recorded from only 6 fields out of 174 examined; the damage was a trace to slight.

Sask.- Out of 181 fields examined 9.9% or 18 were affected with loose smut. These were located chiefly in zone 7. In one survey the variety was recorded with the following results: Marquis, trace in 1 field out of 84 examined; Reward, 0.5% in 5

fields out of 6 examined; Ceres, trace in 2 fields out of 5 examined; Mindum and Garnet, no smut in one field of each examined. A collection made June 30, at Scott, was received (2168).

Man.- Loose smut was recorded in 35% or 33 fields out of 94 inspected and the average damage was estimated at 0.8%, only a trace being present in most fields. The maximum infection in Reward was 2.5%; in Marquis 3%.

Que.- In the lower St. Lawrence valley, loose smut is common in every wheat field and is increasing on certain farms from year to year. The highest infection noted this year was 18%. A trace was present in spring wheat at Macdonald College.

P.E.I.- A survey revealed that loose smut was about equally prevalent in all 3 counties; infection ranged from a trace to 55%, while the average infection for the province was nearly 11%. A correspondent from Alberton reported his Reward wheat heavily infected.

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

Sask.- A leaf spot probably of bacterial origin, was collected at Melfort.

Man.- A trace of black chaff was found on seedlings at Ste. Rose du Lac and Winnipeg, out of 90 fields examined.

In 1933 Pseudomonas translucens var. undulosa was isolated from 22 collections of wheat from 19 points in Manitoba and one in Ontario (Kapuskasing). It has also been collected once on barley in Manitoba, while the barley blight organism (P. translucens) has been isolated from 9 collections of barley from 9 points in Manitoba. (W. Hagborg)

It was very scarce this year, probably as the result of a severe late frost which killed a high percentage of the primary leaves. The death of these leaves, reduced the amount of primary black chaff infection and its subsequent secondary spread.

Que.- A 5% infection of black chaff was recorded in a plot of Marquis at Lennoxville. This is the first report of black chaff from Quebec to the Survey.

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

Alta.- Basal glume rot was reported in 8 fields out of 174 examined. Infection varied from a trace to heavy.

Sask.- Specimens affected with basal glume rot were received from Waseca, zone 11.

ERGOT - Claviceps purpurea (Fr.) Tul.

Alta.- Ergot moderately infected a field near Spruce Grove, while it was abundant in the University plots, Edmonton.

Man.- A trace of ergot was found at Winnipeg on wheat, which was growing close to heavily infected awnless brome grass.

Que.- A trace of ergot was found in one field at St.Denis in Kamouraska county.

P.E.I.- Traces of ergot were found on wheat in all 3 counties.

POWDERY MILDEW - Erysiphe graminis DC.

B.C.- Powdery mildew caused slight damage to wheat on Vancouver island and in the Fraser valley, infection ranging from a trace to 60%.

Alta.- Powdery mildew was fairly common in late stands.

GLUME BLOTCH - Septoria nodorum Berk.

Alta.- A heavy infection of glume blotch was observed at Fallis. Traces of the disease were common in the Peace River district.

Sask.- Glume blotch was found in 2 fields, in both of which the diseased heads had been previously injured by wind or hail.

N.B.- Glume blotch was severe in one field at Andover.

P.E.I.- Traces of glume blotch were present on some experimental rows at Charlottetown.

SPECKLED LEAF BLOTCH - Septoria Tritici Desm.

B.C.- This disease caused slight damage on Vancouver island.

Sask.- Speckled leaf blotch caused slight damage to a field of Ceres wheat at Canora (2156).

FOOT ROTS

B.C.- Take-all (Ophiobolus graminis Sacc.) caused slight damage to a field of wheat on Vancouver island.

Five per cent damage was caused by foot rot in a field in Cariboo county; the soil reaction was pH 7.2. Surface irrigation is practised in this region.

Alta.- Take-all was found chiefly in zones 2, 4, 6, and 10, 48.8% or 85 fields out of 174 examined being affected. The average damage in the diseased fields was 2.8% and the greatest damage observed was 25 and 20% respectively in two fields in zone 11.

Common foot rot (Helminthosporium sativum P.K. & B. and Fusarium spp.) was reported from 37.3% or 65 fields out of 174 examined. The average damage in the affected fields in zone 10 was 3.0%; in all zones, 1.3%.

Sask.- Scattered plants showed take-all lesions on the primary roots in a few fields in the Annaheim district in June (3643). The damage was a trace, but some browning root rot was present on the secondary roots. Take-all caused a trace to slight damage in July in many fields near St. Gregor, where most of the new wheat fields show at least a trace. Besides zone 7, a trace was found in zone 1 (1 field) and zone 9.

Foot rot of the Helminthosporium-Fusarium type became progressively more prevalent and destructive as the season advanced. It caused lesions on the sub-crown internodes of 13% of the wheat

plants and the average damage was slight in the fields examined during a trip from Saskatoon to Indian Head via Moose Jaw on June 1, while 40% of the wheat plants were so lesioned and the average damage was moderate on July 4-5 along the same route. In August the average damage was moderate to severe. Common foot rot was found in 93% or 251 fields out of 270 examined; it caused severe damage in zones 2 and 3 and moderate damage in zones 1, 7, 9 and 11. It was especially serious in the drier areas.

In a plot of Reward wheat sown early, in rod rows 18" apart at Saskatoon, 15 to 20 per cent of the culms bent over at the base. Isolations from affected plants yielded twice as many cultures of Helminthosporium as those of all other fungi, the chief of these being Fusarium. Other varieties of wheat showed only a trace of straw lodging. Apparently Reward is more susceptible to common root rot than the other commonly grown varieties (T.C. Vanterpool).

A trace of prematurity blight (cause unknown) was reported from zones 1 and 2, and in the plots at Indian Head.

Man.- In a survey embracing 100 fields of common wheat and 26 of durum, foot rot infections caused by Helminthosporium and Fusarium were reported as follows:-

Infection	Common	Durum
Heavy	10	4
Moderate	22	3
Slight	27	10
Trace	33	8
None	8	1

The average damage was slight.

Take-all was not found in 1934.

BROWNING ROOT ROT - Pythium spp.

Alta.- Browning root rot caused 20 and 40% damage respectively to 2 fields in zone 9.

Sask.- In central Saskatchewan, where browning root rot was severe last year, it could be found only in widely scattered fields. This was true also in south central Saskatchewan, not in the dried-out areas. On the other hand, in a large area around Paynton and Lashburn in the northwest and in another between Humboldt and Melfort in the northeast, there were many severely damaged fields. Practically all inquiries received this year came from these sections. This shift in the location of browning root rot, which has been observed from year to year, shows how closely the disease is correlated with environmental factors, not only those which prevail just prior to the appearance of the disease, but possibly also those affecting the bare fallow the previous summer.

On the plains, many fields of wheat on summer fallow that had drifted badly early in May, appeared brown in the eroded areas, where top soil had been removed, and green in the drifted areas. The absence of diseased root tips containing Pythium oospores on these plants from the eroded areas readily separates this trouble from browning root rot.

Pythium arrhenomanes Drechsler, probably the chief causal agent of browning root rot of wheat, has been isolated from the following grasses; these grasses were grown in field soil naturally infested with Pythium species parasitic to wheat: awnless brome grass (Bromus inermis), couch grass (Agropyron repens), crested wheat grass (Agropyron cristatum), western rye grass (Agropyron tenerum), green foxtail (Chaetochloa viridis), reed canary grass (Phalaris arundinacea), timothy (Phleum pratense), and wild oats (Avena fatua). Pythium oospores have also been observed in diseased roots of common darnel (Lolium temulentum), Siberian millet (Chaetochloa italica maxima), and wild barley (Hordeum jubatum). (T.C. Vanterpool)

Man.- Browning root rot was found in 9 fields out of 80 examined, causing damage as follows: severe at Eden, Brandon, Forrest (2 fields); moderate at Kemnay, Souris, Deloraine; and slight at Rufford and Varcoe.

HEAD BLIGHT -Gibberella Saubinettii (Mont.) Sacc. & Fusarium spp.

P.E.I.- Head blight showed infections varying from a trace to 2.5% in all 3 counties and on all varieties grown in Prince Edward Island, the damage was slight.

SPOT BLOTCH - Helminthosporium sativum Pamm. King and Bakke

Man.- A mere trace of spot blotch was found in 6 fields out of 70 examined.

ANTHRACNOSE - Colletotrichum graminicolum (Ces.) Wils.

Alta.- A light infection of anthracnose was observed in one field in zone 11. This is the first report of this disease on wheat in Canada, received by the Survey.

Coprinus Brassicae Pk. was found growing from crowns of apparently healthy green Marquis plants on August 7, in Manitoba, (Collected and identified by W.F. Hanna). This is the first record of its occurrence in Canada sent to the Survey.

FROST INJURY

Sask.- Frost on July 6 caused slight damage at Indian Head and in southeastern Sask. It was also reported that it caused some injury about August 25, at Kelvington in zone 10.

FIRING - Non-parasitic

Sask.- Several entire fields of wheat near Saskatoon showed

the tips of the terminal leaves dead or brown and in the last week of June this condition was common, according to reports. It was thought to be caused by strong warm winds, possibly combined with a lack of subsoil moisture (see Plant Disease Survey 12:10). Rains corrected the condition somewhat. (P.M. Simmonds)

PSEUDO BLACK CHAFF - Non-parasitic

Alta.- Pseudo black chaff was observed in several fields of Reward wheat.

Sask.- This discolouration was quite conspicuous in Reward wheat at the Experimental Station, Swift Current, this year.

STEM BREAK - Cause unknown, probably wind.

Sask.- Some specimens of stem break were brought to the Saskatoon laboratory by a hail inspector, who said that, in one field the damage was moderate, and traces were common.

BRITTLE DWARF - Cause unknown

Sask.- About 25% of the culms were affected with brittle dwarf in a patch about 50 feet in diameter in a field at Caron; the damage was slight. A trace was present at Hazenmore.

EEL-WORM DISEASE - Heterodera punctata Thorne

Sask.- Eelworms caused slight damage in a field in the 2nd or 3rd crop of wheat at Hepburn, 30 miles northeast of Saskatoon. This is the first report of eelworms in northern Saskatchewan, west of the Humboldt area.

EAR COCKLE - Anguillulina tritici (Steinb.) Gerv. & v. Bened.

Two samples of wheat being imported into Canada from Kashmir for experimental purposes, contained about one cockle per ounce. (2064). The shipment was destroyed. (I.L. Conners)

OATS

STEM RUST - Puccinia graminis Pers.

B.C.- Stem rust was general in most fields and caused moderate damage in some, on Vancouver island and in the Fraser valley.

Sask - Stem rust was first found on oats at Saskatoon on July 31, on about 4% of the stems. Its distribution and prevalance were similar to that of wheat stem rust, but it caused less damage being a trace to slight in southern Saskatchewan and slight to moderate in zones 7, 9, and 11.

Man.- Stem rust infection of oats was somewhat heavier than that of wheat stem rust. However, in only a small number of fields was the average infection over 20%; the average damage was slight. (B. Peturson)

Que.- Stem rust varied from a trace to 25% in western Que.; the damage was slight to moderate. It was not present at Macdonald College on July 9, but it developed later. Of a number of varieties at Lennoxville, Cartier was the most heavily rusted and Legacy the least. It was general on oats in Kamouraska county and at Cap Rouge. Infections varied from 2 to 40%, but the damage was slight.

N.B.- A trace to slight infection of stem rust was found on oats in the experimental plots, Fredericton, and in York county; the damage was slight.

N.S.- Forty per cent of stems were rusted in a 5-acre field at Kentville.

P.E.I.- The average infection of stem rust was 10% in 60 fields examined in the 3 counties; the damage was slight to severe.

CROWN RUST - Puccinia coronata Cda.

Sask.- Crown rust was not found in Saskatchewan this year.

Man.- Traces of crown rust were present in the eastern part of Manitoba, but it was almost entirely absent from the western part.

Que.- A trace of crown rust was found on oats on July 6. A 15% infection was recorded on Legacy at Lennoxville on July 25, while less was present on other varieties. Crown rust was light but general throughout the lower St. Lawrence valley, but it caused no apparent damage.

N.B.- Crown rust caused severe damage to one field of white Russian in Westmoreland county, and one field of Victory at the Experimental Station, Fredericton.

N.S.- Crown rust moderately infected oats in the rod row plots at Kentville. Adjacent fields were only slightly infected. One field in Pictou county was moderately infected while single fields in Kings and Colchester bore traces of rust.

P.E.I.- Crown rust infection varied from a trace to severe on all varieties grown in Price Edward Island, while the damage was correspondingly slight to severe. No aecia were observed on buckthorns this year.

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

B.C.- Both the loose and covered smuts caused slight damage in a few fields in the Fraser valley.

Alta.- Smut caused an average damage of 4.9% in the infected fields, the number not being recorded; the highest infection was 65% in a field near Perryvale.

Sask.- In south and eastern Saskatchewan, loose smut was found in 3 fields out of 19 examined; the average infection was 0.3% and the highest 5% at the Experimental Farm, Indian Head. In the same area, covered smut was found in 11 fields, the average infection was 3.7%, and the highest 30% at Langenburg. In a

similar survey in zones 7, 9, and 11, no loose smut was found, but covered smut was present in 18 out of 29 fields examined and the average infection was 4.0%. Loose smut was found affecting a few heads in the University plots, Saskatoon. Collections were received as follows: loose smut from Indian Head, July 14 (2188); covered smut from Duff, August 15 (2190) and Radisson, August 3 (2181).

Man.- Smut was found in 16 fields out of 40 examined. The average infection was 0.8%, the maximum infection 15%.

Que.- Covered smut is more common than loose smut, both in western Quebec and along the St. Lawrence between Cap Rouge and Rimouski. The highest recorded infection was 5%.

N.B.- Traces of both loose and covered smut were recorded, the former in Westmoreland county and the latter in York county.

N.S.- Loose smut was reported from 8 fields in 4 different counties; the average infection was 13%, while the maximum was 20%. For 5 of these fields it was learned that the oats had not been treated. Covered smut infected 15% of the heads in one field sown with untreated oats in Colchester county.

P.E.I.- Five per cent of loose smut was found in Banner and 7% in Black in Kings county.

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

Alta.- Damage from halo blight was a trace in 6 fields and heavy in one, the latter in zone 10.

Sask.- Halo blight was reported from 7 fields out of 52 examined; the damage was slight in the south and moderate to severe in the northeast. Specimens received from Indian Head collected July 16 (2192).

Man.- Halo blight was recorded in 18 fields out of 40 examined; the average damage was slight. In a few fields 100% of the plants were infected, in some it was mixed with stripe blight.

Que.- Halo blight infection was slight to moderate on oats at Macdonald College and Lennoxville, and a trace at Ste. Anne de la Pocatière. Cartier appeared to be one of the most susceptible varieties.

N.B.- Infection by halo blight was recorded in rod row plots at Fredericton as follows:- severe on Robin, moderate on Foster, slight on Eagle, very slight on Laurel.

P.E.I.- A trace of halo blight was reported on breeding material at Charlottetown.

STRIPE BLIGHT - Bacterium (Pseudomonas) striafaciens Ch. Elliott

Alta.- Stripe blight caused slight damage in one field in zone 10.

Man.- Stripe blight infected oats as follows: moderate at Starbuck and a trace at Letellier. Stripe blight may have been present in some fields reported as affected by halo blight due to the infections being mixed.

FOOT ROTS

B.C.- Foot rot attributed to Fusarium culmorum (W.G. Sm.) Sacc. caused slight damage in a field in Cariboo county. The soil reaction was pH 7.2.

Alta.- Common foot rot thought to be due to Fusarium spp., was found in 11 fields out of 77 examined. The average damage in the zones surveyed was: zone 2, 7.5%; zone 4, 3.6%; zone 6, 0; zone 10, 1.7%; zone 11,0; zone 12, 0.5%; general average, 3.3%.

A new foot rot of oats (Colletotrichum graminicolum (Ces.) Wilson) reported for the first time last year by Sanford was found in 32 fields out of 92 examined, mostly in zones 10 and 11. The damage was as follows: heavy in 2 fields, moderate in 3, slight in 24, and a trace in 3.

Anthracnose (Colletotrichum graminicolum) on the above-ground parts of the plant, caused slight damage in one field in zone 11.

Sask.- Foot rot of the Helminthosporium-Fusarium type was present in 90% or 67 fields out of 74 examined. It was about twice as prevalent in the southern part of Saskatchewan, as in the central and northern districts; the average damage was: south, slight to moderate; central and north, slight.

Foot rot (Fusarium spp.) caused 5% damage in oats in rod rows 18" apart. The wide spacing was an inovation this year and it apparently allowed foot rot damage to become more manifest (see report under wheat). (T.C. Vanterpool)

Prematurity blight caused slight damage in 4 fields out of 29 examined.

Man.- Foot rot caused by: Helminthosporium and Fusarium spp. was found in 25 out of 45 fields examined. Infection was as follows: moderate in 2 fields; slight in 4; trace in 19.

LEAF BLOTCH - Helminthosporium Avenae Eidam

B.C.- Leaf blotch caused slight damage to oats at Saanichton.

Que.- This disease was reported in 3 fields at Ste. Anne de la Pocatière, where it caused a trace of damage, although infection was higher in low, wet spots in one field.

N.B.- Leaf blotch caused slight damage to variety 1944-3-13 in the rod row plots, Fredericton.

P.E.I.- Moderate damage was caused by leaf blotch to Banner in a field in Queens county.

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

Que.- Speckled leaf blotch was observed on oats on June 20 at Macdonald College. In late July infection ranged from 20 to 45% there and at Lennoxville, while a trace to 5% was present at Ste. Anne de la Pocatière.

ERGOT - Claviceps purpurea (Fr.) Tul.

Alta.- Ergot caused moderate damage to one field of oats in zone 10.

POWDERY MILDEW - Erysiphe graminis DC.

Alta.- Powdery mildew appeared on oats in the greenhouse at Edmonton for the first time.

HEAD BLIGHT - ?Fusarium spp.

Alta.- Head blight caused slight damage in one field in zone 10.

BLAST - Cause unknown

Alta.- Blast was found in 60 fields out of 77 examined. Damage was more severe this season than usual, the average for the affected fields being 10.9%

Sask.- Blast was reported from 41 fields, well distributed over the province, out of 55 inspected. The damage varied from slight to moderate.

Man.- Blast was severe on nearly all plants in a field at Giroux, it caused slight damage at Elm Creek and Elie.

N.B.- The disease was general in York, Carleton, Charlotte and Sunbury counties.

P.E.I.- Blast caused moderate damage on Banner. Infection ranged from a trace to 12% in the 15 fields examined.

EEL-WORM DISEASE

Ont.- The following notes on the discovery of Heterodera schachtii on oats and other cereals were prepared by Mr. D.F. Putnam, and Dr. Thorne respectively:-

During the past few years a serious seedling disease has affected the oat crop in the southern part of Simcoe county. Examination of diseased oat plants collected in July 1933, showed them to be badly infected by root rotting fungi; in addition, large numbers of nematode cysts were found adhering to the roots. The observations were continued in 1934 and a survey made to determine the host range of the parasite and the area of the infested territory. To date the parasite has been found capable of completing its development upon the following hosts: oats, wild oats; barley, spring and fall wheat, speltz and chess. Specimens of the nematodes found on oats were submitted to Dr. Thorne of the U.S.D.A. who identified them as Heterodera schachtii; those on the other host plants have been compared and found to be identical. This is the first reported case of Heterodera schachtii infesting cereals in America, although it has been known as a serious parasite in Europe since 1874.

The present area of infestation includes a rather compact district of about thirty square miles in South Simcoe and a much smaller area which has been found in Ontario county. A total of 139 infested fields were rfound on about 75 different farms. Of these over 90% were located on the same type of soil, a heavy silty clay loam, excessively high in lime and very strongly alkaline.

The disease is apparently more severe upon oats than upon any of the other cereals, so the following brief description will deal only with the oat plant. The symptoms first appear about three weeks after seeding, when the seedlings have two leaves each. The leaves stand stiffly erect with somewhat inrolled margins and the tip of the first leaf turns a brick red colour which gradually involves the whole leaf and often the second leaf as well. Ordinarily, very few plants are actually killed, but because of their stunted growth, the field takes on a very patchy appearance. The greatest contrast is to be seen in the roots. While the roots of healthy oat seedlings are long, white and almost unbranched, infested roots are short, thickened and beset with short stubby laterals. The whole system has a very bushy appearance, a crisp texture and a dirty yellow or yellowish brown colour. Diseased plants are late in maturing and bear small unfilled heads. In dry years an infested field represents a total crop failure. (D.F. Putnam)

On July 25, 1934, a collection of oat roots heavily infected with Heterodera schachtii was received from Mr. D.F. Putnam of the Ontario Research Foundation, Toronto, Canada. Mr. Putnam reported that "It was a severe seedling disease of spring cereals in Ontario". This constitutes the first record of H. schachtii as infesting oats in America, although it is frequently reported as a serious parasite in Europe.

Comparison with Heterodera punctata Thorne, which attacks wheat in Saskatchewan, Canada, showed that the two were very distinctly different. (Gerald Thorne)

BARLEY

STEM RUST - Puccinia graminis Pers.

Sask.- Stem rust was present in all fields examined and was more abundant than last year, but it caused slight damage.

Man.- Very little stem rust was present except in late fields and the average damage was a trace. The maximum infection was 50 to 60%, which was found in a single field.

Ont.- Stem rust was collected on barley at Ottawa, August 1 (2060).

Que.- Stem rust was heavy in one field in Mississiquoi county. While low percentages were recorded at Lennoxville and in Kamouraska county, where it appeared patchy in three fields.

N.B.- A trace of stem rust was recorded at the Experimental Station, Fredericton.

P.E.I.- A trace to 10% of stem rust was reported on Charlottetown 80 in Queens county.

LEAF RUST - Puccinia anomala Ros tr.

B.C. Leaf rust caused slight damage to barley in the Fraser valley and on Vancouver island.

Man.- A trace of leaf rust was recorded at Portage la Prairie.

Ont.- Leaf rust was collected on barley at Ottawa, August 1. (2059)

Que.- The following percentages of leaf rust were reported on barley at Lennoxville: 20%, O.A.C. 21; 5%, Velvet; 3%, Oxford; trace, Bearer, Pontiac, and Gordon.

Leaf rust was more common than stem rust in Kamouraska county, an infection of 70% was present in 3 fields.

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

Alta.- Covered smut was reported in 21 fields out of 43 examined. The average damage was 2.9%.

Sask.- Eight fields out of 16 examined were affected with covered smut. The average damage was 1%, the two highest infections being 6% at Moosomin and 5% at Swift Current (2189).

Man.- Covered smut was found in 2 fields out of 30 examined; in one at Graysville 20% of the heads were diseased.

Que.- About 1% of the heads were affected with covered smut in a field showing also loose smut, at Macdonald College. A trace was also present in the Agronomy plots.

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

P.E.I.- Traces of covered smut were present on Himilayan, Charlottetown 80, Manchurian and O.A.C. 21, at Charlottetown.

LOOSE SMUT - Ustilago nuda (Jens.) Rostr.

B.C.- Loose smut caused slight damage to barley on Vancouver island and the lower mainland.

Alta.- Loose smut was reported from 5 fields out of 43 examined; the average damage in affected fields was 1.1%.

Sask.- This smut was found in 5 fields out of 23 examined. The average damage was a trace; the highest infection was 5% at Melville.

Man.- Loose smut caused a trace of damage in 8 fields out of 30 examined; the maximum infection was 2%.

Que.- Loose smut varied from a trace to 5% in fields and plots in western Que, while infections ranged from a trace to 1% in Kamouraska county, where the disease was uncommon this year.

P.E.I.- Loose smut infected from a trace to 15% of the plants in Prince, Queens and Kings counties. All varieties grown in P.E.I. were affected.

STRIPE - Helminthosporium gramineum Rabh.

B.C.- Barley stripe was reported from Lillooet district.

Alta.- A trace of stripe was found in one field, located in zone 10, out of 43 fields examined.

Sask.- A trace of stripe was reported from one field.

Man.- Stripe was reported from 3 fields as follows: moderate infection at Brandon and Ashville and a trace at Petersfield.

Ont.- A few plants were found affected with stripe at Ottawa (2056).

Que.- Stripe was observed in one field at Ste. Anne de la Pocatière. It occured in patches, 5 to 15% of the plants being infected.

P.E.I.- Stripe caused moderate damage in Prince county, the rate of infection being 5 to 20%.

NET BLOTCH - Pyrenophora teres (Died.) Drechsler (Helminthosporium teres Sacc.)

Alta.- A trace of net blotch was found in 7 fields out of 43 examined.

Sask.- Net blotch caused moderate damage in 4 fields out of 10 examined.

Man.- Net blotch was present in 11 fields out of 25 examined. The average damage was slight to moderate. In a few fields 100% of the plants were infected.

N.B.- Net blotch caused slight to moderate damage to the following varieties in the rod row plots, Fredericton: Byng, Sanalta, Trebi, Glabron, Hannchen Sask. 229, Peatland, Nobarb, Star, Washington 4725, O.A.C. 21, Wisc. Pedigree 38.

SPOT BLOTCH - Helminthosporium sativum P.K. & B.

B.C. Spot blotch was fairly general, but caused slight damage on Vancouver island.

Alta.- A leaf spot (Helminthosporium sp.) caused moderate to heavy damage in 2 fields in zone 11, out of 43 examined in the province.

Man.- Spot blotch was reported from 2 fields out of 46 inspected. Usually only a trace was present, but in 3 fields 75 to 100% of the plants were affected.

Que.- Spot blotch infections ranged from a trace to 25% at Macdonald College and Lennoxville, while a trace was present at Ste. Anne de la Pocatière.

FOOT ROTS

Alta.- Take-all (Ophiobolus graminis Sacc.) caused moderate damage in one field out of 43 examined.

Foot rot of the Helminthosporium-Fusarium type, was found in 53% or 23 fields out of 43 inspected; the average damage was 1.9%.

Sask.- Common foot rot (Helminthosporium and Fusarium spp.) became increasingly more injurious as the season advanced. It was present in practically every field in the southern sections and caused moderate to severe damage, in the central and northern districts it was less prevalent and severe.

A trace of prematurity blight (cause unknown) was present in one field in zone 1.

Man.- Foot rot was found in all 22 fields examined; infections varied as follows: Heavy, 2 fields; moderate, 7; slight, 7; trace, 6.

ERGOT - Claviceps purpurea (Fr.) Tul.

Sask.- A trace of ergot was reported from 2 fields out of 10 examined.

P.E.I.- Traces of ergot were found in most barley fields.

SCALD - Rhynchosporium Secalis (Oud.) Davis.

Alta.- Scald was heavy in 2 fields out of 43 examined.

TWIST - Dilophospora Alopecuri (Fr.) Fr.

Sask.- A portion of the original collection made on barley ar Carlyle, Sask., July 27, 1924 by Dr. P.M. Simmonds has been deposited in the Ottawa herbarium (2129). This is the only record of this disease on cereals in Canada. (See Drayton, F.L., Dom. of Canada Dept. Agr. Bull. 71 n.s.:14. 1926, for a more extended account).

POWDERY MILDEW - Erysiphe graminis DC.

B.C.- Powdery mildew was fairly general, but it caused slight damage on Vancouver island.

Que.- At Lennoxville, powdery mildew infected barley as follows: 40%, Bearer; 30%, O.A.C. 21; 20%, Oxford; 10%, Gordon and Pontiac; and trace, Velvet. The disease was also general on barley in Kamouraska county, 100% of the plants being infected.

P.E.I.- Powdery mildew moderately infected barley in Queens county.

BACTERIAL BLIGHT - Pseudomonas translucens J.J. & R.

Man.- Pseudomonas translucens was isolated from lesions on barley collected at Brandon and Morden (see also report under wheat).

FALSE STRIPE - ?Heterosporium Avenae Oud.

Alta.- False stripe caused moderate damage in one field in zone 10.

Man.- False stripe was reported from 10 fields. The average infection was a trace, but in one field 20% of the plants were affected.

NON-PARASITIC LEAF SPOTS

After the appearance of Christensen's interesting paper (Phytopathology 24:726-742. 1934) barley fields in zone 9 were examined for non-parasitic leaf spots. They were relatively inconspicuous there and in the University plots, Saskatoon, although the latter half of the season was very dry. (T.C. Vanterpool)

HEAT INJURY

Sask.- The terminal leaves of many plants were killed by heat in several University plots. The damage was slight.

RYE

STEM RUST - Puccinia graminis Pers.
Man.- No stem rust was found in 1934.
Que.- A trace of stem rust was reported from Macdonald College.

LEAF RUST - Puccinia dispersa Erikss.
Man.- No leaf rust was found in 1934.
Que.- Leaf rust caused infections ranging from a trace to 85% at Macdonald College.

STEM SMUT - Urocystis occulta (Wallr.) Rabh.
Sask.- Traces of stem smut were observed at Abernethy (2193) and Indian Head.
Man.- No stem smut was found in 1934.

ERGOT - Claviceps purpurea (Fr.) Tul.
Sask.- Traces of ergot were reported from 2 fields out of 7 surveyed. It was also present in the University plots, Saskatoon.
Man.- Ergot was found in 4 fields out of 12 examined as follows: trace, Cowan and Ethelbert; 10% of the plants, Bowsman; 75% of plants, experimental plots, Winnipeg (natural infection).
Que.- No ergot was seen in rye at Macdonald College. Ergot developed on rye grown in 1934 on Anticosti Island (2262).

FOOT ROTS
Sask.- Foot rot of the Helminthosporium-Fusarium type caused moderate damage in all 6 fields surveyed.
Man.- A trace of foot rot was present in 8 out of 12 fields examined.

POWDERY MILDEW - Erysiphe graminis DC.
Que.- Powdery mildew moderately infected the leaves of rye at Macdonald College.

BACTERIAL BLIGHT - Pseudomonas translucens J.J. & R. var. Secalis (J.R. & G.) Stapp
Sask.- Bacterial blight caused a trace of damage in 3 fields. It destroyed about 10% of the leaf surface, the maximum infection, in one field at Belcaries. A collection was received from Indian Head (2191).
Man.- Five per cent of the plants were infected by bacterial blight at Carmen.

II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

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

B.C.- All 7 varieties of alfalfa grown at the Agassiz Experimental Farm were equally susceptible to common leaf spot. The disease caused slight damage in the Fraser valley and on Vancouver island. A slight infection of this leaf spot was reported from McGillivray's Flats and Summerland.

Sask.- A trace of common leaf spot was found in one field in zone 9.

Man.- A slight infection was present on the lower leaves at Gimli; the variety Lytton was severely infected at the Experimental Station, Morden.

Ont.- The lower leaves were affected by common leaf spot in the Forage Crop plots, Ottawa. (3699)

Que.- The disease infected all the Alfalfa fields examined in eastern Quebec, but the damage was slight, although in one field at Cap Rouge it caused some defoliation.

N.B.- Common leaf spot was general in York and Sunbury counties.

P.E.I.- A trace to heavy infections of this leaf spot were observed in all 3 counties.

DOWNY MILDEW - Peronospora trivialis Sydow
(P. Trifoliorum de Bary p.p.)

B.C.- On July 16, Mr. J.W. Eastham made a special survey of alfalfa in the Lytton district, where he inspected the fields of the Indian School at Lytton and those of McGillivray's Ranch, McGillivray's Flats, about 22 miles north of Lytton. The fields at the school were singularly free of disease. However, he noticed that along the irrigation ditches and in spots where there was excess moisture, due to seepage, downy mildew was quite severe. (3657). At Mr. McGillivray's no downy mildew was present. Other diseases were noted at these places, but they will be reported under their respective headings.

Alta.- Downy mildew was moderate to severe in 3 fields out of 19 examined.

CROWN ROT - Sclerotinia sp.

B.C.- Crown rot apparently does not occur at the Indian School, Lytton.

Alta.- A trace of crown rot was reported from a field in zone 3.

Sask.- Six plots of alfalfa were entirely killed by crown rot at the Experimental Station, Scott.

Ont.- A trace of crown rot was found on May 5 at Ottawa (3699).

YELLOW LEAF BLOTCH - Pseudopeziza Jonesii Nannf.
(=Pyrenopeziza Medicaginis Fuck.)

B.C.- Yellow leaf blotch caused from 1 to 5% damage in patches and was more or less present in a 30-acre field at McGillivray's Flats. (3659)

Sask.- The disease caused slight injury to alfalfa at the Experimental Farm, Indian Head, and a trace was found in one field in zone 1.

WITCHES' BROOM - Cause undetermined.

B.C.- At Lytton and McGillivray's Flats there were certain patches in the fields, which contained several plants affected with witches' broom. It is characterized by a large number of thin, wiry, branched stems with very small foliage. The disease was also noticed in other fields in Cariboo county and a single diseased plant was recorded from Summerland. It is found mostly in fields which are surface irrigated, particularly in those which have been laid down for a number of years.

MOSAIC - Virus

Alta.- Mosaic caused light damage in 3 fields out of 19 examined.

CHLOROSIS - Cause undetermined.

P.E.I.- Alfalfa suffered slightly from chlorosis in one field in Queens county. The cause was not determined.

CROWN ROT - Cause undetermined.

N.S.- A crown rot, the cause of which was not determined, was found causing moderate damage to alfalfa by Mr. F. Kinsman. The plants were noticeably stunted.

DROUGHT INJURY

Alta.- Alfalfa was moderately damaged by drought injury in 2 fields.

WATER INJURY

Alta.- One field of alfalfa suffered moderate injury from excessive water.

COMMON CLOVER

COMMON LEAF SPOT - Pseudopeziza Trifolii (Biv.-Bern.) Fuck.

P.E.I.- Common leaf spot was moderately destructive to clover.

POWDERY MILDEW - Erysiphe Polygoni DC.

B.C.- Powdery mildew was fairly general and caused slight

damage in the Fraser valley and on Vancouver island. It also caused severe damage to red clover at Summerland.

Ont.- Powdery mildew was recorded on volunteer plants of red clover at Kenora.

Que.- The disease was general along the lower St. Lawrence from Cap Rouge to Rimouski, but it caused slight damage.

N.B.- Powdery mildew was general and severe in York, Carleton, Sunbury, Charlotte, Victoria, Kings and Westmoreland counties.

P.E.I.- This disease caused slight to severe demage to red clover in all 3 counties.

RUST - Uromyces Trifolii (Hedw. f.) Lév.

B.C.- Rust was general in the Fraser valley on red and alsike clover, especially the former; the damage was slight. A trace of rust only was found on white clover at Agassiz.

Sask.- Clover was moderately infected with rust along a roadside at Watson.

Man.- Volunteer plants of alsike clover were moderately rusted at Winnipeg and Lac du Bonnet, as were also those of white clover at Winnipeg.

Que.- Rust was common on clover in pastures, but it apparently caused little damage in western Quebec. It was not present in every field in eastern Quebec, but where it did occur, the plants in certain patches were covered with rust and the leaf surface was badly dried up.

P.E.I.- Rust heavily infected red clover in Queens county.

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

Sask.- Sooty blotch was found on a few plants of alsike clover by the roadside at Watson.

Que.- Sooty blotch was fairly common on clover at Ste. Anne de la Pocatière and caused some drying-up of the foliage.

P.E.I.- Sooty blotch caused slight damage to red clover in Queens county.

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

Alta.- A light infection of anthracnose was found on red clover in the University plots.

STAGONOSPORA LEAF SPOT - Stagonospora Meliloti (Lasch) Petr.

Alta.- Leaf spot caused moderate damage in one field in zone 10.

MOSAIC - Virus

B.C.- Mosaic was seen only occasionally on red clover, while it is quite general on white clover in the Salmon Arm district.

Ont.- Mosaic affected 47% of the plants in the breeding block of red clover at the Experimental Farm, Ottawa (2069). Many of these plants were severely stunted, while others were a goodly size, but showed more or less well-marked symptoms of mosaic. The high percentage of plants affected is remarkable as all plants that did not appear healthy for any reason had been rogued out late in the season the previous year. Mosaic was quite prevalent in other plots of clover, where the plants were not individually spaced, but the diseased plants were not as noticeable as they were more or less supressed by the more vigorous healthy plants. (I.L. Conners & M. Timonin)

CERCOSPORA LEAF SPOT - Cercospora zebrina Pass.

Man.- Volunteer plants of alsike clover were moderately infected with this leaf spot at Lac du Bonnet.

DOWNY MILDEW - Peronospora Trifoliorum de Bary

P.E.I.- Clover was moderately infected with downy mildew in Queens county.

SWEET CLOVER

MOSAIC - Virus

B.C.- Mosaic affected about 0.5% of the sweet clover in the Salmon Arm district.

CROWN ROT - Sclerotinia sp.

Alta.- Crown rot caused a trace and 10% damage respectively in 2 fields out of 6 examined.

Sask.- Crown rot destroyed 10 plots at the Experimental Station, Scott.

Man.-Volunteer plants were slightly affected by crown rot at Brunkild.

LEAF SPOT - Pseudopeziza Medicaginis (Lib.) Sacc.

Man.- Leaf spot was abundant on volunteer plants along the river bank at Winnipeg (J.E. Machacek).

Examination of the material showed clearly that the leaves are affected by a Pseudopeziza in good condition. The only previous record of the occurrence of P. Medicaginis on sweet clover that I was able to locate was one by Tracy and Earle (Miss. Agr. Exp. Sta. Bull. 34:106. 1895), when they report its occurrence not only on Medicago sativa but also on Melitotus alba and Vicia villosa. However, F.R. Jones (U.S. Dept. Agr. Bull. 759:21. 1919) was unable to infect Melilotus alba with the Pseudopeziza from Medicago sativa and similarly Horsfall (Cornell Univ. Agr. Exp. Sta. Memoir 130. 1930) failed to infect the same host with P.

Trifolii. Further studies on the morphology and host specialization in these species are necessary (cfr. Nannfeldt, Nova Acta Reg. Soc. Sci. Upsaliensis ser. 4,8:179. 1932, and Jones, l.c.) (I.L. Conners)

STEM CANKER - Stagonospora Meliloti (Lasch) Petr.
Man.- A trace of stem canker was present throughout the province.

CORN

BACTERIAL STALK ROT - Bacterium dissolvens Rosen
Sask.- A trace of bacterial stalk rot was found at Indian Head.

SMUT - Ustilago Zeae Unger
Man.- Corn was moderately infected with smut at the Experimental Station, Morden. At least a trace of corn smut occurs generally throughout the province.
Que.- Corn smut was found in 3 fields in Kamouraska county. Diseased specimens were received from Rivière du Loup, St. Sylvère, and Danville. Damage was a trace.
N.B.- A trace of smut was found on Twitchells Pride at the Experimental Station, Fredericton.

RUST - Puccinia Sorghi Schw.
Que.- A trace of rust was present in one field at Ste. Anne de la Pocatière.

FLAX

RUST - Melampsora Lini (Ehrenb.) Desm.
Sask.- A trace of rust was found in one field out of 3 examined.
Man.- A trace of rust was present at Roblin, Sanford and Brunkild. Three other fields were free.

WILT - Fusarium Lini Bolley
Man.- A trace of wilt was recorded at Brandon and Wawanesa.
Ont.- Some strains of flax showed up to 60% wilt in a progeny test on wilt-sick soil at Ottawa.

BROWNING - Polyspora Lini Laff.
Alta.- Sixty per cent of the seeds in a sample from Provost were infected with Polyspora Lini.

HEAT CANKER
Sask.- Heat canker caused about 5% damage to a plot at the University, Saskatoon, on July 20, following several hot days.

Heat and drought also caused premature dying of the stem tips in August at the University. It was rather conspicuous in small areas in several widely scattered plots.

MANGEL

BLACK LEG - Phoma Betae (Oud.) Frank

B.C. Black leg caused a loss of 2% in a field of seed plants on Vancouver island.

MOSAIC - Virus

B.C.- Mosaic affected about 5% of the plants being grown for seed in one field on Lulu Island, near Vancouver. The grower was advised to rogue out the diseased plants. (J.W. Eastham)

The above is the first report of this disease in Canada. It occurs on beet, sugar beet and mangel in Europe (Kohler, E., Viruskrankheiten. In Soraurer Handb. d. Pflanzenkr. Band 1, Teil 2, 6te Aufl. pp. 479-482. 1934). It was first found in the United States in 1915 on sugar beet and it has become of considerable importance in Washington, where garden beets are grown for seed, since its appearance in 1929. (Jones, L.K., The mosaic disease of beets. Wash. Agr. Exp. Sta. Bull. 250. 1931)

SOYBEAN

MOSAIC - Virus

B.C.- About 30% of soybeans were affected with mosaic in the selection blocks at the Experimental Station, Summerland.

Ont.- A percentage of the plants at the Experimental Station, Harrow, showed mottling, typical of mosaic.

BACTERIAL BLIGHT - Pseudomonas glycinea Coerp.

Sask.- Bacterial blight was collected at Scott on August 15 (2058).

Ont.- About 0.5% of the plants were affected with bacterial blight in the seedling stage in the Forage Crop plots, Ottawa, on June 15. On some plants chocolate brown lesions were present on the stem at the ground line or on the cotyledons. On others the stem was only green and watery. A characteristic bacterium was isolated from the lesions. Plants attacked in the seedlings stage nearly all succumbed, but as these were well scattered in the rows the damage was slight. A slight amount of blight was present on the fully grown plants, but the different varieties were not all equally diseased.

Que.- All plants were slightly infected by bacterial blight at the Experimental Station, L'Assomption.

SUNDAN GRASS

BACTERIAL BLIGHT - Bacillus Sorghi Burrill
Man.- A trace of bacterial blight occurred at Morden.

SUNFLOWER

WILT - Sclerotinia Sclerotiorum (Lib.) deBary
Sask.- This disease caused slight damage at Spy Hill.
Man.- Damage caused by wilt was reported as follows: Oakville, 10% of the plants killed; Niverville, 2%; Morden, trace.
Que.- A trace to 10% of the plants were affected by wilt in 5 fields examined in Kamouraska county.

DOWNY MILDEW - Plasmopora Halstedii (Farl.) Berl. & deToni
Que.- Downy mildew was first observed at Ste. Anne de la Pocatière in June, when the plants were about 6 to 12 inches high. The affected plants remained stunted and did not grow higher than 15 inches except an odd plant. In August, as the result of secondary infection, downy mildew has spread until very few of the remaining plants were free of the disease; large discoloured areas were formed on the leaves, but the plants were otherwise normal. In the 3 fields on the Experimental Station, 61% of the plants remained stunted and were a total loss. Nevertheless, the yield of this year's crop was only slightly less than that of last. In 2 other fields at Ste. Anne, 6% of the plants remained stunted. (C. Perrault)

RUST - Puccinia Helianthi Schw.
Sask.- Traces of the aecial stage were present on July 17, at the Experimental Farm plots, Indian Head, and a slight infection showing uredinia and telia was found on August 16 on all the lower leaves.
Ont.- Rust in the telial stage heavily infected the leaves and to a lesser extent the stems at the Experimental Farm, Ottawa, in September. Many of the leaves were dead from rust.
Que.- Rust was general wherever sunflowers were grown in eastern Quebec. At Cap Rouge, where the disease was more prevalent, it caused yellowing of the affected leaves. A slight infection was reported from Abbotsford.

POWDERY MILDEW - Erysiphe Cichoracearum DC.
Man.- A heavy infection of powdery mildew was reported from Winnipeg.

VETCH

STEM CANKER - Ascochyta sp.
Que.- Stem canker infected 50% of the cultivated vetch plants in a field in Kamouraska county. The stems, leaves and pods were

infected. Diseased plants remained small and dried up early. (C. Perrault)

BROOM MILLET

SMUT - Sorosporium Panici-miliacei (McAlp.) Takah.

Sask.- A correspondent from Alameda reported smut in his hog millet for the previous three years.

N.B.- Smut was found in one plot at the Experimental Station, Fredericton.

CULTIVATED GRASSES

AWNLESS BROME GRASS (Bromus inermis)

Ergot (Claviceps purpurea (Fr.) Tul.) heavily infected volunteer brome grass at Winnipeg and Durban, Man., 75-90% and 100% of the plants respectively, being affected. Infection is general in the province.

A single infected plant was found at Fredericton, N.B.

Leaf blotch (Helminthosporium Bromi (Died.) Drechsl.) was very abundant throughout Manitoba in 1934 on volunteer plants. A trace was present in the experimental plots at Morden, Man.

Leaf spot caused by Septoria bromigena Sacc. and to a lesser extent by S. Bromi Sacc. was general throughout Manitoba on volunteer brome grass along roadsides. A trace of S. bromigena occurred in the plots at Morden, Man.

Scald (Rhynchosporium Secalis (Oud.) Davis) was common in Alberta. It heavily infected one field at Edmonton.

CRESTED WHEAT GRASS (Agropyron cristatum)

Ergot (Claviceps purpurea (Fr.) Tul.) was found in a few fields in the Fraser valley, B.C.

A slight infection was recorded at Winnipeg, Man.

Foot rot nearly destroyed a plot of crested wheat grass in the Forage Crop plots, Ottawa. Isolations from the diseased plants yielded almost entirely Helminthosporium sativum P.K. & B. (M. Timonin)

ITALIAN RYE GRASS (Lolium italicum)

Leaf spot (Ovularia sp.) was fairly well distributed on Vancouver island and in the Fraser valley, B.C. Infection ranged from 10 to 80% of the leaf surface; the loss was slight.

KENTUCKY BLUE GRASS (Poa pratensis)

Arthur (Man. Rusts U.S. and Canada p. 150. 1934) has shown that the rust commonly occurring on this grass should be referred to Puccinia Poae-sudeticae (West.) Jørst. It is not improbable that Puccinia Poarum Niels. may be found in Canada as the aecia

have been collected by Fraser on Tussilago Farfara in Nova Scotia. A slight infection of rust on this grass was reported from Queens county, P.E.I.

Leaf blotch (Helminthosporium vagans Drechsl.) was prevalent in lawns at Edmonton, Alta.

Smut (Ustilago striaeformis (West.) Niessl) was collected on volunteer plants, Ottawa, Ont. (3545)

ORCHARD GRASS (Dactylis glomerata)

Powdery mildew (Erysiphe graminis DC.) caused a trace of damage to orchard grass at Saanichton, B.C.

PERENNIAL RYE GRASS (Lolium perenne)

Leaf spot (Ovularia sp.) was rather heavy and fairly general in the Fraser valley. The lower leaves are mostly affected and wither from the attack.

A trace of ergot (Claviceps purpurea (Fr.) Tul.) was found in a few fields in the Fraser valley, B.C.

TALL OAT GRASS (Arrhenatherum elatius)

A few pustules of stem rust (Puccinia graminis Pers.) was found on tall oat grass in a plot at Charlottetown, P.E.I. (2292)

Leaf spot (Scolecotrichum graminis Fckl.) heavily infected this grass at Agassiz, B.C.

Smut (Ustilago perennans Rostr.) affected 2% of the heads at Agassiz, B.C.

TIMOTHY (Phleum pratense)

Stem rust (Puccinia graminis Pers. var. Phlei-pratensis (Erikss. & Henn.) Stakm. & Piem.) caused heavy damage in all 3 fields examined in Alberta.

Stem rust severely infected volunteer plants at Elm Creek, Lac du Bonnet, and Roblin, Man.

Stem rust was first observed in the Forage Crop plots, Ottawa on June 29. It became prevalent and destructive; some strains were heavily infected, while others were apparently free from rust.

Stem rust was general in timothy fields, but infection was light and caused no apparent damage in eastern Quebec. Timothy was heavily rusted in a field in Laval county.

Stem rust caused light to severe damage to timothy, both cultivated and wild, in Queens county, P.E.I.

Heterosporium leaf spot (H. Phlei Gregory) was abundant on patches of volunteer plants at Carman, Man.

Last year's leaves of timothy were abundantly spotted when the Forage Crop plots, Ottawa, Ont., were examined on May 2. When these leaves were placed in a moist chamber the conidiophores and conidia of the fungus were formed in abundance. A similar production of conidia took place in the field during a rainy period about May 22. (3594) However, the new growth developed more quickly than the disease spread. It appeared to do little damage.

Scolecotrichum leaf spot (S. graminis Fuck.) moderately infected one patch of volunteer plants along the roadside at Oakville, Man.

Traces of ergot (Claviceps purpurea (Fr.) Tul.) were found on wild plants in Queens county, P.E.I.

Smut (Ustilago striaeformis (West.) Niessl) was collected on volunteer plants at Ottawa, Ont. (3587)

WESTERN RYE GRASS (Agropyron tenerum)

Smut (Ustilago bromivora (Tul.) Fisch. v. Wald.) was common in Alberta. In one 10-acre field in zone 10, 45% of the plants by count were infected.

Plants, which were growing along the roadside, were heavily infected at Winnipeg, Man.

Ergot (Claviceps purpurea (Fr.) Tul.) slightly infected wild plants at Winnipeg, Man.

A trace of leaf spot (Scolecotrichum graminis Fuck.) was found in a field at Lacombe, Alta.

LAWNS

Snow mould (cause ?) was common and caused 30-35% damage in two lawns in zone 10, Alberta.

Brown patch (Rhizoctonia Solani Kühn) caused the death of the grass in several areas in a lawn of about 800 sq. ft. at Niagara Falls, Ont., in August.

Slime mould (Physarum cinereum (Batsch) Pers.) covered about one quarter of a small lawn in St. Catharines, Ont., on July 30, (3679). It also spread over the leaves of clover, gaillardia, portulaca, pink, dandelion and chickweed in an adjacent garden.

III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

RUST - Puccinia Asparagi DC.
Man.- Asparagus was moderately rusted at Morden.

TIP ROT - ?Bacillus carotovorus L.R. Jones
Ont.- One third of the shoots collapsed and decayed at the tips in a plot containing about 400 plants in the Horticultural experimental grounds, Ottawa. (M. Timonin)

BLIGHT - Cause unknown
Ont.- A blight, which withered the young grass just before it reached the cutting stage, caused considerable loss in Lincoln county in June. The stalks looked as if they had been frozen, but the damage was not localized in the field, the wilted plants being scattered. Isolations were negative. (J.K. Richardson)

BEAN

MOSAIC - Virus
B.C.- Up to 80% of the wax bean plants and 25% of the kidney beans were affected with mosaic in the Summerland district.
Alta.- Beans showed a trace to heavy infection by mosaic at the Experimental Station, Lethbridge, and at two other places in southern Alberta.
Que.- Trace of bean mosaic was present in a field at Abbotsford.
P.E.I.- Mosaic was severe in nearly all plantings of beans in Queens county.

RUST - Uromyces appendiculatus (Pers.) Lév.
Que.- Rust severely infected American Wonder pole beans at Hudson Heights, but it appeared too late to cause appreciable damage.
N.B.- Bean rust was general and severe on pole beans in York county.
N.S.- A trace of rust was found on pole beans at Kentville.
P.E.I.- Traces of rust were present in one plot in Queens county.

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

Man.- A scattered infection of anthracnose was found at Pine Falls.
Que.- Anthracnose slightly to severely infected beans depending on the variety at the Experimental Station, Cap Rouge. Stringless Green Pod was the variety most severely diseased. It also caused heavy damage in a home garden in St. John county.

N.B.- Anthracnose was general in gardens in York and Sunbury counties.

P.E.I.- Anthracnose caused slight to severe damage in all 3 counties.

BACTERIAL BLIGHT - Pseudomonas Phaseoli E.F. Sm.

Alta.- Bacterial blight caused a trace to slight damage in 2 plots in zone 2, out of only a few examined.

Sask.- Bacterial blight caused moderate damage to beans at the Scott Experimental Station. The 3 varieties most heavily infected were Beauty, Early Wonder, and Hunter. A trace was also found at Swift Current and in a home garden at Saskatoon.

Man.- Bacterial blight was general throughout the province and at some places, including the Morden Experimental Station, it was severe.

Ont.-About 25% of the plants were affected with bacterial blight in a late crop of beans in Lincoln county. Apparently the seed was heavily infected for many seedlings were killed before, or shortly after emergence. Pods affected with the disease were received from Chatham. Blight was also present at Ottawa. (3680)

Que.- Bacterial blight infected 5 to 50% of the plants according to the variety grown at Cap Rouge. It was severe in a small garden at Abbotsford and a trace was present at Farnham.

N.B.- Bacterial blight was general in York, Carleton, Queens, Sunbury and Charlotte counties, but the damage was slight.

WILT - ?Fusarium Martii App. & Woll. var. Phaseoli Burkh.

Ont.- Wilt destroyed about 30% of the plants in a plot at Rockcliffe.

STREAK - ?Virus

Ont.- Specimens of diseased beans from a field in Welland county showed small necrotic lesions on the leaves. The identical symptoms were produced on bean plants in the greenhouse by transferring the virus of tobacco mosaic to them. It was suspected that the field beans were similarly affected. (G.C. Chamberlain)

BROAD BEAN

BACTERIAL BLIGHT - Bacillus Lathyri Manns. & Taub.

B.C.- What appeared to be this disease was general at the Experimental Station, Sidney. It was also fairly generally distributed on Vancouver island and in the Fraser valley.

BEET

SCAB - Actinomyces scabies (Thaxt.) Güssow

P.E.I.- About 1% of the beets were scabby in a plot in Queens county.

LEAF SPOT - Cercospora beticola Sacc.

Ont.- Leaf spot moderately infected beets in a large garden in Welland county. It was also noticed in small garden plots. A light infection was reported from Westboro.

Que.- The disease was common on beets in eastern Quebec from Lotbinière to Rimouski. A trace to slight infections were reported from Lennoxville, Ste. Dorothée, and Abbotsford.

BROCCOLI

GREY LEAF SPOT - Alternaria herculea (Ell. & Mart.) J.A. Elliott (= A. Brassicae (Berk.) Bolle)

B.C.- Grey leaf spot caused slight damage in one field at Duncan.

BLACK LEAF SPOT - Alternaria circinans (B. & C.) Bolle (= A. Brassicae Sacc.)

B.C.- A slight general infection of black leaf spot was found on broccoli at Saanichton.

BRUSSELS SPROUTS

CLUB ROOT - Plasmodiophora Brassicae Wor.

N.B.- Club root was severe on brussels sprouts in one garden in Sunbury county.

CABBAGE

CLUB ROOT - Plasmodiophora Brassicae Wor.

B.C.- Club root caused 60% damage in one field near Victoria. The disease occurs widely scattered on Vancouver island and in the Fraser valley. It is also reported on cauliflower.

Que.- Club root was observed in at least 25 fields in Laval county. It appears to be increasing each year. The soil reaction varied from p^H 5 to p^H 8. The damage was less on alkaline soil although a high percentage of the plants were affected. Specimens of cabbage affected with this disease were also received from Montmagny and Rivière du Loup.

N.B.- Club root affected 95% of the plants in one garden in Sunbury county.

N.S.- Young cabbage plants which were grown in flats at the Experimental Station, Kentville, were destroyed by club root. A few turnip stecklings had been started in the greenhouse during the winter and the soil was used again for the cabbage plants.

P.E.I.- Club root infected 1.5% of the cabbage in a field in Queens county.

SOFT ROT - Bacillus carotovorus L.R. Jones

Que.- A trace of soft rot was present in early cabbage not harvested as soon as they should have been at Abbotsford.

BLACK LEG - Phoma Lingam (Tode) Desm.

B.C.- Black leg infected 100% of the pods in 2 acres of Danish Baldhead (Penn. State strain) and one acre of Golden Acre grown for seed at Dewdney in the Fraser valley in June. The crop was destroyed to prevent it becoming established in the province. Although all known cruciferous crops being grown for seed were inspected, the disease was not found in any other fields. (J.W. Eastham)

BLACK LEAF SPOT - Alternaria circinans (B.& C.) Bolle
(= A. Brassicae Sacc.)

B.C.- Black leaf spot affected the pods and stems of plants being grown for seed at the Experimental Farm, Agassiz. The damage was estimated to be 20%.

DAMPING OFF

Sask.- Damping off caused severe damage to cabbage, lettuce, snapdragon and other garden plants being raised in flats in the greenhouse at Saskatoon in April and May. The disease was also troublesome in the spring of 1933. The seed and soil treatments tried were not effective, but they may not have been carried out properly. Pythium de Baryanum Hesse was isolated from diseased plants. (T.C. Vanterpool)

Ont.- Damping off caused by Rhizoctonia Solani Kühn infected one half of the 50,000 plants being grown in plant beds by a grower in Lincoln county on February 21. Lesions were found on the roots which weakened the plants.

GREY MOULD - Botrytis cinerea Pers.

Que.- Affected specimens were received from East Angus.

CARROT

YELLOWS - Virus

N.B.- Yellows was general and severe in York and Sunbury counties, 75 to 90% of the plants being affected.

SCLEROTIAL ROT - Sclerotinia Sclerotiorum (Lib.) de Bary

B.C.- This rot infected 90% of the roots in one field at Aldergrove in November, resulting in severe damage. Heavy losses occur in storage wherever it has been observed, but this appears to be the first record of the disease being serious in the field. (W. Jones)

CAULIFLOWER

CLUB ROOT - Plasmodiophora Brassicae Wor.

Que.- Club root was observed in a few fields in Jacques Cartier county; where the disease is present, the damage is severe. In general cauliflower is not as severely affected as cabbage.

N.B.- Club root was severe in one garden in Sunbury county; 90% of the plants were infected.

P.E.I.- One per cent of the plants were infected in a field in Queens county.

BLACK LEAF SPOT - Alternaria circinans (B.& C.) Bolle
(= A. Brassicae Sacc.)

B.C.- Cauliflower was slightly infected, mostly on the lower leaves, by black leaf spot at Saanichton.

Man.- This disease was injurious in one field at Winnipeg, where cauliflowers had been grown for about 20 years. It was followed in some cases by soft rot. This is the first time it has been noted in Manitoba.

SOFT ROT - Bacillus corotovorus L.R. Jones

B.C.- Soft rot caused slight damage in a few fields of the Saanichton district.

Que.- A trace of soft rot was present at Ste Dorothée.

CELERY

LATE BLIGHT - Septoria Apii Chester

B.C.- Late blight damage varied from 0-30% in the Gordon Head, Duncan and Keating districts on Vancouver island.

Man.- Celery was moderately infected at Winnipeg.

Ont.- Late blight due to S. Apii was noted in several localities in Lincoln county, but it severely infected a vigorously growing late planting of Golden Plume in the middle of September. However, the disease was brought under control by 4 semi-weekly applications of Bordeaux. Late blight caused by S. Apii var. graveolentis Dorogin was severe and caused moderate damage to Plume varieties in Lincoln county, where the plants had been inadequately sprayed, but it was of minor importance where the spraying was thoroughly done.

Que.- Late blight was very destructive to self blanching varieties in Laval and Jacques Cartier counties where spraying was omitted or not thoroughly done. Specimens from Abord à Plouffe, and Abbotsford were infected by S. Apii var. graveolentis. (2049) A very light infection of late blight was observed in the test plots at Cap Rouge.

N.S.- A few rows of celery were heavily infected by late blight at the Experimental Station, Kentville.

P.E.I.- Late blight caused slight to severe damage in Queens county.

EARLY BLIGHT - Cercospora Apii Fres.

Man.- Celery was slightly infected by early blight at the Morden Experimental Station. This is the first report to the Survey from Manitoba.

Ont.- A ¼ acre field of Golden Plume became heavily infected in Lincoln county when the plants were less than one foot in height. Thorough applications of Bordeaux made every 3 or 4 days for several weeks entirely controlled the disease.

Que.- A trace of early blight was found at L'Abord à Plouffe.

STUNT or YELLOWS - Virus

Alta.- Stunt caused severe damage in one plot and a trace in two others in zone 10.

SOFT ROT - Bacillus carotovorus L.R. Jones

Sask.- Diseased specimens were received from a private garden at Meota.

DROP - Sclerotinia Sclerotiorum (Lib.) de Bary

Alta.- One report of this disease was received from Edmonton.

Ont.- Drop affected 10% of the plants in a small plot of celery in the Horticultural plots, Ottawa, on May 27.

BLACK HEART - Physiological

Ont.- Black heart was a little later and was less severe than in 1933, in Lincoln county. Damage was confined to the earlier plantings of Paris Golden and Golden Plume.

FERTILIZER INJURY

Ont.- Excess of nitrogen fertilizer caused root burning, resulting in severe stunting and yellowing of the plants, in a 6-acre plantation in the Holland Marsh area.

CUCUMBER

SCAB - Cladosporium cucumerinum Ell. & Arth.

Que.- Scab was observed on cucumbers at the Bonsecours market, Montreal. According to the grower it caused severe damage. A trace was also found at Abord à Plouffe. Diseased specimens were also received from East Hereford.

N.B.- Scab was general and severe in York, Sunbury and Queens counties.

P.E.I.- Scab caused moderate damage in one planting in Queens county.

FUSARIUM ROT - Fusarium sp.

Que.- Diseased specimens were received from Farnham at St. Catharines.

MOSAIC - Virus

Alta.- A trace of mosaic was found on cucumbers in hot frames at Ponoka.

EGG PLANT

VERTICILLIUM WILT - Verticillium Dahliae Kleb.

Ont.- In all fields visited in Lincoln county wilt was present and caused the premature death of plants and a considerably reduced yield. (J.K. Richardson)

DRY FRUIT ROT - Alternaria sp.

Ont.- Considerable fruit rot was again observed in Lincoln county on several varieties. For the first time typical necrotic lesions were found on the leaves. The Alternaria isolated from these lesions induced the typical dry rot of the fruit reported last year.

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

N.S.- Early blight caused about 5% damage to seedling egg plants at the Kentville Experimental Station.

P.E.I.- Early blight caused slight damage in Queens county.

GINSENG

PAPERY LEAF SPOT - ?Verticillium sp.

Ont.- Isolations from spotted foliage of specimens received from Orangeville yielded Verticillium. The damage was moderate. (A.A. Hildebrand)

HOPS

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

B.C.- Downy mildew was serious in one yard of the Clusters variety in the Fraser valley, where the crowns were not treated. In yards, where the crowns were dusted early with calcium cyanamide, the disaese was markedly checked. In one section germinating hop seedlings furnished an ample supply of conidia, which resulted in the rapid spread of the disease to adjoining plants. Most of the damage occurred in the early stages of growth. (W. Jones)

CHLOROSIS - Virus

B.C.- Chlorosis is still prevalent on Fuggles and Golding varieties in the Fraser valley, but it does not seem to reduce the yield to any appreciable extent.

HORSE RADISH

PALE LEAF SPOT - Ramularia Armoraciae Fuck.

P.E.I.- Pale leaf spot infections varied from a trace to heavy on horse radish in Queens county.

KALE

CHLOROSIS

B.C.- Chlorosis affected 10% of the kale plants in a plot at Saanichton. The symptoms were typical of a virus disease. (W. Newton)

LETTUCE

DROP - Sclerotinia Sclerotiorum (Lib.) de Bary

Alta.- Drop caused severe damage to two plantings of lettuce at Edmonton.

Que.- Traces of drop were found in a planting in Jacques Cartier county.

DOWNY MILDEW - Bremia Lactucae Regel

B.C.- Downy mildew caused moderate damage to lettuce being grown for seed at the Experimental Farm, Agassiz.

Que.- Downy mildew was heavy on lettuce, which was being allowed to go to seed in the Montreal district. It did little damage to marketable lettuce.

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

Que.- Damping off caused severe damage to lettuce in a planting in Jacques Cartier county.

CULTIVATED MUSHROOM

BUBBLES - Mycogone perniciosa Magn.

Que.- Bubbles caused moderate damage to a bed of mushrooms in Montreal. This is the first record of the disease from Quebec.

TRUFFLE DISEASE - Pseudobalsamea microspora Diehl & Lamb.

Man.- The truffle disease caused severe damage in a mushroom bed in Winnipeg. This is the first record of the disease in Canada.

WHITE PLASTER MOULD - Oospora fimicola (Cost. & Matr.) Cub.& Megl. (=Monilia fimicola Cost. & Matr.)

Ont.- White plaster mould caused a total loss of the beds in a grower's cellar in Welland county. This is the first record to the survey.

ONION

NECK ROT - Botrytis Allii Munn
Man.- Neck rot infected 10% of the onions in a field at St. Norbert.
N.B.- Neck rot was reported from Woodstock.

SMUT - Urocystis Cepulae Frost
Man.- A slight infection of smut was reported from Winnipeg. The disease is not commonly found in Manitoba.
Que.- Smut caused slight damage in a planting in Rosemont. (2054)

DOWNY MILDEW - Peronospora Schleidenii Unger
B.C.- Downy mildew was fairly general on Vancouver island and in the Fraser valley. It caused severe damage only where onions are being grown for seed.

RUST - ?Puccinia sp.
Man.- Aecia of a rust was obtained at McCreary. The exact species was not determined.

SMUDGE - Colletotrichum circinans (Berk.) Vogl.
Smudge affected from 10 to 35% of the bulbs in a 50,000 shipment mostly of white onions, about 1% were injured. These onions were grown at Winnipeg, Man., and Bowmanville, Ont. (2295)

PEA

POWDERY MILDEW - Erysiphe Polygoni DC.
B.C.- Powdery mildew was widely distributed on Vancouver island and it was rather severe in some fields; at Keating for instance, up to 20% damage was caused.
Alta.- Powdery mildew was present on the varieties at Edmonton and Brooks.
Sask.- The Duke of Albany variety was a complete failure in a market garden at Quill Lake.
Man.- Peas were heavily infected at Winnipeg.
Que.- A trace was found at Abbotsford and Lennoxville.
N.B.- Powdery mildew was general and severe in York, Carleton, Sunbury, Charlotte, and Queens counties.
P.E.I.- Peas were moderately infected in a field in Queens county.

LEAF AND POD SPOT - Ascochyta Pisi Lib.
B.C.- Peas were heavily infected at the Agassiz Experimental Farm.
Alta.- Leaf and pod spot was present in Edmonton and Lethbridge.
Sask.- About 50% of the pods were affected in the variety Acacia at Scott; traces were found on other varieties.

Ont.- Leaf and pod spot slightly infected field peas at Ottawa. (3686, 2051)

Que.- The disease was severe and general at Cap Rouge and Ste. Anne de la Pocatière.

N.S.- A few scattered plants were infected in many gardens at Kentville; the damage was 1-2%.

LEAF BLOTCH - Septoria Pisi West

Sask.- A trace was found in one garden at Swift Current and in another at Saskatoon.

Man.- Spot blotch slightly infected peas at Morden.

Ont.- A trace of leaf blotch was present at Ottawa (3713).

P.E.I.- Spot blotch caused severe damage in a garden at Brackley Beach (3711).

RUST - Uromyces Fabae (Pers.) de Bary

Ont.- Field peas were slight infected in the Cereal plots at Ottawa.

Que.- Rust appeared late in the season in western Quebec. It was also present in every field of peas at the Experimental Station, Ste. Anne de la Pocatière. It caused no damage on account of its late appearance.

N.B.- Rust was general on peas at the Experimental Station, Fredericton.

P.E.I.- Rust was often heavy and caused severe damage to garden peas in Queens county.

MOSAIC - Virus

Alta.- Mosaic was noted in the variety plots at Edmonton and Brooks.

Ont.- Mosaic was found in field peas in the Cereal plots, Ottawa. Most of the infection was in a range of plots close to a block of red clover affected with mosaic (2057), while the replicates in a second range and thus further removed from the red clover were practically free from mosaic.

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

Que.- This blight caused severe damage, according to the grower, in a field in Laval county.

WILT and ROOT ROT

Alta.- Wilt (Fusarium sp.) was reported from the variety plots at Edmonton and Brooks.

Root-rot (several fungi) was also found at Edmonton and Brooks.

Sask.- A trace of root rot was found in a home garden at Saskatoon. Pythium de Baryanum Hesse was isolated.

Man.- A trace of root rot (Fusarium ?Solani var. Martii) was reported from Morden.

BACTERIAL BLIGHT - Pseudomonas Pisi Sackett

Alta.-Bacterial blight was found in the variety plots at Edmonton and Brooks.

Que.- Bacterial blight was general on one variety at Ste. Anne de la Pocatière. It appeared to be a very susceptible variety.

PEPPER

ROT - Alternaria sp.

Ont.- Dry rot caused moderate damage to practically all varieties of pepper in Lincoln county. The ripening fruits appear to be more susceptible than those which are still green (J.K. Richardson).

Que.- Rot caused heavy loss of the fruits first reaching maturity in Laval county. Mature fruits were most frequently diseased. Alternaria was always present on the spots. (E. Lavallée)

POTATO

The growing of potatoes for seed is an important industry in Canada, especially in Prince Edward Island. Mr. John Tucker, Chief Potato Inspector, has provided data in the form of tables, which give information on the extent of the industry, the chief varieties grown, the reasons why fields failed to pass inspection and the average percentage of three important diseases, blackleg leaf roll, and mosaic given by provinces. All fields were planted with certified seed.

Of the fields inspected, 2584 or 27.5% failed to pass inspection on account of disease or other causes. In 1933 there failed to pass 24.1%, a slightly smaller figure. The chief cause of rejection was the presence of mosaic in excess of amounts permitted in the regulations (2% on the 1st inspection, 1% on the second); 45.8% of the rejections were on account of mosaic. The percentage of rejections for other diseases or causes are given in Table 3, (p.40).

LATE BLIGHT - Phytophthora infestans (Mont.) de Bary

B.C. Late blight appeared the latter part of July, about 2 weeks earlier than in 1933. It was prevalent in the Fraser valley, on Lulu island and the northern end of Vancouver island and caused a 30% reduction in yield. Losses in storage are also being reported. This is the first time late blight has been recorded on Vancouver island. Only a few growers spray with Bordeaux. (W. Jones)

Que.- Late blight developed September 15, which is later than usual. The damage was practically nil, due to the dry weather

Table 1 - Seed Potato Certification: Number of Fields and Acres Inspected, 1934

Province	Number of Fields		Fields Passed %	Number of Acres		Acres Passed %
	Entered	Passed		Entered	Passed	
P.E.I.	4,587	3,296	71.8	17,881	13,193	73.8
N.S.	466	405	86.9	692	623	90.5
N.B.	961	763	79.4	4,439	3,587	80.8
Que.	1,989	1,191	59.9	2,363	1,221	51.7
Ont.	600	503	83.8	1,975	1,659	84.0
Man.	85	61	71.8	324	187	57.7
Sask.	172	155	90.1	511	367	71.8
Alta.	267	243	91.0	261	209	80.1
B.C.	284	210	73.9	364	273	75.0
Total	9,411	6,827	72.5	28,810	21,322	74.1

Table 2 - Seed Potato Certification: Acres of each Variety passed, 1934.

Province	Irish Cobbler	Green Mountain	Bliss Triumph	Rurals	Netted Gem	Early Ohio	All Others	Total
P.E.I.	10,346	2,736	103				8	13,193
N.S.	322	62	199				43	626
N.B.	891	1,950	739				7	3,587
Que.	202	947		29			43	1,221
Ont.	443	101		1,029		10	13	1,659
Man.	79	29	1	1	1	26	50	187
Sask.	79	20	1	1	112	143	11	367
Alta.	23		20		106	34	26	209
B.C.	11	25	1		142	8	86	273
Total	12,396	5,870	1,064	1,123	362	221	287	21,322

Table 3 - Seed Potato Certification: Fields Rejected, 1934.

Province	Mosaic	Leaf Roll	Black Leg	Foreign Varieties	Adjacent to Diseased Fields	Wilt	Poor Cultivation, lack of vigour, etc.	Misc.
P.E.I.	681	1	39	187	299	68		16
N.S.	17	11	3	8	15		7	
N.B.	120	6	8	41	12		1	10
Que.	325	132	39	24	76	168	24	10
Ont.	9	7	20	34	3	7	17	
Man.	8		6	2		7		1
Sask.			4	1			3	9
Alta.		4	5	4			11	
B.C.	24	15	8	3	6	2	7	9
	1,184	176	132	304	411	252	70	55
Rejections as a percentage of fields:								Total
Entered	12.6	1.9	1.4	3.2	4.4	2.7	.7	.6	27.5%
Rejected	45.8	6.8	5.1	11.7	15.9	9.7	2.7	2.3	100.0%

Table 4 - Seed Potato Certification: Average Percentage of Disease Found in the Fields by Provinces, 1934.

Average percentage of disease found in -	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1. Fields inspected	%	%	%	%	%	%	%	%	%
Black Leg	.10	.03	.08	.49	.19	.47	.13	.31	.32
Leaf Roll	.02	.16	.15	.49	.07	.05	.01	.05	.76
Mosaic	1.2	.54	.71	1.41	.09	.61	.01	>.01	.83
2. Fields passed									
Black Leg	.05	.02	.05	.10	.05	.22	.03	.02	.20
Leaf Roll	.02	.12	.10	.21	.05	.06		>.01	.16
Mosaic	.1	.23	.25	.33	.06	.09	.01	>.01	.48
3. Fields rejected									
Black Leg	.34	.08	.23	.63	.87	1.12	1.03	3.52	.64
Leaf Roll	.04	.41	.34	.82	.30	.05	.08	.55	2.47
Mosaic	5.95	2.60	2.46	2.12	.27	1.95	.02		1.81

checking the spread of the disease and preventing much tuber infection. Although unsprayed vines were almost completely destroyed in September.

N.B.- Late blight caused a rot of 0.2 to 0.7% of the tubers in storage by December 11, in several counties. A severe outbreak of late blight occurred in Carleton and Victoria counties.

N.S.- Late blight was not observed to any extent this year. In one small bin at Antigonish, 8% of rot was reported. Small amounts were encountered in Pictou, Cumberland, Colchester, Halifax and Kings counties.

P.E.I.- Late blight was in general less prevalent and destructive than usual. Some individual fields were, however, severely attacked.

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

Man.- Rhizoctonia severely infected 2 fields at St. Norbert. A trace was found at the Morden Experimental Station.

Que.- Rhizoctonia was fairly general in all potato growing districts, but the damage was usually slight. Under Quebec climatic conditions, best results in control were obtained by planting the seed only when the soil was well prepared and warm in order to avoid delay in sprouting.

N.B.- Rhizoctonia slightly infected 423 fields of potatoes in Carleton county. It was estimated that 15% of the misses in the fields were due to this disease. Rhizoctonia was general on the tubers, but usually not over 10% of the tubers were affected. In one lot of 415 bushels, 28.2% bore sclerotia.

N.S.- Rhizoctonia was found on 2 to 8% of tubers of Irish Cobblers in several counties. In one lot of Garnet Chili, 20% of the tubers were affected.

COMMON SCAB - Actinomyces scabies (Thaxt.) Güssow

Que.- Common scab was general and caused slight to severe damage in all potato districts. In one field of Green Mountain 85% of the tubers were severely affected.

N.B.- Scab was less common than rhizoctonia. Percentage of tubers showing scab ranged from 1 to 12% depending on the county.

N.S.- The average percentage of scab found varied from 1 to 6%; in one lot of Irish Cobblers, 18% of the tubers were scabbed.

BLACK LEG - Bacillus phytophthorus Appel

Alta.- Black leg affected from 5 to 25% of the plants depending on the variety in one field in zone 10.

N.B.- Black leg infection averaged 0.1% in Charlotte, Gloucester, Madawaska, Restigouche and Victoria counties, and still less in Carleton and Westmoreland.

N.S.- The 3 highest infections of black leg reported, were 25.9 and 4% respectively, all in Colchester county. The first

field was planted with seed of common stock and untreated. Certified seed planted in the district for the first time showed 3% of black leg, while the parent stock of the latter remained free from the disease. Similarly the second field was planted with uncertified, untreated seed. The seed in the third was certified stock, but untreated, while nearly all the treated seed in 12 fields in the neighborhood gave a crop free from black leg. The disease was also found in small amounts in Antigonish, Pictou, Cumberland and Kings counties, but not in Hants, Halifax or Lumenburg. (W.K. McCulloch)

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

B.C.- Early blight caused from 2 to 20% damage in all potato growing areas on Vancouver island and the mainland. It was found earlier in the season and caused more damage than in previous years. In some fields a high percentage of the plants died down early.

Alta.- Early blight caused 5% damage in varietal test plots and 15-20% in another field in zone 10.

Que.- Early blight was severe in only a few fields where the yield was reduced 30% on account of early blight and drought.

N.B.- Early blight was general in York county. It was less prevalent on potatoes grown on soil to which magnesium sulphate had been added.

N.S.- Early blight was found in all counties. Alternaria rot was present mostly in Colchester and Kings counties, the average infection being 0.5 to 1%. In one lot 7% of rot was found after harvest.

LEAF ROLL - Virus

Que.- Leaf roll was reported from all counties inspected. The heaviest infection was 30% in a field of Early Rose in Charlevoix county.

N.B.- Potatoes from certified stock showed an average infection of leaf roll varying from 0.2 to 0.02% in the different counties.

N.S.- Small percentages of leaf roll were found in fields from certified seed in several counties. One field in Pictou county, from uncertified stock, showed 25% of leaf roll.

MOSAIC - Virus

Que.- The presence of mosaic was the chief cause of rejection. The disease was reported at an altitude of 2,500 feet, where the yield of the diseased plants was much less than on lower land.

N.B.- The average mosaic infection was about one per cent.

N.S.- Mosaic was found in all counties inspected. A 5% infection was reported in a field of Green Mountain in Colchester county.

SPINDLE TUBER - Virus

Que.- A slight percentage of spindle tuber was found in all parts of the province.

N.B.- Spindle tuber affected on the average less than one per cent of the tubers in the different counties.

PHOMA ROT - Phoma tuberosa Melhus, Rosenb. & Schultz

B.C.- Phoma rot was present on a few tubers in the Saanichton district and on Graham island. It is rarely found. (W. Jones)

Que.- In April about 2% of the tubers of the Green Mountain and Irish Cobbler varieties were affected in Portneuf and Champlain counties.

SILVER SCURF - Spondylocladium atrovirens Harz

Que.- It was found on 4 varieties in storage in April and also in the field in October. It was reported from six counties of the province.

N.B.- A trace of silver scurf was found in Carleton county on December 11.

N.S.- At Kentville, 25% of the tubers of Irish Cobbler and Green Mountain were affected with silver scurf.

POWDERY SCAB - Spongospora subterranea (Wallr.) Lagerh.

B.C.- Potatoes were slightly affected with powdery scab on Graham Island and at Kelowna. It is not general in the potato growing sections.

Que.- Powdery scab moderately infected potatoes in Bonaventure, Matane, L'Islet, Temiscouata, Kamouraska and Montmagny counties.

N.B.- The average powdery scab infection was less than 0.1% in Victoria, Restigouche, Madawaska and Carleton counties.

N.S.- Powdery scab was reported in two lots of tubers: 1.5% on Irish Cobbler in Colchester county; less than 1% in Kings county.

BACTERIAL WILT and ROT - Cause undetermined

Que.- This disease affected a trace to 50% of the plants in many fields in Temiscouata, Bonaventure, Rimouski and 10 other counties. It was first observed 5 or 6 years ago and has now increased to alarming proportions. Not only is there a reduction of yield due to the sudden wilting and dying of affected plants, but also from a bacterial decay of the tubers. In many fields from 1 to 50% of the tubers already show decay when harvested. Usually at least one decayed tuber can be found in a hill when the plant exhibits marked symptoms of wilt. Almost always the crop is a total loss.

Affected plants show a wide range of symptoms, of which there are 4 main types:

1. The upper surface of the leaves becomes light yellow and mottled accompanied by an irregular burning and bronzing of the margin of the upper leaves; later the plant wilts, dies and the tubers rot.

2. The yellowing is more pronounced and one side of the plant

is more affected than the other. In such plants there is no wilting nor soft rot, but the tubers exhibit a brown discolouration at the stem end.

3. If there is an abundance of moisture many plants will develop rosette tops accompanied by the formation of aerial tubers. The plants become yellow and the tubers rot, but wilting is not pronounced.

4. The above-ground symptoms described in the 3 previous catagories are absent, but the leaves are soft, slightly rolled and drooping as if there was a lack of moisture. After a few days they lose their green colour, droop, and wither. Sometimes only a single stalk may wilt.

The rot begins at the stem end or through the eyes. Sometimes it is sharply delimited, but at others it is accompanied by vascular discoloration and soft rot. Frequently there are no visible signs of rot, but if the tuber is pressed or cut, it will be found that the interior is completely decayed. (B. Baribeau)

See previous report of this disease in Plant Disease Survey 11(1931):49. 1932.

N.B.- A bacterial rot was reported affecting a trace of the tubers in storage in Carleton and Victoria counties.

DRY ROT - Fusarium sp.

B.C.- One to two per cent of the tubers were affected with dry rot in May on Vancouver island and the Mainland.

FUSARIUM WILT - Fusarium oxysporum Schlecht.

B.C.- Fusarium wilt caused moderate damage to a field of Early Epicure. The organism was isolated from the stems.

N.B.- A trace of Fusarium wilt was found in Carleton county.

VERTICILLIUM WILT - Verticillium sp.

Man.- Verticillium wilt was common in Manitoba this year. It was the worst outbreak in the writer's experience. (J.W. Scannell).

WILT - Cause not determined.

N.S.- Wilt affected 22% of the plants and caused 15% damage in a field of Irish Cobblers in Pictou county. The disease has been under observation for several years (see Plant Dis. Survey 13(1933):33.(1934), and has continued to increase in spite of rogueing. A plot of certified Irish Cobbler was planted on this farm this year, which showed no signs of wilt.

STEM ROT - Sclerotinia Sclerotiorum (Lib.) de Bary

N.S.- A single infected plant was found at Glenmount.

LEAK - Pythium sp.

B.C.- Leak affected 50 to 90% of the tubers in two carloads of potatoes shipped from Kamloops to Vancouver. This disease has been observed in several districts during early harvesting

operations in warm weather. It also causes losses soon after planting in the spring.

SHOE-STRING FUNGUS - Armillaria mellea Fr.

B.C.- Tubers were slightly affected with shoe-string fungus at Pemberton Meadows and Milner. The land had been newly cleared. It has only previously been reported from Manitoba.

GREY MOULD ROT - Botrytis sp.

N.B.- This disease in the form of a leaf spot was general in York and Carleton counties.

MAGNESIUM DEFICIENCY

N.B.- Magnesium deficiency occurred sporadically in York, Sunbury and Carleton counties. In one field in York county the yield was reduced 75%.

P.E.I.- Magnesium deficiency caused severe damage in a field of Green Mountain in Kings county.

FERTILIZER INJURY

P.E.I.- Fertilizer injury was slight in one field in Queens county.

FROST INJURY

Alta.- Frosts in central and northern Alberta greatly reduced the yield.

P.E.I.- Frost caused little damage in the field in September and October.

LIGHTNING INJURY

P.E.I.- Lightning injury was severe in the centre of a field in Prince county.

RHUBARB

CROWN ROT - Cause unknown

Alta.- Crown rot affected 25-30% of the plants in a field at Lacombe and 3-10% in 3 other plantings.

Sask.- Crown rot was present in 3-year old Ruby seedlings in two locations, where rhubarb had not been grown before at Saskatoon. It was beginning to show in a 2-year old plot and the plants were sickly in one, 4 years old, at Speers. It was also reported from Highgate and was severe on Ruby at Swift Current.

P.E.I.- Crown rot severely affected 1% of the Ruby plants in a plot in Queens county.

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

Man.- A trace of Phyllosticta leaf spot was reported from Morden.

Que.- Rhubarb was moderately infected with Ascochyta leaf spot at Lennoxville.

P.E.I.- Leaf spot due to both organisms heavily infected rhubarb in a plot in Queens county.

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

N.S.- Crown gall was observed on rhubarb at the Experimental Station, Kentville. At least an infected plant may always be found in this field.

STREAK - Cause unknown

Sask.- Streak, called in last year's report leaf and petiole spot, affected about 5% of the plants in the two 3-year old Ruby seedling nurseries at the University, Saskatoon. Diseased plants are small and unthrifty as well as showing spotting on the leaves and streaking on the petioles. It would appear that some of the previously affected seedlings have succumbed. (T.C. Vanterpool)

SALSIFY

WHITE RUST - Cystopus cubicus (Strauss) Lév.

Que.- White rust was heavy on salsify at Côte des Neiges and Rosemont. A specimen was received from Montmagny.

SPINACH

DOWNY MILDEW - Peronospora effusa (Grev.) Rabh.

Sask.- Downy mildew caused slight damage in some gardens at Saskatoon.

Man.- The disease was severe in one garden at Winnipeg.

ANTHRACNOSE - Colletotrichum Spinaciae Ell. & Halst.

P.E.I.- Anthracnose was severe in a garden in Queens county in September (2339). It was recorded once previously to the Survey, when it was found at Macdonald College in 1923.

SQUASH

GREY MOULD - Botrytis cinerea Pers.

N.S.- Grey mould destroyed 20% of the squash in storage at Waterville on December 21.

SWEET CORN

SMUT - Ustilago Zeae (Beckm.) Unger

Ont.- Most plantings of sweet corn show a slight general infection of smut in Lincoln county. A diseased ear was also received from Westboro. (2196)

Sask.- A specimen of smut was received from Saskatoon. (2185)

Que.- A trace to 3% of Golden Bantam plants were affected with smut in Laval county. A slight infection was also found at Abbotsford.

N.S.- A trace of smut was observed at Greenwich.

P.E.I.- Golden Bantam was heavily infected in 2 fields in Queens county.

SWISS CHARD

MOSAIC - Virus

Sask.- A trace of mosaic was found in a home garden at Saskatoon. See report under Mangel for further details.

TOBACCO

Mr. N.A. MacRae, Tobacco Division, Central Experimental Farm, Ottawa, compiled the data given below.

(1) Seed Bed

DAMPING-OFF - Pythium de Baryanum Hesse

This disease is still quite prevalent in the province of Quebec. In the northern district one-third of the beds were slightly affected, while in the southern district it was more serious than last year.

BLACK ROOT ROT - Thielavia basicola Zopf

Infection in the northern district of Quebec was quite serious in a few cases, although in the Farnham district there was no perceptible variation in the extent of the seasonal infection.

(2) Field

MOSAIC - Virus

This disease was more serious than usual in Western Ontario. More arid conditions in the soil may have favoured over-wintering. British Columbia reported an 11 per cent infection, whereas the Quebec growers experienced less injury than usual.

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

Odd cases were observed in the Old Belt in Western Ontario.

BLACK ROOT ROT - Thielavia basicola Zopf

Slight infections were reported only from the northern district in Quebec and the Old Belt in Western Ontario.

WILDFIRE - Pseudomonas Tabacum (Wolfe & Foster) Stev.

A general infection of this disease was found on one plantation in the New Belt in Ontario.

BROWN ROOT ROT - Cause unknown

Two areas in one field were discovered to be infected with brown root rot in Western Ontario.

CURLY DWARF - Virus

A few plants of this disease were observed in the Old Belt of Western Ontario.

PHYSIOLOGICAL LEAF SPOT

This condition was common in British Columbia and on the dark sandy loam soils of Western Ontario.

FROST

Early frosts were quite serious during the latter part of August in the New Belt when approximately 5,000,000 pounds of tobacco were lost.

HAIL

In Western Ontario there was considerable damage early in August.

WIND

In the Old Belt several acres had to be replanted as a result of strong winds early in June.

DROUGHT and SUNBURN

Dry weather and sunburn seriously affected the early plantings of Burley and flue in the Old Belt.

TOMATO

BLOSSOM-END ROT - Non-parasitic

B.C.- Blossom-end rot caused about 1% of damage in the Victoria district.

Man.- A trace was present at the Morden Experimental Station.

Ont.- Blossom-end rot was of widespread occurrence in the early crop in the Niagara peninsula.

Que.- This rot was found in many plantings especially in home gardens in the Montreal district. It often caused severe damage. In nine fields at St. Pierre les Becquets a trace to 1% of the fruit were affected, while at Ste. Anne de la Pocatière a trace only was found.

P.E.I.- Blossom-end rot affected 7.5% of the Bonnie Best fruit in a garden in Queens county.

MOSAIC - Virus

B.C.- In half of the greenhouses on Vancouver island it was not uncommon to find 60% of the plants affected with mosaic in April. Although mosaic is generally not severe in the Summerland.

district, 75% of the plants grown from a strain of seed sent for test from Kelowna, were diseased.

Ont.- Mosaic is common in fall-grown greenhouse tomatoes in Lincoln county.

Que.- Seedling plants allowed to grow up in the frames and adjacent to a tobacco field were all affected with mosaic at Abord à Plouffe. A trace to 7% of the plants were affected with mosaic in nine fields examined at St. Pierre les Becquets. Alacrity, John Baer, Heterosis, and Earliana were affected at Cap Rouge, 15% of the plants being diseased in the last variety. A few mosaiced plants were also seen at Ste. Anne de la Pocatière.

P.E.I.- Mosaic affected 7% of the plants in a garden in Queens county.

STREAK- Virus

B.C.- Streak was observed on Vancouver island.

Ont.- Streak is common in the fall crop of greenhouse tomatoes in Lincoln county.

Que.- Streak affected 3 plants in the experimental plots at Cap Rouge. The plots were close to a potato field.

SPOTTED WILT - Virus

Sask.- Spotted wilt affected 10 per cent of the plants by count in a plot of 400 at Saskatoon. Some plants which were attacked early, never fruited. (T.C. Vanterpool)

Ont.- About 40% of the plants in a small block of tomatoes in the Arboretum, Central Experimental Farm, Ottawa, were affected by spotted wilt. This disease has appeared each year on tomato seedlings in the greenhouse for the past 5 years and then spreads latterly in the field. Certain ornamental plants being grown in the greenhouse may well be the source from which it spreads annually to seedling tomatoes. Thrips have been troublesome in the last 2 years. Dr. G. H. Berkeley has demonstrated experimentally the identity of the disease from diseased material sent to him from Ottawa. A paper will appear shortly giving the details of his experiments. This is the first report of its occurrence in Ontario.

LEAF MOULD - Cladosporium fulvum Cke.

B.C.- Leaf mould was found in the majority of the greenhouses on Vancouver island and in the Fraser valley. The average damage was 15%. It was also severe in a greenhouse at Summerland and is present in greenhouses throughout the Okanagan district.

Alta.- Leaf mould was reported from greenhouses at Brooks and Edmonton.

Ont.- The disease was noted in several greenhouses in Lincoln county, but it caused little damage since the crop was largely harvested before it became prevalent.

P.E.I.- Leaf mould lightly infected plants in a greenhouse in Queens county.

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

B.C.- Early blight was fairly general on the foliage in the field on Vancouver island and in the Fraser valley. It caused severe damage to the fruit in some fields in the fall.

Que.- A trace of early blight was present at Lennoxville.

N.B.- Early blight caused severe damage in one field in York county.

P.E.I.- Early blight caused slight damage in one planting in Queens county.

LATE BLIGHT - Phytophthora infestans (Mont.) de Bary

B.C.- Late blight was severe in 2 fields in the Fraser valley. In general infected fruit were mature, cracked or previously affected by early blight.

P.E.I.- Two per cent of the fruit were affected by late blight in a field in Queens county.

LEAF SPOT - Septoria Lycopersici Speg.

Que.- Although this leaf spot severely defoliated tomatoes in Laval county, infection was so late that it caused no appreciable loss of crop. On the other hand it was severe along the lower St. Lawrence from Lotbinière county to Kamouraska. Many young plants were killed and the fruits were also attacked.

N.S.- Leaf spot slightly infected several varieties in a garden at the Experimental Station, Kentville.

P.E.I.- Leaf spot affected 10% of the foliage in a garden in Queens county.

WILT - Fusarium sp.

B.C.- Wilt was present in 10% of the ranges in greenhouse tomatoes in the Victoria district; the average damage was 2%.

Ont.- Wilt affected 20% of the plants in one planting in Lincoln county.

Que.- Wilt destroyed one per cent of the stand in a garden at St. Hyacinth.

WILT - Verticillium sp.

B.C.- Wilt caused severe damage in one field near Vancouver. It was not common.

BUCKEYE ROT - Phytophthora terrestria Sherb.

B.C.- Buckeye rot caused less than 1% damage in the greenhouses on Vancouver island.

BREAKDOWN - Physiological

B.C.- Breakdown caused a trace of damage in one field in Summerland.

SOFT ROT - Phomopsis vexans (Sacc. & Syd.) Harter

Soft rot caused severe damage to tomatoes arriving in Montreal from the West Indies in February. (F.S. Thatcher)

Phoma rot (Phoma destructiva Plowr.) (2321) and Anthracnose (Colletotrichum phomoides (Sacc.) Chest.) (2322) were found affecting tomatoes received at Winnipeg from the Bahamas; the former was the more prevalent.

GREY MOULD - Botrytis sp.

B.C.- Grey mould infection ranged from 5 to 50% in 5% of the greenhouse ranges in the Victoria district; the average damage was 1%.

HAIL

Que.- A hail storm destroyed 25 to 90% of the crop on several farms at St. Pierre les Becquets.

ROOT KNOT - Heterodera marioni (Cornu) Goodey

B.C.- Root knot was found in 20% of the greenhouses in the Victoria district; the damage was 3%.

Ont.- Root knot was found affecting 5% of the plants at the time of transplanting in a greenhouse in Lincoln county.

TURNIP

CLUB ROOT - Plasmodiophora Brassicae Woron.

B.C.- Club root was found in a few garden plots and is apparently spreading in the Vancouver district. In one it caused 10% damage.

N.B.- The disease was general in Carleton, York, Westmoreland, Gloucester, Victoria, Sunbury and Charlotte counties and the damage was severe.

P.E.I.- Club root caused appreciable damage in all three counties.

BROWN HEART - Non-parasitic

N.B.- Brown heart was general in New Brunswick and the damage was severe. Boron applied at the rate of 10 lbs. per acre gave good control (D.J. MacLeod).

P.E.I.- Loss from brown heart was estimated to be $15,000 to $20,000 this year against $25,000 to $30,000 in 1933. Applications of boron reduced the disease very materially under ordinary farm conditions (R.R. Hurst).

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

P.E.I.- Black rot was observed in one field only in Queens county; 1% of the roots were affected.

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

P.E.I.- This rot affected 2% of the Bangholm turnips in storage in November.

DRY ROT - Phoma Lingam (Tode) Desm.

P.E.I.- Dry rot caused slight to severe damage in all 3 counties. Ditmar and Halls Westbury were found affected.

SOFT ROT - Bacillus carotovorus L.R. Jones
N.S.- A few roots were infected by soft rot in October at the Experimental Station, Kentville.

SCAB - Actinomyces scabies (Thaxt.) Güssow
P.E.I.- Traces of scab were found on all varieties in the three counties.

VEGETABLE MARROW

POWDERY MILDEW - Erysiphe Cichoracearum DC.
B.C.- Powdery mildew heavily infected vegetable marrow at Sidney; the damage was a trace.

BACTERIAL WILT - Bacillus tracheiphilus E.F. Sm.
N.S.- A few plants were affected by bacterial wilt at the Experimental Station, Kentville.

IV. DISEASES OF FRUIT CROPS

APPLE

SCAB - Venturia inaequalis (Cke.) Wint.

B.C.- Scab was severe in the Lavington district in 1934, and the disease was controlled with difficulty in many McIntosh orchards. It was slightly less prevalent in the Salmon Arm area. At Sunshine Bay, Kootenay Lake district, 1.9% of the fruit were free of scab on an unsprayed McIntosh tree bearing 774 apples compared to 32.3% in 1933.

Man.- Scab was heavy on two or three trees at Morden.

Ont.- Scab was of little importance in the Niagara peninsula this year. Ascospore discharge was initiated on May 9, but the trees were well advanced before discharge occurred, seasonal discharge was of limited intensity and early season infection was very light. Spread of scab later in the year resulted in the development of pin-point scab and a light infection of the terminal growth. The percentage of foliage infection in the Laboratory orchard, St. Catharines, on October 1st was-on unsprayed trees: McIntosh 59%, Melba 16%, Hume 85%, Joyce 12%, Courtland 90%, Fameuse 50%, Spy 60%, Delicious 25%, Duchess 10%, Baldwin 65%, Greening 30%; and on sprayed trees: 0-11%, Greening being the most heavily infected. (G.G. Chamberlain)

Que.- For the first time since 1929 when the Spray Service was started, conditions were unfavourable for scab development in southwestern Quebec. The perithecia matured later and in much smaller numbers than in previous years. Usually the ascospores are mature when the trees reach the "green tip" stage, but this year the first mature ascospores were found only when the fruit buds were in the "pre-pink" stage. The slight initial development of scab was attributed to (1) Conditions unfavourable for perithecial formation last fall on account of the early winter - heavy snowfall and considerable freezing occurred by October 25, while most of the leaves were still on the trees - (2) a very dry spring; no rain fell between May 22 and June 9. The one and only discharge of ascospores occurred on May 22. A careful examination of trees in many orchards revealed that primary infection consisted of only a very few spots on sepals and the leaves of the fruit spurs. Due to the lack of initial inoculum only a few additional spots were formed during 3 or 4 secondary infection periods. They were localized near the calyx end of the apples. Late or pinhead infection was also very slight although the weather was quite favourable. (F. Godbout)

Scab was present in every ochard in the lower St. Lawrence valley, depending on the number of sprays and the timeliness of their application. The disease was difficult to control late in the season, especially on late varieties. Of the commercial varieties McIntosh and Fameuse were most affected. (C. Perrault)

N.B.- Scab was severe on unsprayed trees, but it was satisfactorily controlled where a regular spray schedule was carried out. Ascospore discharge began on May 15 in the St. John valley. (S.F. Clarkson)

N.S.- Good control of scab was obtained in well-sprayed orchards in the Kentville area. An application of Bordeaux in July controlled late infection. Scab was first observed on a few leaves on May 25.

P.E.I.- Scab was satisfactorily controlled where a spraying schedule was followed. It was found on all varieties of apple except Russet and in all 3 counties. It was sometimes severe. (R. R. Hurst)

FIRE BLIGHT - Bacillus amylovorus (Burr.) Trev.

B.C.- A single affected shoot of Jonathan was found by Mr. R.P. Murray in the Keremeas district. This is the first record of its occurrence in the above district.

Sask.- Fire blight was again epidemic at Saskatoon. Its presence in city gardens was reported more frequently than in 1933, probably due to the fact that last year's cankers were not removed.

Holdover cankers, from which fresh bacterial exudate was oozing on May 15, were observed on large limbs of Transcendant crabs. In some instances the flow of exudate was so copious that it ran down the limb about 2 inches. There was also a great deal of limb blight, which probably arose from an extension of the pathogen from fruit and leaf spur cankers. Bud infections of last year resulted in a large percentage of blighted leaf and fruit spurs on some trees. Many of the buds just opened, while others expanded from one to three inches before drying up. All the foregoing observations were made before blossom time and bee visitation. There seems to be no doubt that holdover cankers are a source of inoculum, even in the cold climate of Saskatoon, before the bees begin to visit the trees. The prevalence of the disease and the presence of fresh exudate were remarkable under the dry conditions, which prevailed in May. (T.C. Vanterpool)

Man.- Scattered infections of fire blight caused slight damage at the Morden Experimental Station.

Ont.- Diseased specimens were received from Pembroke.

Que.- Fire blight was about as prevalent this season as last in the apple-growing districts of western Quebec. At least a slight amount of blight in the form of both blossom and twig infections was present in almost every orchard. Spread of blight probably occurred during the rain that fell on May 21-22, and the rainy spell from June 10 to 16. Further spread was prevented by the dry weather, which followed. Winter injury was particularly severe on branches bearing fire-blight cankers. These branches bore light green to yellowish foliage, which was easily distinguished from that on normal, healthy branches. Old fire blight cankers, which had escaped notice in previous years, were found in 2 blocks of Fameuse at Hemmingford and in one of McIntosh at Chateauguay. If the districts are considered individually, observations may be summarized as follows: at Abbotsford, marked increase of fire blight, blossom infection being severe in Alexander and Duchess trees adjacent to each other in one orchard; in the Rougemont and

St Hilaire districts, about the same amount as last year varying from a trace to slight; in the Hemmingford-Covey Hill-Franklin Centre, the Chateauguay, the Oka-St. Joseph du Lac, and the Cowansville-Frelighsburg districts, fire blight decreased. Only a slight amount was also present at Lennoxville. (H.N. Racicot)

Fire blight infection was slight on several varieties at Macdonald College. It was slightly more prevalent on Alexander, on which holdover cankers were present in addition to the usual blossom blight and twig blight. (R.F. Suit)

Fire blight was observed in small amounts in Bellechase, L'Islet, and Kamouraska counties. (C. Perrault)

P.E.I.- Fire blight was observed in one abandoned orchard; the infection was slight.

BLACK ROT - Physalospora obtusa (Schw.) Cke.
(Sphaeropsis Malorum Pk.)

Que.- The fungus was prevalent in cankers due to winter injury at Macdonald College and it appeared to be spreading into healthy tissue. Leaves were slightly to moderately infected. (R.F. Suit)

N.B.- Black rot caused severe damage in an orchard at Lakeville Corner; the infection was mostly on the leaves.

RUST - Gymnosporangium spp.

Ont.- Rust (G. Juniperi-virginianae Schw.) was reported on Wealthy in Lincoln county.

Que.- A trace of rust (G. clavipes Cke. & Pk.) was found on St. Lawrence, McIntosh, Fameuse and Alexander in Kamouraska county. The rust developed much later than last year and on most fruit it did not mature before harvest.

N.S.- Rust (G. clavipes Cke. & Pk.) affected 10-15% of the fruit on a few small unsprayed crab apple trees atnthe Kentville Experimental Station. Less than 1% were also affected on sprayed Gravenstein trees.

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

N.S.- At Kentville 20% of type IX root stock was affected by crown gall.

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

B.C.- Powdery mildew was fairly general, but the infection was slight on Vancouver island and in the Fraser valley.

In the southern districts of the Okanagan valley, powdery mildew was more severe and widespread this season than any year since the Summerland Laboratory was established. It was found on Jonathan and McIntosh; 10 to 50% of the fruit were marked. (J.C. Roger and T.B. Lott).

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

B.C.- Anthracnose is general in neglected orchards on Vancouver

island and in the Fraser valley. Early varieties are the most susceptible, while Northern Spy is apparently highly resistant.

PERENNIAL CANKER - Gloeosporium perennans Zeller & Childs

B.C.- Perennial canker slightly infected Newton, Spitzbergen and other varieties in the Okanagan valley. This disease is gradually increasing in orchards, where woolly aphids are not kept under control. It is most severe after heavy winters; this year the amount of new infection has been very slight.

WOOD ROT - Schizophyllum commune Fr.

Que.- This fungus was found in cankers due to winter injury on at least 50 trees at Macdonald College. (R.F. Suit).

CROWN ROT - Non-parasitic

B.C.- Crown rot was reported affecting heavy bearing trees of Spitzbergen, Winesap, McIntosh and other varieties in Yale county. It appears to be increasing in some orchards.

DIE BACK - Non-parasitic

B.C.- Die back was very prevalent on April 30, in one orchard in the Trepanier district. The trees had just passed full bloom and the little leaf phase of the disease was evident. (H.R. McLarty).

BREAKDOWN - Non-parasitic

B.C.- Breakdown rendered 75% of the Jonathan crop unfit for use in an orchard in Yale county. It was very severe in many districts this year.

STIPPEN - Non-parasitic

B.C.- Stippen was exceptionally severe in Winter Banana and other varieties in Yale county this season; 2-20% of the fruit were affected.

CRINKLE CORK - Non-parasitic

N.S.- Crinkle cork affected 3% of the fruit of the Wellington variety in the spray plots at Somerset.

BURR-KNOT - Non parasitic

Ont.- One tree of Delicious was affected with burr knot at Port Credit. It is unusual to encounter this trouble in Delicious. (G.C. Chamberlain)

TWIG BLIGHT - Nectria cinnabarina (Tode) Fr.

Que.- One infected twig was found at Ste. Anne de la Pocatière. It was also found on October 1 on twigs and branches of 3 trees following winter injury at Macdonald College. The fungus has spread slightly into healthy bark.

N.B.- Twig blight was found in September following winter injury.

EUROPEAN CANKER - Nectria galligena Bres.

N.S.- European canker affected McIntosh trees at the Kentville Experimental Station; its prevalence varied with the injury caused by the buffalo tree hopper. (K.A. Harrison)

SILVER LEAF - Stereum purpureum (Pers.) Fr.

Man.- One tree was badly top-killed by silver leaf near Emerson.

N.S.- A few trees were affected with silver leaf, among several thousand being produced at Kentville.

BITTER PIT - Non-parasitic

N.B.- Bitter pit was severe on Baxter in an orchard in Queens county.

FRUIT ROT - Botrytis cinerea Pers.

B.C.- Fruit rot affected from .25 to .50% of the McIntosh fruit at picking time in the Salmon Arm and Lavington districts.

DIE BACK - Valsa leucostoma (Pers.) Nits.

Man.- Die back moderately infected apple trees at the Morden Experimental Station.

TWIG BLIGHT - Cytospora sp.

Que.- Cytospora was very common on trees that suffered winter injury; it was found practically in every orchard in the district about Ste. Anne de la Pocatière.

It was also found throughout the summer on bark, which had been injured by the winter, at Macdonald College.

TWIG BLIGHT - Phomopsis Mali Roberts

Que.- This organism was isolated from dead limbs from three orchards in L'Islet and Kamouraska counties. A Phomopsis sp. (possibly Mali) was found associated with many cankers due to winter injury at Macdonald College.

HAIL

B.C.- Hail ruined 2 to 50% of the crop in limited areas in the Okanagan valley.

SCORCH - Mineral deficiency

Ont.- Scorch was very prevalent and marked in a large planting of seedlings at the Vineland Horticultural Station.

WINTER INJURY

I am indebted to Mr. M.B. Davis, Dominion Horticulturist, for the following summary on winter injury not only suffered by apple, but also by small fruits and other tree fruits. Some additional observations may be found under cherry, peach, and plum.

B.C.- The winter of 1933-34 was very mild in this province with the result that orchards suffered practically no winter injury. Small fruits also came through in a very satisfactory condition. Considerable loss was experienced in strawberries and raspberries, but this was more the effect of excess water than frost.

Man.- Apple varieties suffered in various ways from winter injury. Hibernal, which had been considered one of the hardiest apple varieties, was severely cracked down the trunk and main branches. Many Morden-named and numbered varieties, Ottawa varieties and others that were normally considered hardy were severely dried out by the cold winds. This resulted in delayed and uneven foliation in the spring and the extent of this injury will not be fully known until the summer of 1935.

Of the named plums, Assiniboine was, perhaps, the hardiest variety. A number of the Morden seedlings of Assiniboine, Pembina, and Cree wintered 100 per cent and produced a large crop of fruit. Most of the named varieties failed to set more than a few fruits. Oka was killed back 50 per cent.

Bartlett and Gifford pears killed 100 per cent; Anjou 10 to 90 per cent, mostly about 50 per cent; Winter Nelis, 10 to 90 per cent, mostly about 40 per cent; Tyson, 80 to 100 per cent; Clapps 20 to 80 per cent, mostly 40 per cent. The following varieties came through the winter comparatively free of injury: Tait 1, 2, and 4; Hansen 23, 32, and 34; Patten 1200, 1211, 1213, and 2999; Gogal, Tolstoy, Patten, Minnesota 1 and 3; Liaoyang 10, 25, 50, and 100; Mendel, Saponisky, Ovoidea, and Ussurian.

Ont.- The situation in Ontario is rather difficult to sum up. However, there appears to be little doubt but that it suffered more, in so far as apples are concerned, than any other province in Canada. The estimated apple crop reduction in Ontario, due mainly to winter injury, was approximately 65% of the average of the previous five years' production, and 70% of the 1933 crop.

The injury to leaf and fruit buds was very severe and nearly all varieties suffered. At Ottawa, every fruit bud was killed on all varieties except the hardy Russian sorts, Saunder's hybrids and a few of the early standard ones such as Crimson Beauty, Yellow Transparent, Duchess of Oldenburg, Joyce, and Melba. The leaf bud injury was not nearly as severe as that of the fruit buds, but in many varieties these too were all killed. While the loss of fruit buds was a serious economic factor in this province, the injury that occurred to the woody tissues above the ground was of a far more destructive nature and in many cases the trees were killed completely. Trunk or body injury, crotch injury, and killing back were all very prevalent and were responsible for the major destruction. In Oxford county, all the Baldwin trees and 80% of the Wagener's were killed outright, while the King variety was badly injured. In Norfolk county 50% of the Baldwin, Wagener, Golden Russet, and Scarlet Pippin trees died, while Greening was injured to a marked degree. In Lambton county varying degrees of injury were present

in Baldwin, Greening, Golden Russet, and Spy varieties. In Elgin and Middlesex counties, the percentage injury was not greatly in excess of 10%. In Durham and Halton counties, Greening, Ontario, Gravenstein, Wagener, and Spy showed considerable injury, while Baldwin and King were severely injured. In Northumberland and Peel, varying amounts of injury were reported in Baldwin, Spy, Cranberry Pippin, Ben Davis, and King, but the number of trees lost was very small. In Dundas county, the injury was confined to the older heavy cropping trees of the late winter and the Fameuse varieties; the McIntosh variety was not seriously affected. In Halton county, Bartlett and Keiffer pears as well as Japanese plums were very severely injured. Peaches and sweet cherries were completely killed and grapes severely injured.

Small fruits did not suffer to any greater extent than in normal years.

Que.- The apple crop of 1934 was 60% less than the previous year and 40% below the 1929-33 average; it was caused principally by winter injury in 1933-34. Eight per cent of the trees were killed outright in the Montreal region according to a statistical report of the Quebec Department of Agriculture. Taking the province as a whole, about 40% of the commercial orchards were damaged by frost, 20% had their fruit buds frozen and 20% of the trees were killed. The orchards on the Island of Orleans, Côte de Beaupré and Isle aux Coudres suffered very little injury.

Most of the late winter and less hardy varieties such as Baldwin, Spy, Ben Davis, Golden Russet, St. Lawrence, Milwaukee, Scarlet Pippin, and Alexander were completely killed. A very large proportion of the Fameuse and Wealthy trees suffered the same fate, especially where the latter bore heavy crops the previous year. The Yellow Transparent, Duchess, Melba, Joyce, Lobo, and McIntosh varieties came through with comparatively little injury.

Pear trees were practically eliminated. The European plums suffered heavily in the L'Islet and Quebec districts, while on the Island of Orleans, the injury was very slight. Most of the cherry trees were killed out and very few now remain in the province. Small fruits did not suffer to any marked degree. The strawberry crop was about normal, with a slight reduction in the raspberry crop due to moderate cane killing in some sections.

N.B.- The estimated number of trees lost in commercial orchards was less than 1%. There were of course, some few orchards which had a larger percentage of late winter varieties and in these the loss of trees ran as high as 5%.

The injury was most noticeable on young grafts of Northern Spy, and on the older and heavy cropping trees of late winter and other varieties which are on the border line so far as hardiness is concerned, such as Gravenstein, Northern Spy, Bishop Pippin, Ben Davis, Stark, and Golden Russet; the first four varieties sustaining the more severe injury. Fameuse and Wealthy were less injured, except on those trees which bore heavy crops in 1933, and McIntosh had a still smaller degree of injury. Apart from some

bud injury, early varieties were not affected.

Small fruits wintered well due to the very heavy snow coverage and no injury was experienced. Considerable mechanical injury in the form of cane breakage was experienced in raspberries.

N.S.- The estimated crop reduction of apples in Nova Scotia due to winter killing of 1933-34 was approximately 5%. (However, production was 10% above the previous 5 year average).

In the Annapolis Valley, many trees were injured during the past winter to some extent, but this did not prevent them from throwing out leaves and in many cases producing fruit in 1934. There is, nevertheless, evidence to show that many of these trees are not entirely normal and any further adverse conditions, would tend to increase the amount of injury showing up in subsequent years. In the eastern and northern counties, King, Gravenstein, Ontario, Baldwin, and Spy were badly killed out. Ben Davis also suffered somewhat and Golden Russet to a lesser extent in exposed locations. McIntosh, Wealthy, Duchess, Bishop Pippin, and Stark wintered well as a rule, although the latter suffered slightly in exposed locations.

Other tree fruits were not injured enough to cause any reduction in the 1934 crop. Pears showed practically no winter injury in the commercial varieties. Plums showed some bud injury, which effected the production of blossoms in 1934, but in spite of this, a good crop was produced. Sweet cherries showed a great deal of bud injury and in many orchards only a few blossoms were produced. Blackhearting was also prevalent; however, in any year in Nova Scotia sweet cherries suffer more or less from such injury and it was no greater in 1933-34 than in previous years. Sour cherries appeared to be little affected. Peaches, grapes, and small fruits were not injured.

General Note - The commercial production of apples in Canada in 1934 dropped 30% from that of 1933 and 11% from that of the previous five year average, due mainly to the extremely heavy winter injury in the central provinces.

APRICOT

DROUGHT SPOT - Non-parasitic

B.C.- Two to 100% of the crop was unfit for sale on account of drought spot in a few orchards in Yale county.

BLIGHT - Coryneum Beijerinckii Oud.

B.C.- The fruit of 2 trees only was wholly unmarketable due to blight at Longbeach, near Nelson. The disease occurs at the coast and was reported from Lillooet in the Dry Belt in 1932, but up to the present it has not been found in the areas where apricots are grown commercially. (J.H. Eastham)

BLACKBERRY

ORANGE RUST - Gymnoconia Peckiana (Howe) Trotter

Ont.- In one planting of Eldorado in Lincoln county, 12% of the plants were rusted. Wild blackberries in the vicinity were also heavily infected.

Que.- Orange rust was found on a few uncultivated plants at Abbotsford in June.

POWDERY MILDEW - Sphaerotheca Humuli (DC.) Burr. var. fuliginea (Schlecht.) Salm.

Alta.- A specimen was received from Calgary on July 18; immature perithecia were present.

BLUEBERRY

RED LEAF - Exobasidium Vaccinii (Fuck.) Wor.

P.E.I.- Wild blueberries were found affected at Mermaid Lake.

CHERRY

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

B.C.- Leaf spot caused more damage in 1934 than previous years on Vancouver island. In a few orchards it was prevalent on the leaves, pedicels, and fruit, thereby causing defoliation and some loss of fruit. Ordinarily shot hole is confined to the leaves. (W. Jones)

Ont.- A light infection of shot hole was reported on Mayduke and Richmond varieties on July 9 in an orchard in Lincoln county. Montmorency was not yet affected.

P.E.I.- Shot hole caused slight to very severe damage on both cultivated and wild cherries in all 3 counties.

BLOSSOM BLIGHT - Sclerotinia cinerea Schroet.

B.C.- Blossom blight infected 50% of the blossoms in early April at the Sidney Experimental Station; the damage was 20%. Lime sulphur spray was not very effective in controlling the disease. The causal organism was referred to Monilia oregonensis Barss & Posey, a form of S. cinerea. (W. Jones)

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

Que.- Brown rot is present on most trees in eastern Quebec.

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

Que.- Black knot is very common on old trees in Kamouraska and L'Islet counties.

P.E.I.- Black knot caused slight to severe damage on wild and cultivated cherries in all 3 counties.

WITCHES' BROOM - Taphrina Cerasi (Fuck.) Sadeb.

B.C.- Witches' broom caused 5% damage to Royal Anne cherries in an orchard in Lillooet county. Adjacent trees of the Byng variety were only slightly affected.

WINTER INJURY

Que.- Most cherry trees in Kamouraska county are old trees, which have received practically no attention. On account of previous injury by brown rot and black knot they were severely affected by the low temperatures of last winter. Most of these trees were severely injured or completely killed. (C. Perrault)

SCORCH - Mineral deficiency

Ont.- Scorch affected Montmorency trees in an orchard in Lincoln county. Soil analysis showed lack of potash. A similar condition was noted on sweet cherries and young peach trees in the same orchard. (G.C. Chamberlain)

DIE BACK - Non-parasitic

B.C.- A few trees are affected with die back in several orchards throughout the Okanagan valley. Large branches or often the entire tree may be killed in one year. (J.C. Roger)

GUMMOSIS - Cause unknown

P.E.I.- Only traces of gummosis were found this year on cultivated cherries in Queens county, while it affected 50% of the trees in 1933. (R.R. Hurst)

CURRANT

WHITE PINE BLISTER RUST - Cronartium ribicola Fischer

Ont.- Black currant leaves affected with this rust were received from the Ottawa district.

Que.- White pine blister rust was common again on wild and cultivated currants in south-western Quebec.

N.B.- Blister rust was general and severe on wild and cultivated currants in York and Sunbury counties.

N.S.- Rusted specimens of black currant were received from Great Village.

P.E.I.- White pine blister rust heavily infected red and black currants in Queens county, while traces were present on gooseberry.

CLUSTER-CUP RUST - Puccinia Pringsheimiana Kleb.

Man.- Black currants were heavily infected by this rust at Winnipeg.

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

Man.- A severe infection of Septoria leaf spot was reported on black currant from Winnipeg.

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

B.C.- Powdery mildew caused slight damage to black and white currants at the Experimental Station, Summerland.

Alta.- Powdery mildew was reported on black currant from Hilliard, zone 11.

Sask.- Powdery mildew moderately infected most of the red currant bushes in the University orchard, Saskatoon (3631); affected specimens of black currant were received from Hafford.

Ont.- Powdery mildew moderately infected Champion and Giant currants in a planting in Lincoln county. It was also noticed in several other plantings.

GOOSEBERRY

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

B.C.- A single bush was slightly affected at Summerland.

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

Que.- A moderate infection of this leaf spot was recorded at Macdonald College.

GRAPE

YELLOWING - Cause unknown

Ont.- Yellowing was quite prevalent this year, affecting 1-2% of the vines of Concord, Niagara, and Warden varieties throughout Lincoln county. It causes a yellowing of the foliage, stunting of the growth, and shelling of the fruit. The trouble may possibly be due to either winter injury or drought conditions in shallow soils; it appears to be of a physiological nature.

DOWNY MILDEW - Plasmopara viticola (B. & C.) Berl. & de Toni

Que.- A trace of downy mildew was found at Macdonald College.

LOGANBERRY

SPUR BLIGHT - Didymella applanata (Niessl.) Sacc.

B.C.- Spur blight was general and caused 2% damage in a planting at Saanichton.

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

B.C.- Septoria leaf spot was general on loganberry on Vancouver

island and in the Fraser valley; the damage was 3%.

ANTHER and STIGMA BLIGHT - Haplosphaeria deformans Syd.
B.C.- Anther and stigma blight infected 30% of the flowers and caused 10% of damage to loganberry on Vancouver island and in the Fraser valley.

MELON

WILT - Fusarium sp.
B.C.- Wilt infected 4% of the vines of melons grown out of doors at Keating; the damage was slight.

NECTARINE

POWDERY MILDEW - Sphaerotheca pannosa (Wallr.) Lév.
B.C.- Powdery mildew caused moderate damage to nectarines grown at the Experimental Station, Summerland. The disease is widespread wherever nectarines are grown.

PEACH

LEAF CURL - Taphrina deformans (Berk.) Fuck.
B.C.- Leaf curl was found on a few leaves on 2 Elberta trees in the Laboratory orchard, Summerland; the disease is not common.
Ont.- Leaf curl slightly infected peaches in many orchards in Lincoln county; the damage was negligible.

BROWN ROT - Sclerotinia americana (Worm.) Nort. & Ezekiel
Ont.- Brown rot in any of its phases was not serious this year on Rochester in the Laboratory orchard, St. Catharines. In shipments to Western Canada in August and September, however, the damage amounted to as much as 25% in the experimental shipments from check trees. Where the trees had been sprayed or dusted the fruit was almost clean.
The percentage of brown rot in experimental shipments of Elberta in September was not serious even in the checks this year, less than 3% of the fruit being affected on arrival in Western Canada and 10% in shipments to England. The weather was cool although precipitation was fairly abundant during harvest. (R.S. Willison)

Botrytis cinerea Pers. and Rhizopus nigricans Ehr. caused slight and moderate damage respectively, to the fruit of J.H. Hale in an orchard at Penticton, B.C.

POWDERY MILDEW - Sphaerotheca pannosa (Wallr.) Lév. var. Persicae Woron.
B.C.- Powdery mildew caused slight to moderate damage at the

Experimental Station, Summerland.

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

Ont.- Trees of Elberta were found seriously affected with many large galls when they were dug up in an orchard in Lincoln county. The poor vigour of the trees, however, was not ascribed to the presence of crown gall, but to their being located on poor soil.

CHLORSIS - ?Mineral deficiency

Ont.- This trouble was observed in the Laboratory orchard, St. Catharines, and has not yet caused serious damage. Most of the affected trees exhibit a peculiar faint interveinal chlorosis, while the leaves of some are affected by marginal scorch and the fruit of 2 or 3 trees are also dwarfed. This condition was observed to a lesser extent last year; the variety J.H. Hale seems to be the most seriously affected. The cause has not yet been definitely determined. (R.S. Willison)

WINTER INJURY

Ont.- Low temperatures in February caused very serious damage in the western part of the Niagara peninsula. The fruit buds were almost a total loss and many trees were either killed outright or seriously damaged. Besides, the canker outbreak of 1933 was an added complication. In the eastern part the injury was less serious, but was similarly complicated by canker. At the Laboratory orchard, St. Catharines, approximately 50% of the buds were killed on Elberta, and on other varieties the percentage ranged from 6-7% in Greensboro to 90% in Vedette. Frost cracks occurred in the bark and in the large limbs, many of which became cankered subsequently. Twig killing, however, was not serious. (R.S. Willison)

PEAR

FIRE BLIGHT - Bacillus amylovorus (Burr.) Trev.

B.C.- Fire blight was very severe on Prasse Crassane and severe on Anjou, Le Nectier, and Winter Nelis at the Experimental Station, Sidney, and the trees of these varieties were dug up and destroyed. Clairgean was slightly infected, while 45 other varieties did not show symptoms of the disease. (W. Jones)

Ont.- Fire blight was present to a limited extent in the Niagara peninsula, following the serious outbreak in 1933. Where the disease was observed, infection was slight and was mostly confined to very young wood or the leaves.

SCAB - Venturia pyrina Aderh.

B.C.- Scab caused moderate damage to pears on Vancouver island and in the Fraser valley. It was also reported in an orchard at Salmon Arm.

N.S.- Scab was present to a limited extent in the experimental orchard, Kentville.

P.E.I.- The disease caused slight damage in an orchard in Queens county.

DROUGHT SPOT - Non-parasitic

B.C.- A few trees are affected with drought spot in each district of the Okanagan valley.

BLACK-END ROT - Non-parasitic

B.C.- Black-end rot was present in a few orchards in the Okanagan valley. Usually the whole crop on an affected tree is lost. (J.C. Roger)

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

B.C.- Powdery mildew was widespread on pears wherever they are grown in the Okanagan valley; the damage was slight.

GREY MOULD ROT - Botrytis cinerea Pers.

B.C.- A single rotted fruit was noted in an experimental lot of pears in cold storage.

PLUM

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

Que.- Black knot is well under control is eastern Quebec wherever the trees are sprayed, but it has killed nearly all the trees in old negected orchards. A specimen was also received from St. Philippe.

N.B.- Black knot caused the death of several trees at Rose Bank according to a correspondent.

N.S.- A few knots were noted at the Experimental Station, Kentville.

P.E.I.- Black knot caused slight to severe damage in all 3 counties except at the Experimental Station, Charlottetown, where the disease is under control.

PLUM POCKETS - Taphrina Pruni (Fuck.) Tul.

Man.- Cultivated Prunus nigra was moderately infected at Winnipeg.

Que.- Diseased specimens were received from Chicoutimi West.

N.B.- Plum pockets was severe on two trees at the Fredericton Experimental Station.

P.E.I.- Two per cent of the Green Gage fruit were affected in the experimental orchard, Charlottetown.

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

B.C.- Brown rot was rather serious in some orchards in the Fraser valley; the damage was 5%.

Alta.- A disease specimen was received from Manyberries.
Que.- Brown rot is general in old unsprayed orchards, and badly affected trees bear a considerably reduced crop.
P.E.I.- Traces of brown rot were noted on Magnum Bonum in the experimental orchard, Charlottetown.

SHOT HOLE - Higginsia prunophorae (Higg.) Nannf.
(Cylindrosporium prunophorae Higg.)
Man.- A trace of shot hole was found at the Morden Experimental Station.
Que.- About 75% of the leaves were severely infected on the 12 trees in the Macdonald College orchard; there was some defoliation.
N.B.- Shot hole was general on cultivated and wild plums in York county.
P.E.I.- Shot hole was very destructive in several orchards in Kings county.

SCAB - Cladosporium carpophilum Thum.
Ont.- Diseased specimens of Prunus nigra were received from Pembroke.

WINTER INJURY
Ont.- Over 50% of the cultivated varieties in the Georgian Bay district were killed outright by the severe winter.

RASPBERRY

SPUR BLIGHT - Didymella applanata (Niessl) Sacc.
Ont.- In one plantation at Dunrobin spur blight was found as follows: moderate on Herbert; trace on Count, Chief, Starbright, and Latham; and none on Viking. Infected specimens were received from Jasper.
Que.- Spur blight was less prevalent this year than in 1933. A slight amount occurred in a few Herbert plantations, a very slight amount in those of Latham and Newburg and traces in plantations of Viking, Newman, Cuthbert, Chief, Count, and Adams 87. (H.N. Racicot)
P.E.I.- Spur blight caused slight to severe damage to Herbert, Cuthbert, and Viking in all 3 counties.

SEPTORIA LEAF SPOT - Mycosphaerella Rubi Roark
(Septoria Rubi West.)
Ont.- Leaf spot was reported as follows in a plantation at Dunrobin: moderate on Herbert, trace on Viking, and none on Count, Chief, Starbright, and Latham. Infected leaves were received from Markham.
Que.- Leaf spot infection was moderate on Newburg, slight to moderate on Viking, and a trace on Newman in Laval county. It was also moderate to severe on the lower leaves of both Newman and Latham in Sherbrooke county; it caused some defoliation. (H.N. Racicot)

N.B.- Septoria leaf spot slightly infected a few plants at Rothesay.

MOSAIC - Virus

B.C.- On Vancouver island and in the Fraser valley, Cuthbert, the most popular variety, was only slightly infected. In some plantings of Lloyd George, 50% of the plants were affected with mosaic. The Latham variety was also seriously diseased. The above is based on the observations of Mr. R.V. Harris. (W. Jones)

Man.- Mosaic infection was moderate and patchy in raspberries at Morden.

Ont.- Mosaic is widespread in southwestern Ontario, being particularly prevalent on Viking and Cuthbert varieties. In some plantations as high as 75% of the plants were affected. The disease was the cause of the decline of raspberry plantations in the Georgian Bay district, where the main variety has been King. This variety was generally 100% infected with consequent dwarfing and failure of crop. (G.C. Chamberlain)

A heavy infection was reported on Cuthbert from Carleton Place.

Que.- There was a marked increase of mosaic in raspberry plantations inspected over that of last year. In 28 plantations of Newman, mosaic varied from a trace to 15%, the average being 4.8 per cent, while in 26 plantations in 1933, infection varied from a trace to 10%, and an average of 0.8%. The highest infections in the other varieties were Herbert 3%, Viking 7%, Latham 100%, Chief 3%, Brighton 4%, Cuthbert 3%, Count 2%, King and Adams 87 trace, Newburg none. (H.N. Racicot)

P.E.I.- Mosaic affected a trace to 100% of the plants in all 3 counties; all varieties grown in Prince Edward Island were infected.

LEAF CURL - Virus

Que.- Leaf curl affected a few plants in a Viking plantation and 1% in one of Count. (H.N. Racicot)

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

Ont.- Anthracnose-infected specimens were received from Markham.

Que.- Anthracnose was less prevalent this year than in 1933, only a trace to a slight amount being present on Newman and none or slight traces on other varieties. (H.N. Racicot)

N.B.- Anthracnose was found on a few plants at Rothesay.

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

B.C.- Cane blight caused slight damage in old plantations in the Fraser valley.

BLUE STRIPE WILT - Verticillium sp.

Ont.- Blue stripe wilt is becoming more prevalent in plantations, chiefly in those of Viking and Cuthbert. Many plantations in the raspberry district are now affected with the disease. It causes considerable loss of fruiting wood and is most destructive in the younger plantings. Outbreaks can usually be traced to the culture of tomatoes on the same land a year or two previously and where the young plantation is intercropped with tomatoes. (G.C. Chamberlain)

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

B.C.- Yellow rust was fairly prevalent on Vancouver island and in the Fraser valley. Cuthbert, Viking, and Herbert varieties were heavily and Antwerp slightly rusted. Latham, Newman, Newburg, Count, Franconia, Chief, Lloyd George, Preusen, and Ohta were free of rust at the Experimental Farm, Agassiz. (W. Jones)

It was also found on young Viking plants at Westbank.

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

Ont.- Rust was found in a plantation at Dunrobin as follows: plentiful on Viking; trace on Count, Chief, Starbright, and Latham; and none on Herbert.

Que.- Late yellow rust was very plentiful this year on both wild and cultivated raspberries. It was abundant on Newburg and Viking and somewhat less prevalent on Newman in Laval county on September 26. It was already present on 75% of the leaves in Latham and Newman plantations in Sherbrooke county on August 28. (H.N. Racicot)

N.S.- A rusted specimen was received from Kentville on August 20 (3714).

POWDERY MILDEW - Sphaerotheca Humuli (DC.) Burr.

Sask.- Traces of powdery mildew were observed in August in zone 9.

Ont.- Powdery mildew was widespread in south-western Ontario on Latham, on which it caused distinct dwarfing on the tip growth of the new canes. Much of the early infection appears to become parasitized by Cicinnobolus Cesatii de Bary, as described by Peterson and Johnston in Phytopathology 18:787-796, 1928. It was also found affecting to a lesser extent, Chief, Count, and Brighton varieties, especially under nursery conditions. (G.C. Chamberlain)

A trace was found on Latham in a plantation at Dunrobin, while 5 other varieties were free.

Que.- About 50% of the Latham plants were moderately infected with powdery mildew in a plantation in Rouville county; a trace was also seen in an adjacent plantation of Viking. (H.N. Racicot)

In a plantation of Latham in Temiscouata county the disease infected 100% of the plants reducing the yield considerably. Count in the same plantation was clean. (C. Perrault)

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

Ont.- Galls were observed at the crown on numerous plants in one end of a 5-acre Latham plantation at Kingsville. This portion of the plantation was not at all vigorous, but it was thought that the condition of the soil was chiefly responsible for the lack of vigour rather than the presence of gall. The disease could also be found in the more vigorous area. It was also found no uncommonly in nursery plantings, when they were being rogued for mosaic. (G.C. Chamberlain)

P.E.I.- A single affected Cuthbert plant was found in a planting in Queens county.

SAND CHERRY

BLIGHT - Coryneum Beijerinckii Oud.

Sask.- A trace of blight was noted in the University gardens, Saskatoon.

STRAWBERRY

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

B.C.- Leaf spot is general, but it causes slight damage on Vancouver island and the lower Mainland.

Ont.- The disease was widespread in Lincoln county and was noted in many plantations; the damage was slight.

Que.- Leaf spot slightly to severely infected strawberries at Abbotsford, Ste. Dorothée and Abord à Plouffe; the damage was slight or nil. It was also observed at Macdonald College.

N.B.- Leaf spot was general in York and Queens counties.

N.S.- The disease was noted on 20% of the lower leaves at the Experimental Station, Kentville. It was also reported from Masstown.

P.E.I.- Leaf spot caused slight damage to a planting of Senator Dunlop in Queens county.

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

B.C.- Leaf scorch infected 90-100% of the leaves of Royal Sovereign and caused 5-10% damage in a planting on Vancouver. island, while it only slightly affected the adjoining patch of Magoon. As Royal Soverieign is becoming a popular variety, some growers intend to spray with Bordeaux. This is the first report of leaf scorch from British Columbia.

POWDERY MILDEW - Sphaerotheca Humuli (DC.) Burr.

P.E.I.- Powdery mildew heavily infected Senator Dunlop in a planting in Queens county and practically destroyed the crop.

ROOT ROT - Cause undetermined.

Man.- Root rot infection was heavy in patches at the Morden Experimental Station. (Identified by R.V. Harris and M.B. Davis)

Ont.- Root rot was quite general in the early part of the season in Lincoln county. The plantations under observation were moderately infected in June and July, but they appeared to make an excellent recovery late in the season. Their recovery was outstanding in comparison with their behaviour in previous seasons.

?Xanthosis - Virus

Man.- Strawberries were moderately affected with xanthosis in patches at Morden. (Identified by R.V. Harris and M.B. Davis)

Ont.- A suspected case of virus infection in strawberry was noted in a nursery row of Fairfax (a hybrid between Royal Sovereign and Premier) in Wentworth county. The young plants were much stunted and failed to make growth or to produce runners. There was no distinct yellowing of the foliage. Suspected plants were brought back for study. (G.C. Chamberlain)

JUNE YELLOWS - Undetermined

Ont.- All the Eaton plants in a small planting at the Laboratory, St. Catharines, were affected by June yellows. It causes a yellowing and dwarfing of the plants. Affected material on Blackstone variety was received from Maidstone. (G.C. Chamberlain)

V. DISEASES OF FOREST AND SHADE TREES

ARBUTUS (A. Menziesii)

Leaf spot (Mycosphaerella arbuticola Pk.) was serious on a few trees on Vancouver Island, B.C.

Rust (Pucciniastrum sparsum (Wint.) Fischer) was present on a few trees near Saanichton, B.C.

Tar spot (Rhytisma Arbuti Phill.) was fairly general in the Nanaimo district, B.C.

BALSAM FIR (Abies balsamea)

Witches' broom (Melampsorella Caryophyllacearum Schroet.) heavily infects balsam fir in all 3 counties of Prince Edward Island.

CANKER - Aleurodiscus amorphus (Pers.) Reb.

Que.- Cankers caused by Aleurodiscus amorphus were found on a few suppressed but living trees at Mount Burnet. This fairly common saprophyte has been shown by Hansborough (Jour. Forestry 32:452-458, 1934) to be slightly parasitic.

Dasyscypha Agassizii (B.& C.) Sacc. was collected at Mount Burnet (3685, 3733).

Specimens on balsam collected at Mount Burnet, Que., by Dr. H. T. Güssow were identified as Pleonectria calonectroides Woll. (Zeitschr. f. Parasitenk. 3:493-494, 1931) by Dr. Wollenweber. He states that this species differs from Calonectria balsamea (Cke. & Pk. Sacc. (Scoleconectria b. Seav.) by its more minute sporidia which are formed in a trisporous ascus. (I.L Conners)

BEECH (Fagus)

CANKER - Nectria coccinea (Pers.) Fr.

The Nectria following the attack of Cryptococcus fagi on beech (F. grandifolia) in Nova Scotia and probably elsewhere in eastern Canada has been identified as N. coccinea through the courtesy of Dr. Wollenweber from material collected in 1932, thus confirming his earlier identification of material collected in Nova Scotia in 1925 (H.T. Güssow).

Hypoxylon cohaerens (Pers.) Fr. was collected on beech at Chelsea, Que. (2119, 3135); it appears to be mildly parasitic. (I. L. Conners)

BIRCH (Betula)

Hypoxylon multiforme Fr. was collected on yellow birch in Prince Edward Island.

Drought injury was fairly common this year on birch and maple and conspicuous on some trees in zone 9, Saskatchewan. The leaves turn yellow between the veins and subsequently dry up. (T.C. Vanterpool)

CHESTNUT (Castanea)

BLIGHT - Endothia parasitica (Murr.) A.& A.
Ont.- Diseased specimens were received from West Lorne.

ELM (Ulmus)

A specimen affected with Sphaeropsis ulmicola Ell. & Ev. was received from St. John, N.B. (D.J. MacLeod)

Black spot (Gnomonia ulmea (Schw.) Thüm) was found on two trees at Harvey, N.B.

HORSE CHESTNUT (Aesculus)

Leaf blight (Guignardia Aesculi (Pk.) Stewart (Phyllosticta Paviae Desm.) caused slight to severe damage in all 3 counties of Prince Edward Island.

CANKER - Creonectria purpurea (L.) Seav.
Ont.- Horse chestnut trees affected by this canker were found on the Experimental Farm, Ottawa (2277).
Que.- Ttree trees were so severely affected that they will probably die and one other showed traces at Grande Ligne. (H.N. Racicot)

MAPLE (Acer)

TAR SPOT - Rhytisma acerinum (Pers.) Fr.
B.C.- Tar spot moderately infected the leaves of maple on Vancouver island.
Que.- The leaves of red maple (A. rubrum) were light to moderately affected at Lac Vert and Frelighsburg; young trees of silver leaf maple were affected in a nursery at Abord à Plouffe.
N.B.- The leaves of a group of 6 trees were severely infected in Sunbury county.
P.E.I.- Tar spot slight to severely infected the leaves of A. saccharinum in all 3 counties.

Acer pennsylvanicum was moderately infected by leaf spot

(Septoria acerina Pk.) in Queens county, P.E.I., while the leaves of A. spicatum were slightly to severely spotted by Phyllosticta acericola Cke. & Ell. in all 3 counties.

Sphaeropsis albescens Ell. & Ev. was collected on box elder (A. Negundo) in zone 9, Saskatchewan.

A collection of Nectria on maple from Timberlea, N.S., was identified as N. coccinea (Pers.) Fr. (2284).

MOUNTAIN ASH (Sorbus)

Fire blight (Bacillus amylovorus (Burr.) Trev.) was severe on 3 trees and was present on about 6 others at Macdonald College, Que. It also caused slight to severe damage throughout Prince Edward Island. A number of trees have apparently been destroyed, but strong clean sprouts are rapidly growing up from the crowns that have survived an attack.

A trace of rust (Gymnosporangium clavipes Cke. & Pk.) was collected on mountain ash in the Arboretum, Ottawa, Ont. (3701).

Cytospora leucostoma was found apparently causing die-back to mountain ash branches in a garden at Winnipeg, Man.

OAK (Quercus)

Powdery mildew (Microsphaera Alni (DC.) Wint. var. extensa (C.& P.) Salm.) was heavy on the leaves of an oak tree (probably Q. alba) in a very old wood lot near Charlottetown, P.E.I.

Rust (Cronartium Quercuum Miyabe) heavily infected the leaves of red oak (Q. rubra) especially the fresh dense growth from old crowns at Constance Bay, Ont., in July (2053). Galls of this rust are abundant on jack pine (Pinus Banksiana) in the vicinity. The aecia were beginning to open on May 7. No rust could be found on the few white oaks in this area.

PINE (Pinus)

WHITE PINE BLISTER RUST - Cronartium ribicola Fischer

Que.- White pine blister rust is reaching additional white pine stands each year, but nearly everywhere the damage is still slight. It was observed in six new places as follows: Covey Hill in Huntingdon Co.; Cowansville in Brome Co.; Abbotsford in Rouville Co.; Brownsburg and Lost River in Argenteuil Co., and Lake Guindon in Terrebonne Co. Frequently the cankers have been eaten by

chipmunks or squirrels. (F. Godbout)

N.B.- Four trees were found heavily infected at Oromocto.

N.S.- About half the trees in a small group of young pines have died at the Experimental Station, Kentville.

P.E.I.- Rust caused slight to severe damage to white pine in Queens and Prince counties.

Three blister rusts occur on jack pine (P. Banksiana) at Constance Bay, Ont.: C. Quercuum Miyabe is common on both jack pine and red oak, C. Comandrae Pk. is prevalent in restricted areas on both the pine and Comandra, and C. Comptoniae is general but much less abundant than the other two. Uredinia of the latter have been collected on Comptonia asplenifolia. (I.L. Conners and C.G. Riley)

C. Comptoniae has been collected on both Comptonia asplenifolia and jack pine at Eagle Depot, Que., while aecia of C. Comandrae were also collected there on jack pine last July. Galls resembling those of C. Quercuum were found in fruit at Coo-Coo Depot, about 40 miles south of Clova. However, the rust has not been tested experimentally and the nearest oaks are another 50 miles farther south. These rusts are apparently widely distributed in the areas, where jack pine grows. (C.G. Riley)

Cronartium Comandrae was collected once on P. contorta in the Salmon Arm area, B.C., and was prevalent on the same host at Jasper Park, Alta., while C. coleosporioides (D.& H.) Arth. was found on P. contorta at Cowichan and Salmon Arm, B.C.

The needle rust (Coleosporium Solidaginis (Schw.) Thüm) was collected at Coo-Coo Depot on jack pine (3668) and on red pine (P. resinosa) in nurseries at Grand'Mère and Montreal, Que. (3610, 3611).

Hypodermella ampla (Davis) Dearn. was collected on jack pine at Eagle Depot (3620) and Phoma acicola (Lév.) Sacc. on stone pine (P. Cembra) planted at the Experimental Farm, Ottawa, Ont. (2276).

Sycamore (Platanus sp.)

LEAF SPOT and TWIG BLIGHT - Gnomonia veneta (Sacc.& Speg.) Kleb.

B.C.- The leaves were heavily infected by this leaf spot and cankers were also produced on the younger twigs and leaf petioles at the Experimental Station, Saanichton; the damage was slight. This is the first time the disease has been observed here. (W. Jones)

POPLAR (Populus)

LEAF BLIGHT - Fusicladium radiosum (Lib.) Lindr.

B.C.- Leaves of P. balsamifera L. affected with F. radiosum

var. balsamifera J.J. Davis were collected at Fort St. James in 1933 (3601).

Sask.- Diseased leaves of P. tremuloides were collected at Lanigan (3637).

Man.- Leaf blight was commonly found throughout the province and it frequently caused at least partial defoliation of young trees.

Ont.- The disease was found on P. grandidentata at Constance Bay (3704).

Que.- This disease was moderate to severe on one young tree at Lennoxville.

Another leaf spot (Cladosporium subsessile Ell. & Barth.) was found at Constance Bay, Ont., (2195) on P. grandidentata.

POWDERY MILDEW - Uncinula Salicis (DC.) Wint.

Powdery mildew was found at Emma Lake, Sask., on P. balsamifera and was reported as heavy on P. tremuloides at Kenora, Ont.

HYPOXYLON CANKER - Hypoxylon pruinatum (Klotzsch) Cke.

Sask.- From 5 to 10% of the trees of P. tremuloides were moderately infected in a bluff at Rosthern (3627).

Rust (Melampsora Abietis-canadensis (Farl.) Ludwig) was found on a small tree of P. tremuloides at Lennoxville, Que.

CANKER - Cytospora sp.

Ont.- Cytospora cankers were abundant on a small tree of P. Wilsoni in the Arboretum, Ottawa (3672). C. chrysosperma was collected on P. tremuloides at Constance Bay (3695).

Que.- Cytospora canker was apparently killing from 3 to 6 of the lower limbs in a group of Carolina poplars in Quebec county.

SPRUCE (Picea)

RUST - Chrysomyxa ledicola Lagerh.

Many spruce trees were more or less defoliated by this rust between The Pas and Churchill, Man., according to Dr. P.H. Gregory. (G.R. Bisby)

Specimens on white spruce (P. canadensis) were received from Tingoosh Lake, Man. (3660); Anticosti Island, Que. (2120); and St. Peters, P.E.I. (2290) and on black spruce (P. mariana) from Smokey Falls, Ont. (2071).

WINTER INJURY

One blue spruce tree was severely injured at the Experimental Station, Fredericton, N.B.

ENGLISH WALNUT (Juglans)

BACTERIAL BLIGHT - Pseudomonas Juglandis Pierce

B.C.- Bacterial blight caused 20% damage at the Experimental Station, Saanichton.

WILLOW (Salix)

TAR SPOT - Rhytisma Salicinum (Pers.) Fr.

Sask.- Affected leaves were collected at Emma Lake.

Que.- A slight infection was reported from Laval Station.

P.E.I.- Traces of tar spot were found in Queens county.

SCAB - Fusicladium saliciperdum (All. & Tub.) Tub.

Que.- Diseased specimens were received from the Experimental Station, Cap Rouge. The twigs were affected by Diplodina Salicis West., following the scab.

N.B.- Scab was general and severe in the province.

N.S.- About 20% of the young twigs of S. vitellina were affected at Grand Pré.

Rust (Melampsora Bigelowii Thüm.) was fairly general in the Saanichton district, B.C.

Powdery mildew (Uncinula Salicis (DC.) Wint.) was abundant along the river bank at Winnipeg, Man.

WINTER INJURY TO SHADE TREES

Mr. M.B. Davis, Dominion Horticulturist, supplied the following report on winter injury sustained by shade trees at the Central Experimental Farm, Ottawa, Ontario in 1934.

Deciduous Trees

		% Injury
Acer rubrum	Red Maple	none
" saccharum	Sugar Maple	"
" saccharinum Wieri	Weir's Maple	"
" ginnala	Ginnalian Maple	"
" Negundo	Manitoba Maple	"
" platanoides	Norway Maple	10%
" platanoides Schwedleri	Red Norway Maple	none
" pseudo-platinus	Sycamore Maple	75%
Aeculus Hippocastanum	Horse Chestnut	none
Some hybrid horse chestnuts showed 10 to 50% injury.		
Betula	Birch	none
All species of birch wintered well.		
Carya ovata	Shagbark Hickory	none

		% Injury
Cercidiphyllum japonicum	Katsura Tree	75%
Cladastris lutea	Yellow Wood	25%
Catalpa speciosa		10%
" Bungei		10%
" Kaempferi		10%
Fraxinus excelsior	European Ash	50%
Ginkgo biloba	Maiden Hair Tree	none
Gymnocladus dioeca	Kentucky Coffee Tree	"
Juglans cinerea	Butternut	none
" nigra	Black Walnut	"
" Sieboldiana	Japanese Walnut	"
Liriodendron Tulipifera	Tulip Tree	75%
Magnolia acuminata	Cucumber Tree	40%
Populus (all varieties)	Poplar	none
Quercus pedunculata	European Oak	90%
" alba	White Oak	none
" rubra	Red Oak	"
Salix Niobe	Weeping Willow	none
" pentandra	Laurel Willow	"
Sorbus Aucuparia	European Mountain Ash	"
" americana	American " "	"
Tilia americana	American Basswood	none
Ulmus americana	American Elm	none
" racemosa	Rock or Cork Elm	10%

Conifers

Abies concolor	Silver Fir	95%
" lasiocarpa	Alpine Fir	35%
" balsamea	Balsam Fir	35%
Chamaecyparis pisifera		80%
" " filifera		30%
" " " plumosa		85%
" " " aurea		90%

		% Injury
Juniperus Sabina	Savin	30%
" " humilis		none
" hibernica	Irish Juniper	90%
" virginiana	Red Cedar	90%
Larix europea	European Larch	5%
Picea pungens glauca	Colorado Spruce	none
" " Kosteriana	Koster's Blue Spruce	"
" excelsa	Norway Spruce	50%
" " pyramidalis		35%
" mariana	Black Spruce	25%
" canadensis	White Spruce	10%
Pinus Strobus	White Pine	35%
" resinosa	Red Pine	10%
" sylvestris	Scotch Pine	20%
" austriaca	Austrian Pine	20%
" Cembra	Swiss Stone Pine	none
" contorta latifolia	Lodgepole Pine	5%
" montana mughus	Dwarf Mountain Pine	10%
" Banksiana	Jack Pine	10%
Pseudotsuga Douglasii	Douglas Fir	20%
Thuja occidentalis	Common Cedar	20%
Thuja (garden varieties)		10-40%
Tsuga canadensis	Hemlock	90%

VI. DISEASES OF ORNAMENTAL PLANTS

AIMOND (Persica)

Blight (Coryneum Beijerinckii Oud.) slightly infected one bush at Saanichton, B.C.

ASPARAGUS FERN (Asparagus)

A root rot was found affecting this plant in a greenhouse in Peel county, Ont. The fungi isolated from the roots have not been determined. (G.C. Chamberlain)

ASTER

Powdery mildew (Erysiphe Cichoraceārum DC.) slightly infected the lower leaves of a few plants of A. novae-angliae at Summerland, B.C.

Leaf spot (Septoria atropurpurea Pk.) slightly infected A. tartaricus and Perry's Blue variety of A. novi-belgi at Morden, Man.

AZALEA (Rhododendron)

Red leaf (Exobasidium Vaccinii (Fckl.) Woron.) infected all the leaves on A. Hinodegiri in a nursery near Victoria, B.C. It was not found on A. amoena and A. mollis.

BARBERRY (Berberis)

Pycnia of stem rust (Puccinia graminis Pers.) were present on the common barberry (B. vulgaris) on May 21 at Ottawa, Ont. Young barberry plants in a nursery row in the Arboretum were found rusted as follows: slight on B. Guimpelii, B. macrophylla, B. Vernae, and B. provincialis; moderate on B. emarginata; heavy on B. macrocarpa and B. lucida. A hedge of purple barberry on the Experimental Farm was moderately infected; a single pustule was found on a Mahonia fruit.

Rust slightly to moderately infected both common and purple barberry at Macdonald College, Que. Pycnia were mature on June 2, and aecia on June 10, while some of the latter were still discharging spores on July 9. A very heavy infection was also observed at Cedar Park, Montreal.

About 50 feet of a 400 foot hedge appeared to be suffering from a nutritional disorder at L'Assomption, Que. The leaves were turning yellow to yellowish red and dropping off.

BEE BALM (Monarda sp.)

Rust (Puccinia Menthae Pers.) was reported from Abord à Plouffe, Que.

BOUNCING BET (Saponaria officinalis)

Leaf spot (probably Cylindrosporium officinale Ell. & Ev.) of a shot hole type affected the leaves at Morden, Man., but the fungus was immature.

BUCKTHORN (Rhamnus)

No crown rust (Puccinia coronata Cda.) was present on a hedge at Boissevain, Man., on June 7.

A slight amount of rust was present on buckthorn at Macdonald College, Que.; pycnia were mature on June 2 and aecia on June 10.

CALENDULA

Yellows (virus) was severe on calendula in gardens in York county, N.B. Ninety per cent of the plants were affected at the Experimental Station, Fredericton. (D.J. MacLeod)

Yellows was severe in a garden in Queens county, P.E.I.

CARAGANA

Leaf spot (Septoria Caraganae (Jacz.) Died.) caused slight to severe damage in two hedges at Edmonton, Alta.

The disease heavily infected nearly all caragana hedges at Indian Head, Sask., and caused some defoliation. Light and moderate infections were reported from Swift Current and Saskatoon, respectively.

Crown rot (Fusarium Solani App. & Woll.) was severe on a caragana hedge set out 5 years ago in Saskatoon, Sask. The owner states that it was first noticed last year and has rapidly become worse. Isolated cases of what was probably the same trouble was commonly observed (T.C. Vanterpool). Cultures from isolations were identified as Fusarium Solani by Dr. W.L. Gordon, who reported he has obtained it from affected caragana at Winnipeg, Man., but its pathogenicity had not been tested.

CARNATION (Dianthus)

Anther smut (Ustilago violacea (Pers.) Fuck.) was found in the anthers of all of the 6 plants (3696) in flower on August 1 in the Botany greenhouses, Ottawa, Ont., out of 8 cuttings of diseased plants which were received last December from Toronto. Although no special precaution was taken to prevent these cuttings from becoming contaminated by spores, the results strongly suggest that smut infection is systemic and that once a plant becomes infected, cuttings from it will also carry the contagion. (I.L. Conners)

Rust (Uromyces caryophyllinus (Schrank) Wint.) slightly infected red and white carnations in the Macdonald College greenhouse, Que. It was also found in the Laboratory greenhouse, Ste. Anne de la Pocatière.

Rust was severe on Improved Ward in a greenhouse in Fredericton, N.B.

Leaf spot (Heterosporium echinulatum Berk.) was fairly general on border carnations at Saanichton, B.C.

Grey mould (Botrytis cinerea Pers.) caused some bud rot in a greenhouse at Greenwich, N.S.

CENTAUREA

Powdery mildew (Erysiphe Cicoracearum DC.) was prevalent in several gardens in Lincoln county, Ont.

CENTURY PLANT (Agave)

Nearly all of the 50 century plants in the greenhouse at the Oliver Institute, near Edmonton, Alta., were severely affected and unsightly on account of a bacterial leaf spot. The lesions swarmed with motile bacteria. According to Mr. S.F. Ashby the only bacterial disease reported on Agave is a yellow bacterial blotch found on Agave sisalana at Nairobi in Kenva Colony (cfr. Dowson, W.J., Problems of economic biology in East Africa. Ann. Appl. Biol. 8:83. 1921). (G.B. Sanford)

CHINA ASTER (Callistephus)

Rust (Coleosporium Solidaginis (Schw.) Thum.) was found at Ste. Dorothée, St. Martin and Abbotsford, Que.; infection varied greatly from plant to plant, some being severely rusted.

A single infected plant was observed in a nursery at Sussex, N.B.

Yellows (virus) was present on only a few plants at Summerland, B.C.

Four plants out of 200 were affected with yellows at L'Assomption, Que.

Yellows was severe in gardens in York, Sunbury, and Carleton counties, N.B.

Yellows was severe in Queens county, P.E.I.

Plants affected with wilt (Fusarium conglutinans Woll. var. Callistephi Beach) were received from Peachland and Cranbrook, B.C. The correspondent at the former place reported that most of his plants were affected and dying and at the latter that the disease was troublesome in the district.

Wilt was rather common in zone 10, Alta.; 15% of the plants were affected in one garden.

Wilt infection was moderate at Winnipeg and slight on the Princess variety at Morden, Man.

Wilt had infected 20% of the plants of California Giant in a commercial planting in Wentworth county, Ont., on July 12.

This disease was observed in several gardens at Macdonald College and Ste. Anne de Bellevue, Que. It caused the death of practically all the plants set out in the borders at the Experimental Station, Ste. Anne de la Pocatière; all varieties seemed to be susceptible. Diseased specimens were received from St. Hyacinth.

Some of the plants, that wilted at Ste. Anne de la Pocatière, Que., were killed by a Sclerotinia (S. ?Sclerotiorum (Lib.) de Bary) which developed profusely on the lower part of the stems.

CHRYSANTHEMUM

Powdery mildew (Oidium Chrysanthemi Rabh.) caused 1% damage to

chrysanthemums in greenhouses on Vancouver island, B.C.

Nematode (Aphelenchoides fragariae Ritzema Bos) caused up to 50% infection and 20% damage in a few plots in Saanich county, B.C.; shipments from affected areas were restricted.

CLARKIA

Leaf spot (Alternaria sp.) caused slight damage in one garden in Queens county, P.E.I.

CLEMATIS (C. ligusticifolia)

Leaf spot (Septoria Clematidis Rob.) was severe at Morden, Man.

COLCHICUM (C. autumnale)

Smut (Urocystis Colchici (Schlechtd.) Rabh.) was prevalent in one clump of colchicum (3585) on the Experimental Farm, Ottawa, Ont.; other clumps in the same border were not infected. (M. Timonin) This is the first record of this smut in Canada.

COLUMBINE (Aquilegia)

Powdery mildew (Erysiphe Polygoni DC.) affected plants growing in the Laboratory garden, Summerland, B.C.

Leaf spot (cause uncertain) moderately infected A. flabellatum at Morden, Man.

COREOPSIS

Yellows (virus) was found on 2 plants in a garden at the Experimental Station, Fredericton, N.B.

COSMOS

Stunt (virus?) was found in a garden at Saskatoon, Sask. The plants failed to flower or branch; the upper internodes were short and the plants resembled asters affected with yellows.

DAHLIA

Stunt (virus) was reported on Jane Cowl, Ambassador, Jersey Beacon, Maud Adams, Pride of California, Jersey Beauty, Cigarette, and Mrs. J.A. Clark at Charlottetown, P.E.I.

Mosaic (virus) was found on dahlia in a greenhouse at Saskatoon, Sask.; a trace was present outdoors later in the summer.

Mosaic was found in several private gardens in Toronto, Ont.

EVERLASING (Helichrysum)

Yellows (virus) was severe on everlasing at the Experimental Station, Fredericton, N.B.

FIRE THORN (Pyracantha)

Scab (Fusicladium Pyracanthae Otth) causes considerable defoliation on Vancouver island and the Mainland, B.C.

FREESIA

Stem rot (Sclerotinia Sclerotiorum (Lib.) de Bary) slightly infected freesia at Winnipeg, Man.

GAILLARDIA

Smut (Entyloma polysporum (Pk.) Farl.) heavily infected gaillardia at Winnipeg, Man.

Yellows (virus) was severe at the Fredericton Experimental Station, N.B.

GERANIUM (Pelargonium)

Basal stem rot (probably Pythium ultimum Trow.) was found on geranium cuttings in a greenhouse at Saskatoon, Sask. (T.C. Vanterpool)

Crown gall (Pseudomonas tumefaciens (Sm. & Towns.) Dugg.) was affecting a plant sent from a greenhouse at Oakville, Ont.

Blight (Botrytis cinerea Pers.) caused severe damage to greenhouse material at Charlottetown, P.E.I.

GLADIOLUS

Hard rot (Septoria Gladioli Pass.) was reported from Edmonton, Alta.

Scab (Bacterium (Pseudomonas) marginatum McCull.) infected one per cent of the corms at Saanichton, B.C.

About 3% of the plants were affected by scab on August 20, at Macdonald College, Que. Badly diseased corms were also received from Three Rivers, October 24 (2244).

Root rot (cause undetermined) was found again in Queens county, P.E.I.; the damage was moderate.

A petaloid modification of the margin of the leaf in the apical region was independently reported by Drs. G.H. Berkeley and P.M. Simmonds on Apricot Glow variety, together with specimens of leaves showing this teratological phenomenon. The specimens were from Smithville, Ont., and Regina, Sask., and have been deposited in the teratology folders of the Phanerogamic Herbarium. In the Ontario plantation 10% of the plants were affected. The modified tissue has the texture and the apricot colour of the petals of the variety. (F.L. Drayton)

GOLDENGLOW (Rudbeckia laciniata)

Powdery mildew (Erysiphe Cichoraceārum DC.) slightly infected goldenglow at Summerland, B.C., and Abbotsford, Que.

HAWTHORN (Crataegus)

Rust (Gymnosporangium clavariaeforme (Jacq.) DC.) was collected at Charlottetown, P.E.I., July 12 (2288).

Powdery mildew (Podosphaera Oxyacanthae (DC.) de Bary) was heavy on hawthorn in Queens county, P.E.I.

HEPATICA (H. triloba)

Leaf spot (Septoria Hepaticae Desm.) was severe on a few plants in the perennial border at Lennoxville, Que.

HOLLY (Ilex)

Tar spot (Rhytisma sp.) affected a few leaves of holly on Vancouver island.

HOLLYHOCK (Althaea)

Rust (Puccinia Malvacearum Bert) was fairly abundant in Saanich county, B.C., where it was observed as early as January. It was prevalent and caused some stunting in many gardens throughout the Okanagan valley.

Rust was first observed on June 11, in a garden at Ottawa, Ont.; at that time most of the plants were free from infection, the rust being confined to a few leaves in one or two centres. It was also collected on July 5 (3962) and July 15 (2061) at Ottawa. The disease was widespread in central Ontario.

The rust was common in southwestern Quebec; it was reported from Abbotsford, Macdonald College, L'Assomption, Chateauguay, and about Montreal. Climatic conditions seemed to be very favourable for its development. It also heavily infected hollyhocks at Ste. Anne de la Pocatière.

Rust was general and severe in York and Carleton counties, N.B.

Rust slightly to severely infected hollyhocks and caused some defoliation in all 3 counties of Prince Edward Island.

Leaf spot (Ascochyta althaeina Sacc. & Bizz.) caused slight damage in a garden in Queens county, P.E.I.

Wilt (Sclerotinia Sclerotiorum (Lib.) de Bary) caused extensive decay in a single stalk of hollyhock at Winnipeg, Man. This is the first record of its occurrence on hollyhock in Manitoba.

HONEYSUCKLE (Lonicera)

Blight (Glomerularia Lonicerae Pk.) was collected on L. orientalis (3690), L. discolor (3091), and L. Morrowi bella candida in the Arboretum, Ottawa, Ont. The first two species were badly infected. The basidiomycetous stage reported by Sinden (unpublished

data) was found fruiting on the young lesions. (I.L. Conners, M. Timonin and F.S. Thatcher)

Blight slightly to severely infected honeysuckle depending on the species and variety at Lennoxville, Que.

HOUSE LEEK (Sempervivum)

A single rusted (Endophyllum Sempervivi (Alb. & Schw.) de Bary) plant was collected in a rockery at Vancouver, B.C., in March by Dr. Wm. Newton. Materials collected in 1931 either from newly imported plants or from a rock garden nursery at Vancouver was received from Mr. J.H. Eastham, on January 4, 1935. Mr. Eastham stated that he had seen the disease more than once at Vancouver. The rust was identified as E. Sempervivi; this is the first report of its occurrence in Canada. (I.L. Conners)

IRIS

Leaf spot (Didymellina macrospora Kleb. (Heterosporium gracile Sacc.) was general, but caused only a trace of damage on Vancouver island and in the Fraser valley, B.C.; infection was heavy, stunting growth in a few gardens where the soil was wet or over irrigated in the Okanagan valley, B.C.; slight to moderate, mostly on the lower leaves at Edmonton and Ponoka, Alta. (2319); severe in some plots of iris at Morden, Man. - I. pumila, a dwarf iris, was moderately infected while I. pseudoacorus gigantea was the most resistant, only one plant being infected; observed at Niagara Falls, St. Catharines, and Westboro, Ont.; usually slight to moderate at Macdonald College, Ste. Dorothée, Abord à Plouffe, L'Assomption, Abbotsford, and Sherbrooke in western Quebec; general and severe causing complete drying up of the leaves before September at St. Anne de la Pocatière and Cap Rouge, Que., wherever the plants were not protected by Bordeaux sprays; present on many varieties on May 17, at the Experimental Station, Kentville, N.S.; heavily infected and very destructive to iris in 1934 in Queens, Kings, and Prince counties, P.E.I.

Rhizome rot (Bacillus carotovorus L.R. Jones) caused severe damage in August in Queens county, P.E.I.

Nematode (Tylenchus dipsaci Kühn) affected 5% of the plants of Hart Nibbrig in the Laboratory garden, Saanichton, B.C. A few diseased plants were found following affected daffodils in the Gordon Head district.

LARKSPUR (Delphinium)

Bacterial blight (Pseudomonas Delphinii (E.F. Sm.) Stapp) slightly infected larkspur at Morden, Man. It was reported from L'Assomption, Que., and caused severe damage to 16% of the plants at Charlottetown, P.E.I.

Powdery mildew (Erysiphe Polygoni DC.) caused slight damage on Vancouver island and in the Fraser valley, B.C.; was general

and severe on many plants in the Summerland district; reported from Saskatoon, Sask.; moderate infection at Pine Falls, Man.; severe damage in one planting in York county, N.B.

Stunt (virus) affected a few plants at Windsor, Ont. (F.J. Hudson and G.C. Chamberlain)

Phoma Jacquiniana Cke. & Mass. (2122) was found on dying larkspur stalks on October 14 at Ottawa, Ont. (M. Timonin)

LILAC (Syringa)

Powdery mildew (Microsphaera Alni (Wallr.) Salm.) was reported from Macdonald College, Que., and Queens county, P.E.I.

Lilac apparently affected by mosaic (virus) was observed by Dr. H.T. Gussow at Kentville, N.S. This is the first report of a trouble of this nature to the Survey.

LILY (Lilium)

Blight (Botrytis elliptica (Berk.) Cke.) affected 15-20% of the plants of L. concolor in a garden at Lacombe and 90% in one at Edmonton, Alta.

LUPINE (Lupinus)

Powdery mildew (Erysiphe Polygoni DC.) was general and caused slight damage on Vancouver island and in the Fraser valley, B.C.

MALTESE CROSS (Lychrus chalcedonica)

A leaf spot moderately infected this host at Lennoxville, Que. The pathogen and the effect on the leaf agrees well with the description of Phyllosticta Lychnidis A. Bondarzew (3717) as given in Saccardo, Sylloge Fungorum 25:28, except that a few spores are uniseptate. (F.S. Thatcher and H.N. Racicot)

MARIGOLD (Tagetes)

Yellows (virus) was severe on marigold at the Experimental Station, Fredericton, N.B.

MATRIMONY VINE (Lycium)

Powdery mildew was heavy on L. chinense at Summerland, B.C. The perfect stage of the fungus was not found. Sphaerotheca pannosa (Wallr.) Lév. has been reported on L. halimifolium in North America (cfr. Seymour, Host Index 596. 1929).

MEXICAN ORANGE (Choisya ternata)

Die-back (Nectria cinnabarina (Tode) Fr.) caused 30% damage to a 14 year old bush at Victoria, B.C.

MORNING GLORY (Ipomaea)

Leaf spot (Cercospora sp.) heavily infected the leaves of morning glory at Fredericton, N.B.

NARCISSUS

Only a trace of leaf scorch (Stagonospora Curtisii (Berk.)Sacc.) was found on Vancouver island, B.C.

Smoulder (Botrytis narcissicola Kleb.) caused slight to severe damage on Vancouver island. It was most severe where cultivation and weed eradication were neglected; also early varieties, such as Golden Spur and Obvallarius were more severely affected than later ones.

Eelworms (Anguillulina dipsaci Kühn) caused a trace to severe damage on Vancouver island, B.C. It was serious on one farm, but where the stock has been treated for the past 3 years infection has been reduced to a minimum.

Root decline (Anguillulina pratensis de Mann) was found in patches, but on the whole the infection was slight in the Gordon Head district, B.C.

NASTURTIUM (Trepaeolum majus)

White rust (Cystopus candidus (Pers.) Lév.) was found at Saskatoon, Sask., on nasturtium (3653).

PANSY (Viola)

Leaf spot (Cercospora Violae-tricoloris Bri. & Cav.) was prevalent in one garden in Lincoln county, Ont.; a single infected plant was found at L'Assomption, Que.

Powdery mildew (?Sphaerotheca Humuli (DC.) Burr. var. fuliginea (Schlecht.) Salm.) was general on pansies on October 22 at Summerland, B.C. The perfect stage was not found.

PENTSTEMON

Powdery mildew (Erysiphe Cichoracearum DC.) affected leaves of a few plants at Summerland, B.C.

PEONY (Paeonia)

Blight (Botrytis Paeoniae Oud.) infected all the plants in a garden in Cariboo Co., B.C.; the damage was 8%.

The disease was observed in 3 gardens in zone 10, Alta.

Blight was apparently fairly prevalent at Saskatoon, Sask.

A slight amount of blight was reported at Macdonald College, Que. At Cap Rouge the amount of bloom was reduced where plants had not been sprayed. Young plants failed to bloom on account of the disease. Similarly at Ste. Anne de la Pocatière, late buds became infected and dried up. The disease was quite conspicuous once the heavy bloom was over. Some young plants were destroyed.

Blight was severe on peonies at the Experimental Station, Fredericton, N.B.

A few plants were affected by blight at Kentville, N.S.

Leaf blotch (Cladosporium Paeoniae Pass.) was moderate in July at Macdonald College, Que. Diseased leaves were collected at L'Assomption.

A trace of Septoria leaf spot (Septoria Paeoniae West. var. berolinensis Allesch.) was found on most varieties at Morden, Man.

Ringspot (virus) was found on the following varieties at the Experimental Station, Fredericton, N.B.: Carnea striata, Virgo Maria, Boule de Neige, Marquis d'Ivry, Asa Gray, Alsace-Lorraine, and Margaret Gerow.

The following varieties were commonly infected with ringspot at the Experimental Station, Morden, Man.: Avalanche, Sarah Bernhardt, Germaine Bigot, Atro-sanguinea, Mons. Krelage, La Loraine, and Triomphe de l'Exposition de Lille.

PETUNIA

A powdery mildew of petunias was seen in the autumn of 1933 and it has been sent in during 1934 from gardens in Winnipeg. No perithecia have been seen. (G.R. Bisby)

PHLOX

Powdery mildew (Erysiphe Cichoracearum DC.) was general in several gardens in Lincoln county, Ont. It was also observed in the Ottawa district.

The disease caused slight damage to 4 plants at the Experimental Station, Fredericton, N.B.

One specimen affected with yellows (virus) was sent in from Kings county, N.B.

RED CEDAR (Juniperus)

Collections of the quince rust (Gymnosporangium clavipes Cke. and Pk.) and the hawthorne rust (G. globosum Farl.) were made in the Arboretum, Ottawa, Ont., on May 17 and 18, 1934 on the following hosts:-

Gymnosporangium clavipes: Juniperus canadensis 5903 (3576); J. communis aurea 1250 (3579), 1262 (3565); J. communis aurea-variegata 4389 (3573), 4611 (3575), 4612 (3574); J. communis depressa (3564); J. communis suecica 1259 (3548); J. communis suecica compacta 1272 (3549); J. cuppresifolia 5015 (3558); J. litoralis 3519 (3580); J. nana canadensis aurea 3534 (3657); J. Oxycedrus 4633 (3559); J. rigida 2160 (3571); J. Sabina 1260 (3553), 1256 (3550), 4166 (3560); J. Sabina tamariscifolia 2156 (3572); J. Wilhmanniana 5009 (3578).

Gymnosporangium globosum: Juniperus fragrans 4390 (3552); J. pendula viridis 4626 (3557), 4627 (3556); J. Sabina erecta 2157 (3569); J. virginiana 3145 (3570); J. virginiana cinerascens (3563); J. virginiana Cannartii 2144 (3554); J. virginiana elegantissima

1265 (3555); J. virginiana nana 3520 (3581); J. virginiana pendula 3523 (3566); J. virginiana plumosa 2148 (3561); J. virginiana plumosa alba 4388 (3577); J. virginiana pyramidalis 3146 (3568); and J. virginiana Schottii 1258 (3562), 3147 (3551).

In general it may be said that G. clavipes is common on Juniperus communis and its varieties, but the form common in many parts of eastern United States on J. virginiana is not present. G. globosum is somewhat less prevalent on Juniperus virginiana and its varieties. Juniperus chinensis, which also grows in the Arboretum has never been found infected, while J. Sabina has been found rusted but rarely by G. clavipes and still less frequently by G. globosum. Both species of rust have never been collected on the same plant. The hosts have not been critically studied, but the names and numbers reported are those, under which the specimens are carried in the Arboretum. (I.L. Conners)

About 40% of the plants of Hills Silver red cedar in a consignment from Dundee, Ill., to Ridgetown, Ont., were affected with rust. Two species (G. Juniperi-virginianae Schw. and G. globosum Farl.) were about equally prevalent on the specimens communicated by Mr. Chamberlain. (I.L. Conners)

Gymnosporangium clavipes heavily infected nearly every shoot of Juniperus communis var. depressa, which was abundant in a 2-acre field at Woodside, N.S. G. clavariaeforme (Jacq.) DC. was not as prevalent, but infected branches were more erect than those free from this rust. (K.A. Harrison)

ROSE (Rosa)

Rust (Phragmidium sp.) slightly infected La France variety at Saanichton, B.C. in April.

Rust was heavy on the lower leaves of Conrad F. Meyers in the University grounds, Saskatoon, Sask.

The aecial stage of P. speciosum lightly infected roses in patches at Morden, and it was commonly found at Winnipeg, Man.

Rust was prevalent on several varieties of roses in the rose gardens in Victoria Park, Niagara Falls, Ont., on July 15.

Rust (P. americanum Diet.) was severe on a few rose bushes at Lennoxville, Que. (2067). A trace of rust was found on 2 rose bushes at Ste. Anne de la Pocatière.

Rose leaves affected with rust (P. disciflorum (Tode) J.F. James) were sent from Kentville, N.S. (3655).

All varieties examined at the Experimental Station, Charlottetown, P.E.I. showed a trace to 100% infection; rust was also found in Kings and Prince counties.

Powdery mildew (Sphaerotheca pannosa (Wallr.) Lév.) was general and caused slight damage on Vancouver island and in the Fraser valley, B.C. It was rather severe on one variety, but little or none was present on most of them at Summerland, B.C.

A specimen affected with powdery mildew was received from Montreal, Que.

Black spot (Diplocarpon Rosae Wolf (Marssonina Rosae (Lib.) Died.) was of general occurrence on Vancouver island and in the Fraser valley, B.C.; it causes slight damage, but the affected plants are unattractive.

The disease was present on a few varieties in the University gardens, Saskatoon, Sask. (2180); infection was moderate on Austrian Copper and a trace on Persian Yellow. About 20% of the lower leaves of Harrison's Yellow were spotted at Swift Current (2186).

Black spot was prevalent in the Rose Garden of the Victoria Park Commission, Niagara Falls, Ont., and the civic garden, St. Catharines.

Black spot was found on all rose varieties and caused slight defoliation in a few bushes at Ste. Anne de la Pocatière, Que.

This spot was heavy on a rose variety in Queens county, P.E.I. on September 5.

Crown gall (Pseudomonas tumefaciens (Sm. & Towns.) Dugg.) severely affected one Paul Scarlet plant in Ottawa, Ont.

A root rot (cause undetermined) caused considerable loss in a greenhouse in Peel county, Ont. Isolations yielded fungi, but the cause has not been definitely determined. (G.C. Chamberlain)

A mosaic (virus) found on rose in York county, N.B., was transmitted by the rubbing method to tobacco; it produced severe mosaic in the latter plant. (J.L. Howatt)

SANDHILL ROSE (Lewisia rediviva)

A few plants in a rockery at Saanichton, B.C., were rusted (Uromyces unitus Pk.). The rust was also collected on the wild host at Kaleden (3666) and Summerland (3667), where it was quite general on plants growing on the hills near the Laboratory.

SAXIFRAGE (Saxifraga)

A trace of leaf spot (Phyllosticta sp. immature) was found at Morden, Man., on S. cordifolia purpurea.

SHASTA DAISY (Chrysanthemum maximum)

Yellows (virus) caused severe damage to shasta daisy at Charlottetown, P.E.I.

SNAPDRAGON (Antirrhinum)

Rust (Puccinia Antirrhini Diet. & Holw.) was found in one third of the greenhouses in the Victoria district, B.C., and was general in the fields and gardens on Vancouver island. It is a rather serious disease where plants are grown for seed. Rust destroyed whole plantings in many gardens throughout the Okanagan valley.

In one garden in Lincoln county, Ont., rust killed many plants before the blooming period. Several complaints were also received.

regarding this disease.

Snapdragons were moderately rusted in a greenhouse at Macdonald College, Que., on November 1.

Rust was general in York county, N.B., and diseased specimens were received from Sussex.

SNOWBERRY (Symphoricarpos)

The leaves of snowberry were moderately infected with leaf spot (Sphaceloma Symphoricarpi Barrus & Horsfall) at L'Assomption, Que.

SOLOMON SEAL (Polygonatum)

A leaf spot (cause undetermined) with a striking purplish border was found on P. multiflorum at Morden, Man.

SPIRREA

One shoot of spiraea was infected by Nectria cinnabarina at Kentville, N.S.

Winter injury was severe on Spiraea Vanhouttei at the Experimental Station, Fredericton, N.B.

STOCK (Matthiola)

Basal stem rot (cause unknown) was reported to have caused severe damage in one garden and moderate in another at Saskatoon, Sask.

SWEET PEA (Lathyrus)

Powdery mildew (Microsphaera diffusa Cke. & Pk.) caused severe damage in a garden in Queens county, P.E.I.

Several plants wilted and died at the Experimental Farm, Indian Head, Sask.; the roots were rotted.

At Saskatoon, root rot was not observed or reported this year, while in 1932 and 1933 it was common both in the seedling and flowering stages. (T.C. Vanterpool)

Root rot infected from a trace to 65% of the plants in a garden in Queens county, P.E.I. Liberal applications of organic mercury compounds to the soil give splendid control. (R.R. Hurst)

Streak (virus) was abundant in a few gardens at Winnipeg, Man., and in some of these the damage was severe. It was not noted in previous years.

TULIP (Tulipa)

Blight (Botrytis Tulipae (Lib.) Lind) spread rapidly and caused moderate damage at the beginning of April on Vancouver island, B.C., but it was checked about the middle of April by a dry spell. Very little primary infection was found in the majority of fields. (W. Jones and R. Hastings)

Blight affected 12 to 15% of the tulips in the Laboratory garden, St. Catharines, Ont. In a garden in Lincoln county 1% of the Darwin tulips were diseased.

Breaking (virus) is quite general in private flower gardens in the Salmon Arm district, B.C., but the disease was not noticed in commercial plantations.

VINCA

Rust (Puccinia Vincae (DC.) Berk.) was found developing on vines in window boxes at a private residence in Ottawa, Ont. (3670).

ZINNIA

Wilt (Sclerotinia ?Sclerotiorum (Lib.) de Bary) affected 3 plants at the Experimental Station, Summerland, B.C.

Wilt (Fusarium ?conglutinans Woll.) caused the death of 4% of the plants in a garden in Ottawa, Ont.

WINTER INJURY

Mr. M.B. Davis, Dominion Horticulturist, supplied the following observations of winter injury to shrubs growing at the Central Experimental Farm, Ottawa, Ont.: Weigela (Diervilla Eva Rathke, D. florida alba) 90%; Forsythia (F. intermedia) none; Salt tree (Halimodendron argenteum) 20%; Hydrangea (H. arborescens, H. paniculata) none; Bush clover (Lespedeza Sieboldi) none; Honeysuckle (Lonicera), all varieties, none; Lilac (Syringa) 10-15%; Mock orange (Philadelphus) 20-80%; Rose (Rosa) R. rugosa 10-20%, hybrid perpetuals 20-80%, hybrid teas 10-90%; Spiraea 10-75%.

VII. DISEASES OF MISCELLANEOUS PLANTS

Some 400 specimens, which were added to the Mycological Herbarium, Division of Botany, Ottawa, in the past year, are reported here or in the preceding sections. To reduce the number of entries in this section, all specimens of fungi parasitic on cultivated plants and collected in 1934 are reported in their proper place in the preceding sections, the accession number of each specimen being given. Thus, specimens of Tilletia foetens collected on Triticum aestivum are reported under wheat bunt (p.2) All other records supported by specimens in this Herbarium are reported in this section and are indicated by an asterisk (#). In addition many records of miscellaneous diseases unsupported by specimens are also reported below. The principal contributors and the areas, in which they collected, were: G.E. Woolliams, Okanagan valley, B.C.; M.W. Cormack, Alberta; R.C. Russell, central Saskatchewan; B.J. Sallans, southern Saskatchewan; and J. Adams, Anticosti island, Que. Most of the saprophytic fungi were collected during a few excursions chiefly to Mount Burnet, Que., 17 miles north of Ottawa, the last two weeks in September.

Abies Balsamea (L.) Mill.
#Volutella ciliata (A. & S.) Fr. var. stipitata Sacc. on cones, Mt. Burnet, Que.

Acer glabrum Torr.
#Asteroma minutissima Ell. & Ev. Watertown Lakes, Alta.
#Septoria circinata Ell. & Ev. Watertown Lakes, Alta.

Acer spicatum Lam.
#Rhytisma punctatum (Pers.) Fr. Berthierville, Que.

Acer sp.
#Diatrype stigma (Hoff.) Fr. Cobden, Ont.
#Lycogola flavo-fuscum (Ehr.) Rost. Ottawa, Ont.
#Nectria cinnabarina (Tode) Fr. Chelsea, Que.
#Steganosporium Acerinum Cda. Hillcrest, N.S.

Aesculus Hippocastanum L.
#Nectria cinnabarina (Tode) Fr. Grand Ligne, Que.

Agoseris glauca
#Puccinia Hieracii (Schum.) H. Mart. Annaheim, Sask.
#Puccinia patruelis Arth. Annaheim, Sask.

Agromonia gryposepala Wallr.
#Sphaerotheca Humuli (DC.) Burr. Kingsmere, Que.

Agromonia striata Michx.
#Sphaerotheca Humuli (DC.) Burr. Edmonton, Alta.

Agropyron junceum Beauv.
#Puccinia graminis Pers. Edmonton, Alta.

Agropyron repens (L.) Beauv.
Claviceps purpurea (Fr.) Tul. Winnipeg, Man.; #Lake Timagami, Ont.
Erysiphe graminis DC. Lac du Bonnet and Cowan, Man.; York and Westmorland counties, N.B.; #Edmonton, Alta.; Kentville, N.S.
#Phyllachora graminis (Pers.) Fuck. Edmonton, Alta.
Puccinia graminis Pers. Macdonald College, Que.; heavy infection.
#Septoria Agropyri Ell. & Ev. Edmonton, Alta.

Agropyron Smithii Rydb.
#Claviceps purpurea (Fr.) Tul. McLeod, Alta.; Scott, Sask.
Puccinia graminis Pers. Oakville, Man.

Agropyron tenerum Vasey
#Claviceps purpurea (Fr.) Tul. N. Battleford, Sask.
#Puccinia Clematidis (DC.) Lagerh. Drumheller, Alta.

Allium cernuum Roth.
#Puccinia granulispora Ell. & Gall. Peace River, Alta.

Alnus incana (L.) Moench.
#Erysiphe aggregata (Pk.) Farl. Farnham, Que.
#Phyllactinia corylea (Pers.) Karst. Pike Lake, Sask.
#Taphrina Robinsoniana Gies. Farnham, Que.

Alnus sp.
#Psilopeziza hydrophila (Pk.) Seav. Digdegwash river, N.B.

Alopecurus aristulatus Michx.
#Scolecotrichum graminis Fuck. Mulhurst, Alta.

Althea sp.
#Erysiphe Polygoni DC. Saskatoon, Sask.

Amaranthus retroflexus L.
Cystopus Bliti (Biv.) Lév. Summerland, B.C.; Plum Coulee, Man.; Macdonald College and Rougemont, Que., heavy infection.

Ambrosia trifida L.
Erysiphe Cichoracearum DC. Winnipeg, Man.; slight infection
Puccinia Xanthii Schw. Morris, Man., heavy infection; Winnipeg, Man., medium infection.

Amelanchier alnifolia Nutt.
Gymnosporangium corniculans Kern. Sidney, Man., severe infection.

#Phyllosticta innumerabilis Pk. Edmonton, Alta.
Podosphaera Oxyacanthae (DC.) DeBary. Winnipeg, Man., slight infection.

Amelanchier canadensis (L.) Medic.
#Apiosporina Collinsii (Schw.) v. Höhn. St. Andrews, N.B.
#Gymnosporangium clavariaeforme (Jacq.) DC. Constance Bay, Ont.
#Gymnosporangium clavipes Cke. & Pk. Grand Manan, N.B.

Amelanchier oblongifolia (T.&G.) Roem.
#Gymnosporangium clavipes Cke. & Pk. Constance Bay, Ont.

Amphicarpa monoica (L.) Ell.
#Synchytricum decipiens (Pk.) Lagerh. Ottawa, Ont.

Andromeda polifolia L.
#Rhytisma Andromedae (Pers.) Fr. Anticosti Island, Que.

Andropogon furcatus Muhl.
Puccinia Andropogonis Schw. Westbourne, Man., heavy infection.

Anemone canadensis L.
Puccinia Clematidis (DC.) Lagerh. Carman and Pine River, Man., trace.

Anemone cylindrica A. Gray
Phleospora Anemones Ell. & Kellerm. Humboldt, Sask.
#Puccinia Clematidis (DC.) Lagerh. Lanigan, Sask.

Anemone virginiana L.
Puccinia Clematidis (DC.) Lagerh. Alymer, Que.

Antennaria canadensis Green
#Phialea phaeoconia Fairm. Iberville, Que.

Antirrhinum majus L.
#Puccinia Antirrhini Diet. & Holw. Kamloops, B.C.; Saskatoon, Sask.

Apium graveolens L.
#Cercospora Apii Fr. Abord à Plouffe, Que.

Apocynum androsaemifolium L.
#Cylindrosporium sibiricum D.&B. Oxbow, Sask.

Arabis sp.
#Puccinia monoica Arth. Pike Lake, Sask.

Aralia nudicaulis L.
Nyssopsora clavellosa (Berk.) Arth. Minaki, Ont.

Arctium minus Bernh.
Puccinia Bardanae Cda. Winnipeg, Man.; #Philipsburg, Que.

Arenaria lateriflora L.
#Puccinia Arenariae (Schum) Wint. Anticosti Is., Que.

Artemisia biennis Willd.
#Ophiobolus acuminatus (Sow.) Duby, Indian Head, Sask. (det. J. Dearness)

Artemisia frigida Willd.
#Puccinia Absinthii (Hedw.) DC. Ethelbert, Man. This was reported last year as P. Millefolii Fuck. Examination of the specimen showed it belonged here.

Asparagus officinalis L.
#Puccinia Asparagi DC. Saskatoon, Sask.

Aster cordifolius L.
Puccinia Asteris Duby. Kenora, Ont., medium infection.

Aster laevis L.
#Coleosporium Solidaginis (Schw.) Thüm. Athabasca, Alta.

Aster umbellatus Mill.
#Coleosporium Solidaginis (Schw.) Thüm. Clova, Que.

Aster sp.
#Coleosporium Solidaginis (Schw.) Thüm. Montney, B.C.
Erysiphe Cichoracearum DC. Winnipeg, Man., medium infection.
#Puccinia Asteris Duby. Clova, Que.
Puccinia extensicola Plowr. #Lanigan, Sask.; Carman, Man., medium infection and Sanford, Man., a trace.

Astragalus mallissimus Sorr.
#Physalospora megastoma (Pk.) Sacc. Clandonald, Alta.

Avena fatua L.
Puccinia coronata Cda. Lorette, Man., trace.
Puccinia graminis Pers. Man., slight infection throughout the province.

Beckmannia erucaeformis (L.) Host.
#Puccinia coronata Cda. St. Paul, Alta.

Betula lutea Michx.
#Hypoxylon multiforme Fr. Falconwood, P.E.I.
#Nectria episphaeria (Tode) Fr. Cobden, Ont.

Betula papyrifera Marsh
#Diatrypella discordea Cke. & Pk. Kingsmere, Que.

Betula subcordata
#Helotium citrinum (Hedw.) Fr. Enderby, B.C.

Betula sp.
#Exidia glandulosa (Bull.) Fr. Mt. Burnet, Que.
#Hypoxylon multiforme Fr. Mt. Burnet, Que.

Bidens cernua L.
Sphaerotheca Humuli (DC.) Burr. var. fuliginea (Schlecht.) Salm
Fraser valley, B.C., general; #Surrey, B.C.

Boletus sp.
#Sepedonium chrysospernum Fr. Mt. Burnet, Que.

Bromus ciliatus L.
#Mycosphaerella Wichuriana (Schroet.), Hobbema, Alta.
#Puccinia Clematidis (DC.) Lagerh. Edmonton, Alta.

Bromus inermis Leyss.
#Septoria bromigena Sacc. Saskatoon, Sask.

Calamagrostis sp.
Claviceps purpurea (Fr.) Tul. Emma Lake, Sask.

Calamovilfa longifolia (Hook.) Hack.
Puccinia amphigena Diet. Westbourne, Man., medium infection.

Capsella Bursa-pastoris (L.) Medic.
Cystopus candidus (Pers.) de Bary, Saanichton, B.C.; Macdonald College, Que.; Queens Co., P.E.I.
Peronospora parasitica (Pers.) de Bary, Macdonald College, Que.

Carex aquatilis Wahl.
#Cintractia Caricis (Pers.) Magn. Lake Waskiseu, Sask.

Carex siccata Den.
#Septoria caricinella Sacc. Constance Bay, Ont.

Carex sp.
#Puccinia hieraciatum (Schw.) Arth. & Kern. Old Chelsea, Que.

Carya sp.
#Eutypa milliaria (Fr.) Sacc. Portland, Ont.

Celastrus scandens L.
Phyllactinia corylea (Pers.) Karst. Winnipeg, Man., medium infection.

Cerastium arvense L.
#Melampsorella Cerastii (Pers.) Schroet. New Brunswick.

Chamaedaphne calliculata L.
#Venturia pulchella Cke. & Pk. Proton, Ont.

Chelone glabra L.
Erysiphe cichoracearum DC. Doak, N.B.; Queens Co., P.E.I.

Chenopodium album L.
Peronospora effusa (Grev.) Rabh. #Edmonton, Alta.; Ethelbert, Elm Creek, St. Agathe, Plum Coulee, Man., general throughout province; Côte des Neiges and Macdonald College, Que.; Fredericton, N.B.; Queens Co., P.E.I.
Puccinia subnitens Diet. Minto, Man., slight infection.

Circaea lutetiana L.
#Puccinia Circaeae Pers. Ottawa, Ont.

Cirsium arvense L.
Puccinia suaveolens (Pers.) Rostr. East Kelowna, B.C., severe in an orchard; Rougemont, Que., slight infection.
Septoria Cirsii Niessl, Ashville, Man., slight infection.

Cirsium undulatum Nutt.
#Uromyces Junci (Desm.) Tul. Birch Lake, Alta.

Clavaria cinerea Bull.
#Eleutheromyces subulatus (Tode) Fuck. Kingsmere, Que.

Claytonia caroliniana Michx.
#Puccinia Mariae-Wilsoni G.W. Clinton, Ottawa, Ont.; Abbotsford, Que.

Clematis ligusticifolia Nutt.
#Cercospora squalidula Pk. Allen Grove, B.C.
#Didymaria Clematidis Cke. & Harkn. Allen Grove, B.C.

Clintonia borealis (Ait.) Raf.
Puccinia mesomajalis B.& C. Minaki, Ont., light infection.

Commandra pallida DC.
Cronartium Commandrae PK. Lac du Bonnet, Man., 100% in patches.

Comptonia asplenifolia L.
#Cronartium Comptoniae Arth. Constance Bay, Ont.

Convolvulus sepium L.
Puccinia Convolvuli (Pers.) Cast. St. Adolphe, Man., trace.

Cornus canadensis L.
Puccinia porphyrogenita Curtis, Queens Co., P.E.I., trace to heavy.

Cornus stolonifera Michx.
Septoria cornicola Desm. St. Adolphe, Man., trace.

Cornus sp.
Monilia Corni Reade, Vancouver island, B.C. Slight damage in low-lying areas; affected leaves fall but fresh growth follows.

Corylus americana Walt.
Gnomoniella Coryli (Batsch.) Sacc. var. circinata Dearn. & Bisby. Pine River, Man., trace.
Septoria corylina Pk. Pine River, Man., slight infection.

Corylus rostrata Ait.
#Gnomoniella Coryli (Batsch.) Sacc. Emma Lake, Sask.

Crataegus sp.
#Gymnosporangium clavipes Cke. & Pk. Saskatoon, Sask.

Dentaria diphylla Michx.
#Cystopus candidus (Pers.) Lév. Old Chelsea, Que.

Dirca palustris L.
#Aecidium hydnoideum B. & C. Eagle Depot, Que.

Distichlis spicata (L.) Greene
Puccinia subnitens Diet. Transcona, Man., heavy infection.

Distichlis stricta (Torr.) Rydb.
#Puccinia subnitens Diet. Vonda, Sask.

Dodecatheon pauciflorum (Durand) Greene
#Puccinia Ortonii Jacks. Zone 7 and Humboldt, Sask., first record for survey.

Elymus canadensis L.
Claviceps purpurea (Fr.) Tul. Lacombe, Alta., medium to severe in isolated patches.
Helminthosporium Tritici-repentis Died. Carman, Man. Abundant on leaf blades and culms causing large spots. First record for Man. (J.E. Machacek)
Phyllachora graminis (Pers.) Fuck. Winnipeg, Man., abundant in shady places.

Elymus innovatus Beal.
#Claviceps purpurea (Fr.) Tul. Humboldt, Sask.

Elymus Macounii Vasey
Claviceps purpurea (Fr.) Tul. Winnipeg, Man., slight infection.
#Septoria bromigena Sacc. Margo, Sask. This is a very interesting and new record. Further search for this parasite should be made on this and other species of Elymus.

Epilobium angustifolium L.
#Pucciniastrum Abieti-Chamaenerii Kleb. Clyde, Alta.; Clova Que.
Ramularia punctiformis (Schl.) Höhn. Duck Mt. Forest Reserve, Man., medium infection.

Erigeron canadensis L.
Yellows (virus) was general in York county, N.B.

Euphorbia serphyllifolia Pers.
Uromyces proeminens (DC.) Pass, var. typica Arth. Fort Garry, Man., medium infection.

Fagus sp.
#Xylaria corniformis Fr. On decayed wood, Mt. Burnet, Que.

Fragaria canadensis Michx.
Ramularia Tulasnei Sacc. Man., infection general.

Fragaria glauca (S. Wats.) Rydb.
Marssonina Fragariae (Sacc.) Kleb. Dana, Sask., first report from Saskatchewan.
#Ramularia Tulasnei Sacc. St. Gregor, Sask.

Galeopsis tetrahit L.
#Septoria Galeopsidis Westd. Edmonton, Alta.

Galium asprellum Michx.
#Puccinia punctata Link, Richmond, P.E.I.

Galium boreale L.
#Hainesia borealis Ell. & Ev. Allen Grove, B.C.; Dana, Sask.
Puccinia rubefaciens Johans. Virden, Man., trace; Kenville, Man., abundant in patches.

Galium sp.
#Puccinia punctata Link, St. Peters, P.E.I.

Glyceria borealis (Nash) Batchelder
Clavideps purpurea (Fr.) Tul. St. Francois Xavier, Que., medium infection.

Glyceria grandis Wats.
Ustilago longissima (Sow.) Tul. Rapid City, Man.; abundant

in wet area causing distortion of leaves and stunting of plants. First record for Manitoba.

Glycyrrhiza lepidota (Nutt.) Pursh.
#Uromyces Glycyrrhizae (Rabh.) P. Magn. Coderre, Sask.

Grossularia sp.
#Puccinia Pringsheimiana Kleb. Lanigan, Sask.

Hedysarum boreale Nutt.
#Uromyces Hedysari-obscuri (DC.) Cav. & Picc. Reynaud, Sask.

Helianthus annuus L. (cult)
#Puccinia Helianthi Schw. Saskatoon, Sask.

Helianthus fascicularis Greene
#Plasmopara Halstedii Farl. Marrinville, Alta.

Helianthus Maximiliani Schrad.
Puccinia Helianthi Schw. Cartwright and Winnipeg, Man., trace.

Helianthus subrhomboideus Rydb.
Puccinia Helianthi Schw. Lockwood, Sask.
#Uromyces Junci (Desm.) Tul. Lanigan, Sask.

Helianthus sp.
#Septoria Helianthi Ell. & Kell. Drumheller, Alta.

Hepatica triloba Chaix
#Ascochyta Vodakii Bubak, Ottawa, Ont.

Hieracium albertinum Harr.
#Puccinia Hieracii (Schum.) Mart. Islay, Alta.

Holcus Sorghum var. sudanensis
#Bacillus Sorghi Burr. Indian Head, Sask.

Hordeum jubatum L.
Claviceps purpurea (Fr.) Tul. Winnipeg, Man., slight.
Puccinia graminis Pers. Charlottetown, P.E.I., trace to heavy.
#Puccinia Clematidis (DC.) Lagerh. Edmonton, Alta.
Septoria Passerinii Sacc. #St. Paul, Alta.; Elie, Man., heavy infection in patches.
#Ustilago Lorentziana Thum. Alix, Alta.; Medium infection in one field in the Peace River district, Alta.; Saskatoon, Markinch and zone 9 in Saskatchewan.

Hordeum vulgare L.
#Ustilago Hordei (Pers.) K. & S. Grand Prairie, Alta.; Neilburg, Sask.

Ilex verticellata (L.) Gray
#Rhytisma concavum Ell. & Kell. Berthierville, Que.

Iris versicolor L.
Puccinia Iridis (DC.) Rabh. #Anticosti Is., Que.; Magog, Que.
#Puccinia sessilis Schneid. Bennett Lake, Ont.

Iva axillaris Pursh
#Puccinia intermixta Pk. Hawker, Sask.

Iva xanthifolia Nutt.
Basidiophora Kellermanii (E. & H.) Wils. Oakville, Man., slight infection.

Juncus filiformis L.
#Uromyces Junci (Desm.) Tul. Saskatoon, Sask.

Juncus tenuis Willd.
#Uromyces Silphii (Syd.) Arth. Pike Lake, Sask.

Juniperus communis L. var. depressa Pursh.
Cercospora Sequoiae E.& E. var. Juniperi E.& E. Zone 9, Sask.
#Gymnosporangium clavariaeforme (Jacq.) DC. Woodside, N.S.
Gymnosporangium clavipes Cke. & Pk. Saskatoon, Sask., light infection; Old Chelsea, Que.; Woodside, N.S.

Juniperus horizontalis (Moench) Rydb.
Gymnosporangium corniculans Kern, Saskatoon, Sask., light infection.
#Gymnosporangium juvenescens Kern, Saskatoon, Sask., light infection.

Lactuca pulchella (Pursh.) DC.
#Bremia Lactucae Regel, Annaheim, Sask.
Puccinia minussensis Thüm. #Annaheim, Sask.; in Manitoba the disease was found to be severe at Binscarth, medium at Winnipeg and traces at Minnedosa and Dauphin.
Puccinia patruelis Arth. #Annaheim, Sask.; Melbourne, Man., medium infection, and Riding Mts. and Winnipeg, Man., trace.

Larix laricina Koch
#Melampsora Medusae Thüm. Eagle Depot, Que.

Lathyrus venosus Muhl.
Erysiphe Polygoni DC. Zone 8, Sask.; Winnipeg, Man., in patches.

Ledum groenlandicum Oeder
Chrysomyxa ledicola Lagerh. Banff, Alta.; Whitemouth, Man.

Lophodermium sphaerioides (A. & S.) Duby, Whitemouth, Man., common,

Lepidium densiflorum Schrad.
#Peronospora parasitica (Pers.) Tul. Saskatoon, Sask.

Lilium sulphurgalex princepes (cult.)
#Uromyces Holwayi Lagerh. Simcoe, Ont.

Linum Lewisii Pursh.
Melampsora Lini (Pers.) Lév. #Peace River, Alta., Jasper Park, Alta., prevalent.

Lolium rigidum
Claviceps purpurea (Fr.) Tul. Winnipeg, Man., trace.

Lonicera sp.
#Microsphaera Alni (Wallr.) Wint. Clova, Que.

Lycopus uniflorus Michx.
Puccinia augustata Pk. Queens Co., P.E.I.

Lycodesmia juncea Don.
#Puccinia Stipae Arth. Saskatoon, Sask.

Malva rotundifolia L.
Puccinia Malvacearum Bert. Winnipeg, Man. First record for Manitoba on this host; abundant in one location. Macdonald College, Que., common.
Septoria malvicola Ell. & Mart. Macdonald College, Que.

Malva sp. (cult.)
#Puccinia Malvacearum Bert. Winnipeg, Man.

Menispermum canadense L.
Entyloma Menispermi Farl. & Trel. St. Adolphe, Man., trace.

Mentha canadensis L.
#Puccinia Menthae Pers. Falher, Alta.

Mentha glabrior (Hook.) Rydb.
#Puccinia Menthae Pers. Pike Lake, Sask.
#Septoria menthicola Sacc. & Let. Thorhild, Alta.

Mitella nuda L.
#Puccinia Heucherae (Schw.) Diet. Ellis Bay, Que.

Monarda mollis L.
#Puccinia Menthae Pers. Derwent, Alta.

Monarda mollis L. var. menthaefolia Fern.
#Puccinia Menthae Pers. Cutbank, B.C.

Monolepis Nuttalliana (R. & S.) Wats.
Cystopus Bliti (Biv.) Lév. Scott, Sask., moderate infection.

Nabalus albus (L.) Hooker
Puccinia patruelis Arth. Virden, Man., heavy infection

Oenothera biennis L.
#Septoria Oenotherae Westd. Myrnam, Alta.

Osmorrhiza longistylis (Torr.) DC.
Puccinia Pimpinellae (Strauss) H. Mart. Aecial stage prevalent in Manitoba; #Pike Lake, Sask.
Septoria Aegopodii Desm. Winnipeg, Man., medium, scattered infections.

Panicum capillare L.
Puccinia emaculata Schw. Hull, Que.

Panicum miliaceum L.
#Sorosporium Panici-miliacei (Pers.) Takah. Indian Head, Sask.

Phalaris arundinacea L.
#Puccinia sessilis Schneid. Sutherland, Sask.

Phaseolus vulgaris L.
#Fuligo septica (L.) Gmelin, Rockcliffe, Ont.

Phragmites communis Trin.
Hadrotrichum lineare Pk. Cowan, Man., abundant.
Napicladium arundinacearum (Cda.) Sacc. Cowan, Man., slight infection. First record for Manitoba.

Pinus Banksiana Lamb
#Biatorella resinae (Fr.) Mudd. Constance Bay, Ont.
#Zythia resinae (Ehrenb.) Karst. Constance Bay, Ont.

Pisum sativum L.
#Uromyces Fabae (Pers.) de Bary, C.E.F., Ottawa, Ont.

Plantago major L.
Erysiphe Cichoracearum DC. Winnipeg, Man.; Kenora, Ont., heavy infection; Macdonald College and Côte des Neiges, Que., heavy infection.
Yellows (virus) was general in York and Sunbury counties, N.B.

Poa compressa L.
Erysiphe graminis DC. Carman and Winnipeg, Man., heavy infection.

Poa eminens J.S. Presl
#Claviceps purpurea (Fr.) Tul. Anticosti Is., Que.

Poa pratensis L.
Claviceps purpurea (Fr.) Tul. Winnipeg, Man., medium infection.

Poa triflora Gilib.
Erysiphe graminis DC. Winnipeg, Man., medium infection.

Polygonum aviculare L.
Erysiphe Polygoni DC. Winnipeg, Man., and Kenora, Ont. medium infection; Macdonald College, Que., severe infection.
Uromyces Polygoni (Pers.) Fuck. #Carstairs, Alta.; Macdonald College, Que.

Polygonum fluitans (Eaton) Greene
#Puccinia Polygoni-amphibii Pers. Prudhomme, Sask.

Polygonum pennsylvanicum L.
#Ustilago utriculosa (Nees) Tul. Ottawa, Ont.

Polygonum Persicaria L.
Septoria Polygonorum Desm. Queens Co., P.E.I., moderate infection.

Polygonum viviparum L.
#Pucoinia Bistortae(Str.) DC. Anticosti Is., Que.

Polygonum sp.
Erysiphe Polygoni DC. Caron, Sask.
Ovularia avicularis Pk. St. Gregor, Sask.
#Puccinia Polygoni-amphibii Pers. St. Gregor, Emma Lake and Carlyle, Sask.

Populus sp.
#Septoria populicola Pk. Indian Head, Sask.

Portulaca oleracea L.
Cystopus Portulacae (DC.) Lév. #Saskatoon, Sask.; Morden and Winnipeg, Man., slight infection

Potentilla Anserina L.
Ramularia arvensis Sacc. Sclater, Man., slight infection; Ashville, Man., heavy infection.

Potentilla norvegica L. var. hirsuta (Michx.) Lehm.
#Fabraea Dehnii (Rabh.) Nannf. Falher, Alta.

Potentilla pectinata Raf.
#Phragmidium Potentillae (Pers.) Karst. Percée, Que.

Potentilla sp.
#Phragmidium Ivesiae Syd. Beaverlodge, Alta.
#Phragmidium Potentillae (Pers.) Karst. Clandonald, Alta.; Saskatoon, Sask.

Prenanthes altissima L.
#Sphaerotheca Humuli (DC.) Bur. var. fuliginea (Schl.) Salm. Anticosti Is., Que.

Prunus Cerasus L.
#Exoascus Cerasi (Fuck.) Sacc. Penticton, B.C.

Prunus melanocarpa (A. Nels.) Rydb.
#Dibotryon morbosum (Schw.) Theiss.& Syd. Saskatoon, Sask., slight infection.

Prunus pennsylvanica L.
#Taphrina Institiae (Sadeb.) Johans. Antigonish, N.S.

Prunus virginiana L.
Cylindrosporium lutescens Higg. Common throughout Manitoba.
Dibotryon morbosum (Schw.) Theiss. & Syd. General in York and Sunbury counties, N.B.

Psoralea Argophyllae Pursh.
#Uromyces Argophyllae Seym. Saskatoon, Sask.

Pteritis nodulosa (Michx.) Nieuwl.
Uredinopsis Struthiopteridis Störm. St. Adolphe, Man., heavy infection.

Pyrola americana Sweet
#Chrysomyxa Pyrolae Rostr. Petawawa, Ont.

Radicula Armoracia (L.) B.S. Robinson
#Ramularia Armoraciae Fuck. Edmonton, Alta.

Ranunculus abortivus L.
Uromyces Alopecuri Seym. Carman, Man., trace.

Rhamnus alnifolia L'Her
Puccinia coronata Cda. Seddon's Corners and Pine River, Man., severe infection; Beausejour, Man., medium infection; and Winnipeg, Man., trace.

Rhus Toxicodendron L.
#Pileolaria Toxicodendri (B. & Rav.) Arth. Toronto, Ont.

Ribes americanum Mill.
Puccinia Pringsheimiana Kleb. Common throughout the province of Manitoba.

Ribes glandulosum Weber (R. prostratum L'Her)
#Cronartium ribicola Fisch. Clova, Que.

Ribes hudsonianum Richards
Sphaerotheca mors-uvae (Schw.) Berk. Zone 1, Alta.

Ribes nigrum L.
#Sphaerotheca mors-uvae (Schw.) Berk. Saskatoon, Sask.

Ribes sanguineum Pursh.
Cronartium ribicola Fisch. Saanichton, B.C., general infection.

Ribes vulgare Lam.
#Gloeosporium Ribis (Lib.) Mont. & Desm. Indian Head, Sask.

Ribes sp.
#Cronartium ribicola Fisch. Richmond, P.E.I.

Rosa acicularis Lindl.
#Phragmidium Rosae-acicularis Liro, Drumheller, Alta.

Rosa blanda Ait.
#Phragmidium americanum Diet. Anticosti Is., Que.

Rosa gymnocarpa Nutt.
#Phragmidium montivagum Arth. Cache Creek, B.C.

Rosa pisocarpa Gray
#Phragmidium Rosae-californicae Diet. Allen Grove, B.C.

Rosa sp.
Cercospora rosaecola Pass. General throughout the province of Manitoba, in some places quite severe.
#Phragmidium Rosae-arkansanae Deit. Beaverlodge, Alta.

Rubus acaulis Michx.
#Gymnoconia Peckiana (Howe) Trotter, Sutherland, Sask.

Rubus canadensis L.
Gymnoconia Peckiana (Howe) Trotter, P.E.I.

Rubus odoratus L.
#Sphaerotheca Humuli (DC.) Burr. Ottawa, Ont.

Rubus parviflorus Nutt.
#Lachnum bicolor (Bull.) Karst. Vancouver, B.C.

Rubus strigosus Michx.
#Pucciniastrum americanum (Farl.) Arth. Anticosti Is., Que.

Rubus sp.
#Pucciniastrum americanum (Farl.) Arth. Kentville, N.S.

Rudbeckia ampla A. Nels.
Septoria Rudbeckiae Ell. & Halst. Oakville, Man., common.
Uromyces perigynius Halst. Carman, Man. Heaviest infection ever found in province.

Sagittaria latifolia Willd.
Cercospora Sagittariae E. & K. Elm Creek, Man., severe infection.

Salix candida Flügge
#Rhytisma Salicinum (Pers.) Fr. Anticosti Is., Que.

Salix sp.
#Gloeosporium Salicis West. Ponoka, Alta.
#Melampsora arctica Rostr. North River, B.C.

Sambucus sp.
#Phoma sambucina Sacc. Indian Head, Sask.

Saxifraga virginiensis Michx.
#Puccinia curtipes Howe, Old Chelsea, Que.

Saxifraga sp.
Puccinia curtipes Howe, B.C., general on plants in wild state.

Secale cereale L.
#Claviceps purpurea (Fr.) Tul. Edmonton, Alta.; Vanscoy, Sask.
#Urocystis occulta (Wallr.) Rabh. Balcarres, Sask.

Sempervivum sp.
#Endophyllum Sempervivi (A.& S.) de Bary, Vancouver, B.C.

Senecio aureus L.
#Puccinia recedens Syd. Anticosti Is., Que.

Shepherdia canadensis (L.) Greene
#Septoria Shepherdiae (Sacc.) Dearness, Athabasca, Alta.

Sium cicutaefolium Schrank.
Uromyces Scirpi (Cast.) Burr. Rapid City, Man., medium infection. First record on this host from Manitoba.

Solanum tuberosum L.
#Colletotrichum atromentarium (B.& Br.) Taub. Unity, Sask.

Solidago canadensis L.
#Coleosporium Solidaginis (Schw.) Thüm. Valley River, Man.

Solidago macrophylla Pursh
#Coleosporium Solidaginis (Schw.) Thüm. Clova, Que.

Solidago pruinosa Greene
#Coleosporium Solidaginis (Schw.) Thüm. Saskatoon, Sask.

Solidago Riddellii Frank
#Coleosporium Solidaginis (Schw.) Thüm. C.E.F., Ottawa, Ont.

Solidago rugosa Mill.
#Coleosporium Solidaginis (Schw.) Thüm. Gaspé, Que.

Solidago sp.
#Coleosporium Solidaginis (Schw.) Thüm. Pike Lake, Sask.; Mishomis Farm, Que.
#Puccinia extensicola Plow. Lanigan, Sask.

Sorbus scopulina Greene
Gymnosporangium Juniperi Link, Minaki, Ont., medium infection.

Spartina gracilis Trin.
#Claviceps purpurea (Fr.) Tul. Kisbey, Sask.

Spartina sp.
#Leptosphaeria personata Niessl. Charlottetown, P.E.I.
#Uromyces acuminatus Arth. Merigomish, N.S.

Stellaria borealis Bigel
#Melampsorella Cerastii (Pers.) Schroet. Anticosti Is., Que.

Stellaria longipes Goldie
#Melampsorella Cerastii (Pers.) Schroet. Anticosti Is., Que.

Stipa comata Trin. & Rupr.
Puccinia Stipae Arth. Westbourne, Man., medium infection.

Stipa viridula Trin.
Claviceps purpurea (Fr.) Tul. Winnipeg, Man., trace

Symphoricarpos occidentalis Hook.
Septoria Symphoricarpi Ell. & Ev. Banff, Alta.

Symphoricarpos racemosus Michx.
#Cercospora Symphoricarpi Ell. & Ev. Fort St. James, B.C.

Septoria Symphoricarpi Ell. & Ev. Saanichton, B.C., common.

Taraxacum officinale Weber
Colletotrichum Dematium (Fr.) Grove. Winnipeg, Man. Abundant on wilted or dead potioles and midribs. First record for Manitoba.
Puccinia Hieracii (Schum.) Mart. Summerland, B.C., light infection; Salmon Arm, B.C., general infection; #Evansburg, Alta.; Macdonald College, Que., moderate infection; Kentville, N.S.
#Puccinia variabilis Grev. Kentville, N.S.
Ramularia Taraxaci Karst. #Edmonton, Alta.; Oakville, Man., severe infection; Erickson, Man., slight infection.
Sphaerotheca Humuli (DC.) Burr. var. fuliginea (Schlecht.) Salm. #Saanichton, B.C.; Yale Co., B.C.; Oakville, Man., slight infection.

Thalictrum dioicum L.
#Puccinia Clematidis (DC.) Lagerh. Lanigan, Sask.

Thalictrum polygamum Muhl.
Erysiphe Polygoni DC. Queens Co., P.E.I., traces.

Thalictrum sp.
Puccinia Clematidis (DC.) Lagerh. Man., common throughout the province.

Triticum aestivum L.
#Pseudomonas atrofaciens (McCull.) Stev. Grandora, Sask.
#Septoria Tritici Desm. Hoey, Sask.

Tsuga canadensis (L.) Carr.
#Keithia Tsugae Farl. Streetsville, Ont.

Urtica gracilis Ait.
Puccinia Urticae Lagerh. Seddon's Corners, Man., heavy infection; Carman, Man., slight infection.

Urtica viridis Rydb.
#Puccinia Urticae Lagerh. Macdowall, Sask.

Vaccinum macrocarpon Ait.
#Venturia compacta Pk. Merigomish, N.S.

Viburnum cassinoides L.
#Coleosporium Viburni Arth. Clova, Que.

Viburnum eradiatum (Oakes) House. (= V. pauciflorum Pylaie)
#Puccinia Linkii Klotzsch, Emma Lake, Sask.

Viburnum Lentago L.
Microsphaera Alni (Wallr.) Salm. Winnipeg, Man., medium infection.

Vicia americana Muhl.
Uromyces coloradensis Ell. & Ev. Winnipeg, Man.
#Uromyces Fabae (Pers.) de Bary, Grimshaw, Alta.; Pike Lake, Sask.

Vicia Cracca L.
#Uromyces Fabae (Pers.) de Bary, Ottawa, Ont.

Vicia sparsifolia Nutt.
#Uromyces coloradensis Ell. & Ev. Saskatoon, Sask.

Vicia sp.
#Uromyces coloradensis Ell. & Ev. var. campestris Arth. Clyde, Alta.
#Uromyces Fabae (Pers.) de Bary. Clyde, Alta.

Viola canadensis L.
Puccinia Violae (Schum.) DC. Winnipeg, Man., slight infection;
#St. Gregor, Sask.

Viola sp.
#Puccinia Violae (Schum.) DC. Kingsmere, Que.; Anticosti Is., Que.

Xanthium sp.
Puccinia Xanthii Schw. Delta, Man., trace.

Zea Mays L.
#Epicoccum neglectum Desm. Yarmouth, N.S.
#Puccinia Sorghi Schw. Indian Head, Sask.

Zostera marina L.
#Ophiobolus halimus Diehl & Mounce n. sp. On leaves in culture. Leaves received 5/1/34 from Tidal Cove, St. Andrews, N.B. Removed and dried 13/3/34, Ottawa. - Type

Zygadenus chloranthus Richard
#Puccinia atropuncta Pk. & Clint. Baie Ste Claire, Que.

MISCELLANEOUS FUNGI

After a comparatively dry summer, rain fell abundantly during the ten days preceding September 15. As a result, various edible and poisonous species of mushrooms were more abundant in the Ottawa district than at any time in the past 6 years. From Sept. 15th to 19th numerous large collections of Lepiota naucina Fr. were brought in to be identified at the Laboratory. Then for several days Psalliota campestris (L.) Fr. predominated. Other species were Marasmius oreades (Bolt.) Fr., Armillaria mellea Fr. and the giant puffball, Calvatia gigantea Batsch, immature specimens of which measuring from 6 to 12 inches in diameter were common. Latterly the collections were varied assortments of species chiefly gathered in woods. Specimens were also received by mail from widely scattered points in Ontario and Quebec. Of the poisonous species it should be noted that the fly agaric, Amanita muscaria (L.) Fr. was actually sent by a correspondent enquiring whether or not it was edible. Several collectors suspecting it to be a poisonous species brought it for identification.

Collections of Boletus spp., with notes on the fresh condition and spore prints were made and duplicates were submitted to Dr. W. H. Snell, Brown University, Providence, R.I., for identification. Of the ones submitted to and identified by him the following were the common species: Boletus scaber Bull. ex. Fr. and B. edulis Bull. ex Fr., Mt. Burnet, Que.; B. viscidus Fr. (= B. elbensis Pk.) under larch, B. granulatus L. ex Fr. under pine and B. flavus With. ex Fr. under mixed conifers, Forest Belt, Central Experimental Farm, Ottawa, Ont. (I.L. Conners)

#Aleuria aurantia Fuck. On ground, Mt. Burnet, Que.
#Ascotremella turbinata Seaver, On old log, Mt. Burnet, Que.
#Chlorosplenium aeruginascens Nyl. On decaying wood, Kingsmere and Mt. Burnet, Que.
#Chromocrea gelatinosa (Tode) Seaver, on rotten wood, Mt. Burnet, Que.
#Coryne sarcoides Fr. On old wood, Mt. Burnet, Que.
#Cudonia circinans (Pers.) Fr. On ground, Mt. Burnet, Que.
#Cyathus Olla Pers. On surface soil, St. Hyacinthe, Que.
#Delastria rosea Tul. Found in soil of a tulip bed, Eldon, P.E.I. October 27. (Determined by J. Dearness)
#Geoglossum glabrum Pers. On very rotten wood, Old Chelsea, Que.
#Helvella elastica Bull. On ground, Mt. Burnet, Que.
#Helvella infula Schaeff. On rotten wood, Mt. Burnet, Que.
#Hypocrea rufa (Pers.) Fr. On rotten wood, Mt. Burnet, Que.
#Leotia stipitata (Bosc.) Schroet. On ground, Mt. Burnet, Que.
#Microglossum rufum (Schw.) Underw. On decayed wood, Old Chelsea, Que.

#Paxina fusicarpa (Ger.) Seaver, On surface soil, Kingsmere, Que.
#Paxina hispida (Schaeff.) Seaver, On old wood, Mt. Burnet, Que.
#Peziza badia Pers. On ground, Mt. Burnet, Que.
#Peziza repanda Pers. On old wood, Ottawa, Ont.
#Plectania coccinea (Scop.) Fuck. On burned wood, Old Chelsea, Que.
#Pleurage erostrata D. Griff. On old horse dung culture, Man. Agr. College, Winnipeg, Man.
#Spathularia clavata (Schaeff.) Sacc. On ground, Mt. Burnet, Que.
#Spathularia velutipes Cke. & Farl. On rotten wood, Mt. Burnet, Que.
#Sphaerobolus stellatus Tode, On old wood, Mt. Burnet, Que.
#Stemonitis splendens Rost. On old wood, Ottawa, Ont.
#Stilbum giganteum Pk. On rotten bark, Mt. Burnet, Que. (Det. by J. Dearness)
#Trichia Botrytis Pers. var. lateritia List. On rotten wood Mt. Burnet, Que.
#Verpa bohemica (Krombh.) Schroet. MacGregor Lake, Que.
#Xylaria polymorpha (Pers.) Grev. On rotten wood, Ottawa, Ont.

Only the names of the cultivated plants have been included in this index. For diseases on plants not under cultivation the section of "Diseases of Miscellaneous Plants" may be consulted.