B. J. Sallans

DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

EXPERIMENTAL FARMS BRANCH

H.T. GÜSSOW
Dominion Botanist.

E.S. ARCHIBALD
Director.

FIFTEENTH ANNUAL REPORT OF THE CANADIAN PLANT DISEASE SURVEY 1935

Compiled by

I.L. Conners
Plant Pathologist.

FOREWORD

The Fifteenth Annual Report of the Canadian Plant Disease Survey follows closely the arrangement of the previous reports. In conformity with a motion passed at the meetings of the Canadian Phytopathological Society in June, 1935, at Edmonton, Alta., the names of the bacterial plant pathogens are given according to the system proposed by the Committee of the Society of American Bacteriologists as far as they have appeared in Bergey's Manual of Bacteriology 1923, 1925 and 1930. The names of some of the fungous pathogenes have also been changed to conform to best usage.

It should also be mentioned that Section VII, entitled "Disease of Miscellaneous Plants" has been omitted. This section requires about a month to prepare and deals mostly with diseases of non-economic plants. Instead more time has been spent on identifying fungi as the collections received from correspondents have been very heavy this year.

Permit me at this time to thank everyone who has contributed to the present report. Although a formal list of collaborators might have been prepared, I have preferred to add the name in brackets of the contributor to some of his more interesting or unusual contributions. In this way many an individual contributor receives direct recognition of his contributions. Again it is impossible to know who are contributors for at many of the larger Laboratories a summary of the observations only is prepared, which may have been crystalized from several persons' observations. In fact these reports are the result of team work among the Plant Pathologists of Canada and thus a joint contribution in this important field.

My thanks are also due to Mr. G. A. Scott, who has proofread this report as it was typed and mimeographed.

May 15, 1936,
Division of Botany,
Central Experimental Farm,
Ottawa, Canada.

I.L. Conners,
Plant Pathologist.

New or Noteworthy Diseases

Stem rust of wheat was the outstanding plant disease in Canada in 1935. It appeared once more in epidemic form in Manitoba and Saskatchewan and was particularly destructive in southern Manitoba west of the Red river and in eastern Saskatchewan in which area moisture was sufficient throughout the growing period to insure an exceptionally fine crop. Rust and drought practically destroyed the crop in Manitoba east of the Red River and rust caused some damage as far west as Moose Jaw and also in northern Saskatchewan. This epidemic has been described in some detail in the main part of the report for if the new rust resistant varieties now about to be made available to the farmer displace the present varieties on a large scale, rust losses should be largely eliminated.

A few new diseases have been reported for the first time in Canada. Probably the most interesting is the finding of Beet rust (Uromyces Betae) on sugar beets, mangels, and on garden beets in British Columbia. It is possible that the rust was introduced on the seed from Europe for both teliospores and urediniospores were found in abundance on imported seed. Although this may be a fresh introduction, the rust is known from California and Oregon and may have suddenly spread up the coast. Moreover, the sowing of similar seed in Ontario has not led to its appearance in that province.

The downy mildew (Peronospora manshurica) of soy bean was found in western Ontario this year. It has been reported from Indiana as well as from farther south in the United States. Downy mildew (Peronospora Meliloti) was found on sweet clover at Edmonton, Alta. Although the mildew appeared to be spreading from Lytton alfalfa, Gaumann considers the downy mildews on Melilotus and Medicago to be distinct. Until experimental evidence has definitely established that there is in reality only one species, I have thought it advisable to consider the two as distinct.

A seedling-infecting loose smut of barley was recognized in Canada for the first time this year. The smut developed in plants grown by Dr. W. F. Hanna in the Rust Research greenhouses from seed inoculated with spores collected in 1934 at Brandon, Man., for those of "loose smut". This finding is more fully discussed on page 11.

Another new rust was Uromyces Geranii, which was heavy on several species of Geranium, cultivated as herbaceous perennials in the border of the Arboretum, C.E.F., Ottawa, Ont. This rust is known in Europe but on this Continent it has been collected

only in Alaska. Prof. Jackson also communicated a specimen collected on G. pratense by Dr. H. D. House near Williamsburg which is about 40 miles from Ottawa. Downy mildew (Peronospora Cheiranthi) was found on wallflower at Victoria, B.C. This appears to be new to Canada. Grey bulb rot (Sclerotiorum Tuliparum), an extremely rare disease of tulips in Canada was found at Rockcliffe, Ont. It was found several years ago in Beechwood cemetery, Ottawa, Ont. by Dr. Drayton and has been reported once before to the Survey from New Brunswick, although no details were given.

The weather and Its Influence on Plant Diseases

On Vancouver island and the lower Mainland, B.C. the season began much later in 1935 than in 1934. In general diseases were much less prevalent with the exception of the powdery mildews and the anthracnose of apple, which was severe on Vancouver island as the result of early autumn rains in 1934, which fell before the trees were sprayed.

Most of the diseases appeared about 3 weeks later than in 1934 and caused considerably less damage. This fact was noted for early and late blights of potato, downy mildew of onions, late blight of celery, shot hole of cherries, and snapdragon rust. Usually snapdragon rust and downy mildew of onions seriously reduce the amount of seed of these crops harvested.

Tulip blight was appreciably checked by the dry weather in the spring, the total precipitation during April and May at Saanichton being 0.59 inches. Powdery mildews were fairly prevalent; that on apple caused some damage when the trees were in bloom. (W. Jones)

In Alberta the season began fully two weeks later than usual, the temperature in June being often near freezing. Soil moisture was excessive in the western half of central Alberta and northward into the Peace River area and in consequence seeding of wheat was delayed from 10 days to 2 weeks. In the eastern half of central Alberta moisture was about normal. The season was considerably delayed by the late spring precipitation in southern Alberta, but the weather was very dry during June, July and August and in consequence cereal crops were light except in the irrigated districts. In central and northern Alberta rain fell frequently during the season keeping the soil moisture high and the temperature low. A killing frost occurred in the area on August 16, being most severe along a line running east and west through Edmonton, the lowest temperature being near Lloydminster. This area extended from High River, Olds, Stettler, and Provost on the south to the Peace river on the north. A similar frost occurred on September 3 over roughly the same area. On the other hand the wheat area north of the Peace river mostly, escaped severe frosts until September 23.

The winter of 1934-35 began with a heavy fall of snow early in the fall, which remained until an unusually late date in the spring with little attendant alternate freezing and thawing. Conditions were apparently favourable to winter wheat and legumes since these crops came through in splendid condition. (G.B. Sanford)

Seeding began about the usual time with a fair supply of moisture available in the Saskatoon district and eastward, but the soil was very dry in west central Saskatchewan. The weather was mostly cool during May with a temperature considerably below that of several years previous. There was frost on 4 nights early in the month. In June it was alternately cool and warm with 1.8° frost on June 4. July was hot especially the 2nd and 3rd weeks while August was cool.

Rainfall was only 0.52 inches in May and poorly distributed. In June 4.56 inches fell and it was well distributed. This rainfall was above average and restored much of the moisture lost in May. It was dry in July, there being 23 days without rain and a total fall of only 2.32 inches. In August 2.28 inches of rain fell on 14 days. In this district and east and north of here, the abundant rains of June provided sufficient moisture to mature the crop, but in a large area in west central Saskatchewan (zones 3, 9, and 11) rain was nearly absent and in consequence of the severe drought a very poor crop was harvested.

High winds prevailed during 10 days in May, 12 days in June, 8 days in July, and 10 days in August. Much moisture was lost in May, particularly in the western dry areas, and soil drifting was also severe there. The high, hot winds in July were devastating to the crops.

Soil temperatures as compared with 1934 were low in May and June, high in July, and average in August. The low soil temperatures in May probably checked infection by common foot rot which caused little damage this year. (H.W. Mead)

Seeding in general was somewhat later than usual in southern Saskatchewan and a delay of a week or more occurred following heavy rains in the first few days of May when approximately 50% of the wheat was sown. May and June were several degrees cooler than in the past 2 years and 2° and 3°F. cooler respectively when compared with the means for the 10-year period, 1922-31 at Indian Head. July on the other hand was 6°F. warmer than the 10-year period. The rainfall for May, June, and July was 11.13 inches and fairly well distributed, an increase of 65% of the 10-year period. The relative humidity was high from May to August.

Soil temperatures taken at a 6-inch depth at Indian Head would indicate that they were relatively low in May and June, particularly in the former month, when air temperatures were also low and rainfall high.

Conditions were favourable for the development of stem rust. Crop development was retarded by 10 days to 2 weeks, stem rust spores arrived earlier, and high temperatures and heavy precipitation occurred during July. Leaf spots were abundant compared with their scanty prevalence in the past few years. Low soil temperatures in the spring months apparently retarded infection by the common foot-rotting fungi for these diseases were less prevalent and injurious than they were in the drier years. (B. J. Sallans)

In Manitoba the temperature was about normal for May. Rainfall in the western half of the province was considerably above the average, while in the eastern section it was 20-30% below the usual amount. In June both temperature and precipitation were decidedly abnormal. Temperatures throughout the province were 2-5° F. below the average and rainfall was 1½ to 3 times in excess of the normal amount. The heaviest rains occurred in the south-western corner of Manitoba in the so-called dry area. Towards the end of June temperatures were higher than usual and hot weather prevailed throughout July, the average being 4-7°F. above normal. In the same month rainfall was 1½ to 3 times the usual amount. During August temperatures were normal or slightly below, but rainfall was much above the average in some localities. As pointed out more fully in the discussion on stem rust of wheat the weather conditions prevailing in 1935 were particularly favourable for the development of an epidemic. (B. Peturson)

In the Niagara Peninsula of Ontario the cool moist weather of the early spring checked early growth. It favoured the development of leaf curl (Taphrina deformans) and the disease was very common throughout the peninsula. Where the trees were sprayed late or the spraying was poorly done, every leaf was infected. May and June were also cool with a fair amount of rainfall. A rainy spell in early May was favourable for Venturia inaequalis and scab lesions were common by the end of May. The disease spread rapidly during June and heavily infected fruits were common before the season was far advanced. Fireblight (Erwinia amylovora) was quite prevalent and widespread on apples particularly on Greening, while it was of little importance on pears. Possibly this might have been due to a week's difference in the date of blooming this year. The greater amount of moisture in the early season favoured both powdery and downy mildews. Powdery mildew (Sphaerotheca Humuli) of strawberry was important in some plantations. Downy mildew (Plasmopora viticola) of grape appeared in the vineyards, but was kept in check by spraying. Powdery mildew (Sphaerotheca pannosa) of peach, which is usually of little importance was conspicuous

especially on the fruit. Powdery mildew (Sphaerotheca Humuli) of raspberries was extremely prevalent and appeared earlier than usual. Latham is extremely susceptible. Mildews attacking ornamental shrubs and flowers were also prevalent. The weather was favourable during the peach harvest and little brown rot was evident in the early crop. Some rot appeared in the late crop but losses were negligible. The hot weather in midsummer seemed to mask the symptoms of virus diseases of raspberries. (G.C. Chamberlain)

In the Ottawa district the early spring was cold and backward so that it was late before heavier soils were warm and dry enough to work. Although it was hot in the latter part of May, much of June was cool and rainy. In consequence crops were late and heavy and when hot weather came in July, stem rust (Puccinia graminis) was fairly heavy on wheat and crown rust (P. coronata) was decidedly more prevalent than usual. Also head blight (Helminthosporium sativum and Fusarium spp.) was distinctly noticeable in the wheat plots. Other diseases which were probably favoured by the season were dollar spot (Rhizoctonia solani) on turf and Cercospora leaf spot of sugar beets.

At Ste. Anne de la Pocatière and in eastern Quebec the winter was long and snowfall heavy. May was dry and cold, at least at night throughout the month. As a result, apple trees did not bloom until June 2. During the growing season rainfall was higher than in 1934, especially in the district about Quebec city, where precipitation was extremely high in June, July, and August. In this district late blight appeared in July, while elsewhere in the province it was not found until August. Apple scab was difficult to control and was present to some extent in every orchard. The second and third weeks of August were unusually hot, and cold north to north-east winds were entirely absent. Crops were very good, but owing to frequent and heavy rains haying was difficult. Rust and leaf spots were abundant. (C. Perrault)

In New Brunswick the winter of 1934-35 was colder than usual, however it was neither so prolonged or so extreme as the previous winter. Fruit trees or shrubs suffered little or no injury.

The spring was cool, June was wetter than usual and the amount of sunshine was considerably below average. Weather conditions in June were most favourable for the development of damping-off; mangel seedlings in particular suffered severely from root rot. In July and the first 3 weeks of August the average temperature was high and rainfall was at a minimum, 101.5° F. being recorded on August 18. This resulted in an

almost complete masking of mosaic symptoms in the potato throughout the province. Cooking of tomatoes and cucumbers on the vines was commonly reported from garden areas in York and Sunbury counties. Blossom-end rot of tomato and bean anthracnose was much more prevalent and destructive than usual.

Moderately heavy rains fell the last week of August and the first week of September and at the same time the temperature declined sharply. These conditions were favourable for an outbreak of late blight of potato, which, however, was checked by the dry weather that followed. Mosaic symptoms, previously masked, now began to show up on the new growth that the potato plants made. October was fairly warm and very dry, and frost was recorded on only 2 nights. The month was ideal for harvesting, and garden crops, potatoes, and turnips were lifted without damage by frost. (J.L. Howatt)

At Kentville, N.S. the early spring was cold and vegetation was slow in commencing growth. May and June were about normal. On account of dull weather and rain, some difficulty was experienced in putting on the first two orchard sprays after the trees had bloomed. During August temperature records were broken at Kentville when 90° F. was registered for 7 consecutive days and 99° F. on one day. A good rain followed this warm spell and little drought injury was experienced. September was cool and precipitation was above normal, while in October rainfall was below and hours of sunshine were above the 20-year average for that month. (J.F. Hockey)

I. DISEASES OF CEREAL CROPS

WHEAT

STEM RUST (*Puccinia graminis*). In 1935 Western Canada experienced the severest and most destructive epidemic of stem rust in its history. The rust made its appearance in southern Man. about July 1. Its development and spread was very rapid so that by July 25 stem rust infections on common wheat ranged from 75 to 100% throughout the whole area of Man. south of the Riding Mountains. In this area about 50% of the wheat was not harvested and in some districts in the southwestern part of the province less than 5% of the bread wheat was threshed. In fact the Swan River valley was the only district in Man. where the common wheat was all threshed, although it had been severely affected by rust. In early July, before stem rust was noticeable, it was freely predicted that common wheats in Man. would yield on the average, from 20 to 25 bushels per acre; however, the actual average yield was about 4 bushels per acre.

The 1935 rust epidemic was no more severe than the one experienced in 1916, but the total damage was greater because of the larger acreage affected. The reduction in yield was placed for Man., excluding heat damage in eastern Man., at 20,000,000 bushels and for Sask. at 82,000,000. Based on a price of 80 cents per bushel for No. 1 Northern the monetary loss was $81,600,000. A further loss in grade of 6 cents per bushel on an estimated yield of 48,000,000 bushels from the affected areas amounted to $2,880,000. Thus calculated the total loss was estimated to be approximately $85,000,000. (L.H. Newman)

Reward wheat withstood the attack of rust considerably better than Ceres and Marquis. The rust resistant wheat, Renown, produced at the Dominion Rust Research Laboratory, Winnipeg, Man., was practically rust free and Thatcher, developed at the Minn. Agr. Exp. Sta., St. Paul., was only very lightly rusted. In Man., the yield per acre for Renown and Thatcher under experimental conditions was 24.7 and 28.6 bushels respectively.

Durum wheat, throughout Man., was much less affected by rust than common wheat, the average infection being about 20%. The average yield of durum wheat was at least 13 bushels per acre and most of the crop graded No. 3 or better.

Weather conditions during early spring and summer favoured stem rust development. Seeding began, in general, a few days later than usual. Normal weather conditions prevailed throughout

May, but in June temperatures in Man. were 2 to 5 degrees below normal and the rainfall was 1½ to 3 times in excess of the normal amount. The cool, wet weather during June retarded the development of cereal crops. During July, temperatures were from 4 to 7 degrees above normal and rainfall 1½ to 3 times normal; only in the Swan River valley was the rainfall for July below normal. Spores from the rusted areas in the United States began to arrive in Man. about June 23, and during the last week in June and early July stem rust spores in the air were more prevalent than usual for that time of year.

The factors which were responsible for the unusual severity of the rust epidemic in 1935 were the arrival of abundant inoculum at an early date, the heavy precipitation during June and July, and the retardation of crop development on account of unseasonable weather during the early spring and summer.

(B.Peturson)

Stem rust began to appear on common wheat at Indian Head, Sask., about July 8, after a spore shower on June 29, and it was found at Saskatoon on July 10. It rapidly reached epidemic form and caused severe damage in south-eastern and eastern Sask., especially in zones 1, 2, and 7. Over the rest of Sask. it caused a trace to slight damage before the crop was harvested.

Durum wheat was only lightly infected by stem rust, and it suffered little or no damage.

No stem rust was found in Alta. until August 17, when a few pustules were observed on Gullen at Lethbridge. It was collected in the Edmonton district on August 26 and a slight scattering of rust appeared suddenly in this area on Sept. 1. By this time, however, most of the crop was harvested and no damage was caused. In zones 1-5, 8 and 9 the weather was very dry, while in zones 8-13 the crop was injured by frost.

Stem rust heavily infected wheat at Agassiz, but only slightly at Saanichton, B.C.

Stem rust was more prevalent than usual in the Cereal plots, Ottawa, Ont., due to the cool weather and excessive rainfall of June. A trace was present on July 17, and the following infections were noted on July 30: a club wheat, 40%; Marquis, 30%; a durum wheat, 20%; Huron, 5%. The damage, however, appeared to be slight.

The following extract from a letter written Sept. 2, by Mr. W.R. Reek, Experimental Farm, Ridgetown, Ont., and communicated by Mr. L.H. Newman, indicates that stem rust was destructive to winter wheat in south-western Ontario: "The rust did so much

damage that our entire crop is not fit for seed. Consequently we are purchasing all our own seed wheat and we are forced to cancel the various orders from farmers for seed which amounted to about 600 bushels. The rust did a great deal of damage throughout south-western Ontario, and I anticipate there will be a real scramble for seed about the middle of September".

Stem rust infection was moderate in Que., except at Ste. Anne de la Pocatière, where it caused moderate damage. Stem rust infection was severe on the 73 varieties and strains at Fredericton, N.B.; only the following were slightly infected: Pent. x Ma. 1005, 5%; Pent. x Ma. 1000, 5%; Pent. x Ma. 729, 4%; Thatcher, 3%; 32-6-24-1511, 3%; R.L. 716, 1%. In P.E.I. stem rust appeared early in the season and was very destructive, resulting in much low grade wheat.

LEAF RUST (Puccinia triticina) moderately infected wheat at Agassiz, B.C., while a light infection was reported from Enderby. In Alta. it appeared later than usual and was very scarce, except in one field where a 65% infection was reported. Leaf rust was general but light on common wheat in Man. and in eastern Sask., and the infections were too light to cause appreciable damage. A trace was also reported on durum wheat in Man.

Leaf rust infection ranged from 75-80% on the leaves and up to 25% on the sheaths in the Cereal plots, Ottawa, Ont. The infection ranged from 40-50% at Lennoxville and Macdonald College, Que.; a 100% infection was reported in one field of Red Fife at Ste. Anne de la Pocatière. Leaf rust slightly to heavily infected wheat at Kentville, N.S. It was widespread in P.E.I., infections being from a trace to 100%.

STRIPE RUST (Puccinia glumarum) was common on Vancouver island, B.C. On the varieties at Saanichton infection ranged from 10-60%; damage, a trace to 2%. Egyptian Amber was most seriously affected. Stripe rust was severe only at Lethbridge, Alta., and the damage there was only a trace. Out of 227 fields examined it was noted in 4, one of which was in the Peace River district.

BUNT (Tilletia caries and T. laevis). Besides the field reports, a summary of the data collected from the records of the Western Grain Inspection Division has been kindly supplied by Dr. W.F. Hanna.

Table 1. Wheat Bunt in Western Canada.

Inspection period, August 1 to October 31, 1935

Class of Wheat	Cars Inspected	Cars Graded Smutty	Percentage Smutty
Hard Red Spring	63,360	418	0.6%
Amber Durum	4,945	49	1.0
White Spring	12	2	16.7
Alberta Red Winter	249	98	39.4
All Classes	69,873	569	0.8

If the figures given in Table 1 are compared with those recorded in previous reports (see Ann. Rept. Can. Plant Dis. Survey 14:2-3. 1935) bunt was apparently slightly more prevalent than it has been for the past three years. The most striking increase was in the percentage of cars of Alberta Red Winter which graded smutty in 1935. Usually the figure is slightly more than 10%, but even this, percentage is far higher than that generally recorded for other classes of wheat and suggests that it is more difficult to control bunt in winter wheat in Alberta than in spring-sown varieties.

Usually only a trace of bunt is present in wheat on Vancouver island, B.C., but in one field 50% of the heads were found infected. Bunt (T. caries) was also severe in winter wheat at Armstrong and Enderby in the interior, up to 50% of the plants were found affected. Bunt was found in 16 fields in southern Alta. out of 227 examined, the average damage being 4.0%, while in Sask. bunt was recorded from 3 fields out of 211, with average damage, a trace. Bunt was also reported from all 3 counties of P.E.I.; the damage was a trace to severe.

LOOSE SMUT (Ustilago Tritici) has been found in imported wheat on Vancouver island, B.C., but it seems to disappear after one year; it is believed that conditions are not favourable for smut development. Traces of loose smut were present in 30 fields and infections of 2 and 1% respectively were reported in two others out of 227 fields examined in Alta. It was observed also in 23 fields out of 211 in Sask.; usually only a trace is present, but in one field at Benson, zone 2, 5% of the heads were infected. In Man. loose smut was reported as follows: Marquis, in 5 out of 30 fields, average damage, a trace; Reward, in 18 out of 20, av. damage less than 1%; Ceres, in 21 out of 26, av. damage 1.4%; durum wheat, in 5 out of 46, av. damage, a trace.

Traces to 2% of loose smut were not uncommon in Que.; infections up to 30% were reported from Kamouraska county. Reward 928 contained 1% smutted heads and 20 other varieties showed traces at Fredericton, N.B. Loose smut was found on Marquis, Huron, and other varieties in all 3 counties, P.E.I.; generally damage was light to moderate, but in 10 fields it was severe.

BLACK CHAFF (Pseudomonas (Phytomonas) translucens var. undulosa). One field in zone 10 in Alta. showed 75% infection.

In Man. black chaff was recorded in 19 out of 63 fields examined; the disease was severe on Ceres and Marquis shortly after heading at Virden, Pipestone, and Oak Lake, before rust and drought damage overshadowed it. (W.A.F. Hagborg)

BASAL GLUME BLOTCH (Phytomonas atrofaciens) infected one field severely, 3 slightly, and a trace was present in 97 others out of 227 examined in Alta.; it also infected about 10% of the heads in a field of Marquis wheat at Muenster, Sask.

The disease caused a trace of damage in Man.; it was recorded from 7 fields, but in late July and August rust was so heavy that accurate observations could not be made. (W.A.F. Hagborg)

ERGOT (Claviceps purpurea). Traces were recorded from Chilliwack, B.C.; 4 fields in zones 8 and 10, Sask.; Winnipeg, Man.; Macdonald College, Que.; Queens county, P.E.I.

POWDERY MILDEW (Erysiphe graminis). In general a trace was present at Agassiz and on Vancouver island, B.C., but the variety Hybrid was infected 100%. The disease was also heavy at Lethbridge, Alta., but apparently it caused little damage; a trace was present in 4 other fields.

GLUME BLOTCH (Septoria nodorum). A heavy outbreak, probably causing some damage, occurred in zone 3, Alta., with Nobleford as the centre, where the crop was light and moisture deficient. Traces were recorded in 91 other fields out of 227 examined. A trace was reported in 2 fields in zone 1, Sask., on heads of fallen culms. A trace was also found on Marquis and Early Red Fife in P.E.I.

SPECKLED LEAF BLOTCH (Septoria Tritici) caused slight infections in Saanich county and the Fraser River valley, B.C.

Traces were also recorded from 35 fields in Alta. Leaf spots, caused in part by S. Tritici, were recorded from 39 fields in Sask. and resulted in slight to moderate damage; in one field at Balcarres, the leaves were nearly all infected and dead by August 6.

FOOT ROTS. A trace of Take All (Ophiobolus graminis)was recorded on Vancouver island, B.C.; while other foot rots caused a slight amount of damage.

Take All affected 27 fields out of 227 examined in Alta., and caused an average damage of 3.4%. Foot Rot due to Helminthosporium sativum and Fusarium spp. was reported from 55 fields and caused an average damage of 3.0%; traces were present in 61 other fields.

Take All caused a trace to moderate damage in 6 fields out of 294 examined in Sask.; in one field at Verigin, zone 7, 20% of the plants in a large patch were killed. In southern Sask. Common Foot Rot (Helminthosporium and Fusarium spp.) affected 125 fields out of 129 examined, the average damage being slight. The severity of infection increased only slightly as the crop matured. The disease was reported to have killed 25 to 50% of plants in some fields of durum wheat at Carnduff. In northern Sask. 160 out of 165 fields were found infected; the average damage was slight. The usual increase in severity with the advance of the season was almost absent. Infection ranged from a trace to 80% of the plants, and only a few fields were severely or even moderately infected. A few plants in a plot at Saskatoon and 10% of the plants in a field of durum wheat at Tuxford, Sask. were dead from Pre-Maturity Blight (cause unknown).

A trace of Take All was found at Durban, Man. In 87 fields of common wheat, Common Foot Rot was found in 84, infection was as follows: severe in 18 fields, moderate in 23, light in 24, and a trace in 19. A similar survey of fields of durum wheat showed 40 fields affected out of 43 examined with infection severe in 6 fields, moderate in 22, and light in 12.

BROWNING ROOT ROT (Pythium sp.). A trace was present in one field in zone 8 in Alta.

The disease was widespread in zones 1, 2, 7, 9, and 11 in Sask. for it was noted in 104 out of 196 fields examined. Several fields were severely damaged. In west central Sask. (zones 3 and 9) where drought was severe, the disease was also common and did moderate damage. While browning root rot was moderate in the check plots at Scott, it was progressively less

prevalent with increasing amounts of ammonium phosphate and superphosphate.

HEAD BLIGHT (Fusarium spp.) caused a trace of damage in one field in zone 10, Alta. It was unusually prevalent in the Cereal plots, Ottawa, Ont., probably on account of the hot weather in July following the excessive rain in June. A trace to 1% of the heads had one or more spikelets affected. On Marquis most of the head blight was chiefly due to Fusarium spp., but on some other varieties including those of durum wheat, Helminthosporium sativum caused about half of the blighting; Epicoccum neglectum Desm. was also fruiting on some of the diseased spikelets. Fusarium affected heads were sent to Dr. W.L. Gordon, who found that Fusarium culmorum predominated. No isolations of Gibberella Saubinetii (F. graminearum) were obtained. Traces to slight amounts of head blight were also reported from N.B. and P.E.I. respectively.

SPOT BLOTCH (Helminthosporium sativum) was found in 6 out of 43 fields of durum wheat, and in 8 out of 80 of common wheat examined in Man.; the average damage was slight. A trace was reported from one field in Alta. As noted above H. sativum caused about half the head blight observed at Ottawa, Ont.

ANTHRACNOSE (Colletotrichum graminicola). In the guise of a spikelet blight, a trace was found in one field, in zone 4,Alta.

FALSE BLACK CHAFF (Non-parasitic) was present in moderate amounts in a plot of Reward at Scott, Sask. A similar trouble was observed in Cereal plots at Ottawa, Ont., on Hope x Reward and H. 44 x Marquis crosses and to a less extent on Pentad x Marquis 729.

BRITTLE DWARF (Cause unknown) was present on late tillers around the edges of the plots at the Experimental Station, Swift Current, Sask. Aphids were abundant inside the leaf sheaths of affected tillers.

OATS

STEM RUST (Puccinia graminis) did not become epidemic on oats, but it moderately infected the crop throughout Man. and also in southeastern and east central Sask. The severity of infection in most fields ranged from 10 to 15%, but in some late fields it was as high as 40%. Rust was also observed west of this large area, chiefly in central Sask. None was reported from Alta.

A light infection of stem rust was observed in the Cereal plots, Ottawa, Ont. Similarly traces to light infections were reported from Que., and a field at Kentville, N.S. was lightly infected. Stem rust was prevalent and destructive throughout P.E.I.

CROWN RUST (Puccinia coronata) was prevalent throughout the entire grain growing area of Man. and was particularly severe in the district south of the Riding Mountains. In the more heavily infected fields the severity of infection averaged 70%. Crown rust along with stem rust caused considerable damage to oats. It also caused light to moderate damage in southeastern and east central Sask. In other sections infection was light. Its presence was not reported in Alta.

Crown rust moderately infected oats in the Cereal plots, Ottawa, Ont.; the damage was slight. Rust was frequently reported from Que., but it rarely caused more than a trace to slight damage. Light infections were found in N.S., but it is reported to have caused severe damage in the three counties of P.E.I.

SMUT (Loose Smut, Ustilago Avenae, and Covered Smut, U. Kolleri Wille = U. levis (Kellerm. & Swingle) Magn.) was rather general on Vancouver island and in the Fraser valley, B.C.; infection ranged from 1 to 5%.

A trace of loose smut was found in two fields in Alta., while covered smut caused 4.1% damage in 22 fields out of 103 examined. In Sask. loose smut slightly affected 3 fields out of 48 examined; the same survey revealed usually slight to moderate infection of covered smut in 26 fields, but in one south of Prince Albert 25% of the heads were smutted. In Man. smut was found in 18 out of 36 fields examined; infections varied from 0 to 40% with an average of 5%.

Covered smut infected 25% of the heads in a field at Antrim, Ont.

Covered smut was reported from 20 and loose smut from 60 fields scattered throughout Que.; the average infection was covered smut 10%, loose smut 6%, while the highest infection reported was 50% for covered smut and 41% for loose smut.

Ninety-six collections of oats representing some 15 varieties collected from all parts of the province were sown in plots at Fredericton, N.B. Smut infection in the resulting crop varied from 0 to 20%, with an average infection of 5%.

Covered smut destroyed 20% of the heads in two fields in N.S. The grower of one claimed that he has always treated his seed with uniformly good results with this exception; he asked if covered smut was more difficult to control. Loose smut infections ranging from 2 to 20% were also reported. In some of the smutted fields it was definitely ascertained that the seed had not been treated; on the other hand, no smut was present in fields known to have been sown with treated seed.

Loose smut infections ranged from a trace to 40% throughout P.E.I.; the presence of covered smut was not reported.

HALO BLIGHT (Phytomonas coronafaciens) caused slight damage in 2 fields and a trace of the disease was present in 30 others out of 103 examined in Alta. A trace to moderate damage was caused in 12 fields out of 73 surveyed in Sask. In a plot of Gopher oats at Swift Current 5% of the leaf surface was involved. Halo blight was encountered in Man. as follows: slight in 1 field, moderate in 1 and severe in 3 out of 30 examined.

At Macdonald College, Que., halo blight infections were reported on July 26 as follows: 3% on Banner, 2% on Martin, 1% on Lanark and Mable, trace on Robin and Lasalle, and none on Cartier, Foster, and Acton. A trace was found on Martin at Lennoxville. Traces were also reported in the rod rows at Charlottetown, P.E.I.

STRIPE BLIGHT (Phytomonas striafaciens). Traces were present in 11 fields in zones 8, 10 and 13 in Alta.

FOOT ROTS. A trace of Common Foot Rot (Helminthosporium and Fusarium spp.) was found in 2 fields in zone 2, in Alta. Slight damage was reported in 10 fields in zone 12 and a trace in one in zone 10 due to a foot rot caused by Colletotrichum graminicola.

Common Foot Rot caused a trace to slight damage in 58 fields out of 73 examined in Sask. A trace of Pre-Maturity Blight was also noted in 4 fields. Out of 35 fields surveyed in Man., a trace of Common Foot Rot was found in 22 fields, slight infection in 2, moderate in 3, and heavy in 4.

BROWNING ROOT ROT (Phythium spp.). A trace was found in 2 fields in zone 9, Sask., one on summerfallow at Colonsay and the other on brome land at Guernsey.

LEAF BLOTCH (Helminthosporium Avenae). Traces were found in 8 fields in Alta. Traces to slight infections were reported from Ste. Anne de la Pocatière, Que. and Queens and King counties, P.E.I.

SPECKLED LEAF BLOTCH (Leptosphaeria avenaria (Septoria Avenae) infected 9 varieties as follows: 4% on Acton, 20% on Robin, and 10-15% on the remainder, at Macdonald College, Que. Similar infections were noted at Lennoxville and in one field at Ste. Anne de la Pocatière.

BLAST (Non-parasitic) was found in 61 fields out of 103 surveyed in Alta.; the amount of blast in per cent by zones was: zone 1, 4.3%; zone 2, 7.0%; 3, 4.0%; 4, 3.0%; 5, 5%; 6, 7.2%; 8, 9.3%; 10, 8.2%; 13, 10.0%; an average of 7.5%. While blast was reported from only 26 fields in any quantity out of the 48 examined in Sask., the disease was widespread and severe in some areas, particularly zones 12 and 13, where very dry weather prevailing at heading time may have been a contributing factor. No records of blast were received from Man.

About 5% of spikelets were blasted in a field of Cartier at L'Assomption, Que., and traces were noted in P.E.I.

A BACTERIAL HEAD BLIGHT was severe in both 1934 and 1935 on the variety Nidar in the Cereal plots, Edmonton, Alta. It has been observed to a lesser extent on other varieties and also at Lacombe and Olds. The disease is most striking as the head emerges from the sheath; the upper part of the panicle and sheath are sometimes severely blighted. (A.W. Henry and G. B. Sanford). The disease appears to be of bacterial nature and is not caused by Fusarium spp. as reported last year (Ann. Rept. Can Pl. Dis. Survey 14:12)

ANTHRACNOSE (Colletotrichum graminicola) caused a trace of damage as a leaf spot in zone 9, Sask.

Other LEAF SPOTS (Cause unknown) resulted in a trace to slight damage to 16 fields of oats out of 73 surveyed in Sask.; in one field at Meota, bacterial lesions were found on the flag leaf.

An apparently new LEAF SPOT of fungus origin was destructive in one field of oats in zone 10, Alta.

A disease of oats, which causes the crop to be chlorotic and stunted is generally present throughout the potato growing areas of N.B. Increases up to 20 bushels per acre have resulted from the application of magnesium. (J.L. Howatt and E.M. Taylor)

Frost banding occurred in June in a small field of oats at Fredericton Junction, N.B. Recovery took place in about 10 days. (E.M. Taylor and D.J. MacLeod)

BARLEY

STEM RUST (Puccinia graminis) moderately infected barley in Man. and eastern Sask., but it only caused slight damage as the crop ripened early over most of the area. A trace of rust was noted in one field in Alta.

Stem rust moderately infected barley at Lennoxville, Que.; other observations, mostly earlier in the season revealed traces. In the plots at Fredericton, N.B. rust infection varied from 1-100%; Byng, York, Peatland and O.A.C. 21 showed less than 5%. Light infections were also present throughout P.E.I.

LEAF RUST (Puccinia anomala) slightly infected barley at Saanichton, B.C. and at Minitonas, Winnipeg, Jordan, Brunkild and Oak Bluff, Man. Slight to moderate infections were reported from Macdonald College and Lennoxville, Que.

STRIPE RUST (Puccinia glumarum). A trace was reported from one field in Alta.

COVERED SMUT (Ustilago Hordei) slightly infected barley at Saanichton, B.C. Traces were present in 4 fields in Alta. and recordable percentages in 6 others, the average damage in the latter being 10%. It caused a trace to slight damage in 7 fields out of 28 surveyed in Sask. It was also present in 8 out of 20 fields in Man.; infection varied from a trace to 10% with an average of 1.2%.

Covered smut was reported from 18 fields located at widely scattered points in Que.; infection varied from a trace to 10%, and averaged 3.0%. In 16 collections of barley collected in N.B. and sown in plots at Fredericton, infection varied from a trace to 10%. The average infection of 2.5% was recorded from a survey of 41 fields in P.E.I.

LOOSE SMUT (Ustilago nuda). Traces were reported from 2 fields in Alta., a slight infection in 3 fields in Sask., and in 6 fields in Man.

Dr. W.F. Hanna has also discovered a seedling-infecting loose smut in Man. The smut developed in plants grown in the greenhouse, Winnipeg, in 1935, from seed inoculated with spores collected at Brandon in 1934 for "loose smut". During the past year I have been able to compare the material kindly deposited by Dr. Hanna in the herbarium with a photograph and spores of U. nigra Tapke presented by the author to Dr. Güssow, and also to be shown by Mrs. Nebel at Geneva, N.Y., representative material obtained by her in her studies. Spores in Dr. Hanna's form are

lighter coloured and the surface markings are more pronounced than in Tapke's U. nigra. (Phytopath. 22:870. 1932). If a name must be applied to these intermediate forms between U. Hordei and U. nuda having the appearance of loose smut, with rough spores, but whose spores produce sporidia on germination and are capable of infecting the seedling, I would suggest Ustilago medians Biedenkoff (Zeitschr. f. Pflanzenkr. 4:321. 1894). In fact Dr. Hanna's form closely resembles the published description of U. medians and his material was sent to me under that name. The work begun by Mrs. Nebel (Mabel L. Ruttle, N.Y. (Geneva) Agr. Exp. Sta. Techn. Bull. 221. 1934) should be continued and extended especially to a genetic study of these intermediate forms and crosses between them and U. nuda and U. Hordei.

Loose smut was reported in 39 fields in Que.; infection ranged from a trace to 12%, with an average of 3%. Observations throughout N.B. indicated that infections ranged from a trace to 5%. In P.E.I. the average infection was 12% in 40 fields surveyed.

STRIPE (Helminthosporium gramineum) slightly infected a plot of Colsess barley at Saskatoon, Sask. A trace was observed in 2 fields and on 1% of the plants in a third in Alta.

FALSE STRIPE (Cause unknown) slightly infected 3 fields located at Holland, Beausejour and Oak Bluff, Man.

NET BLOTCH (Pyrenophora teres (Helminthosporium teres) was fairly prevalent on Vancouver island and in the Fraser River valley, B.C., but caused slight damage. Traces were present in 20 fields and a slight infection was seen in 3 others in Alta. out of 37 surveyed. A trace to a slight amount of the disease was found in 5 fields in Sask. It was reported from 21 fields out of 35 surveyed in Man. as follows: light infection in 8 fields, moderate in 4, and heavy in 9.

SPOT BLOTCH (Helminthosporium sativum) was fairly general on Vancouver island and the Fraser River valley, B.C., but infection was slight to moderate. Traces were reported in 11 fields and a slight infection in two others in Alta.

It was found in 11 fields in Man. as follows: light infection in 9 fields, moderate to severe in 2; the average damage was slight.

Barley varieties at Macdonald College and Lennoxville showed slight amounts of spot blotch.

FOOT ROTS. Traces of Common Foot Rot (Helminthosporium and Fusarium spp.) were reported from 3 fields and slight damage was done by it in 5 others in Alta. It caused a trace to slight damage in half the fields surveyed in Sask. It was observed in 24 fields in Man. as follows: infection light in 15, moderate in 5, and heavy in 4.

ERGOT (Claviceps purpurea). A trace was found in a field in Alta., at the Experimental Station, Scott, Sask., at Macdonald College and at two other points in Que., and throughout, P.E.I.

SCALD (Rhynchosporium Secalis) slightly infected barley at Saanichton, B.C. A trace was present in 10 fields and slight infection in one in Alta. It caused a trace to slight damage in 2 fields in Sask.

POWDERY MILDEW (Erysiphe graminis) was moderately severe on most barley varieties in 1935 at Winnipeg, Man. Dr. Margaret Newton has found that some varieties are resistant to powdery mildew or at least to some strains. By this differential reaction she has been able to distinguish physiologic forms within E. graminis DC. f. sp. Hordei.

Powdery mildew infections ranged from 8-35% on barley varieties at Macdonald College and 1-7% at Lennoxville, Que. It was heavy on barley in three fields in Que., in two of which the growth was rank.

BACTERIAL BLIGHT (Phytomonas translucens) was present in one field in zone 13, Alta., and one in Sask.

BROWN STRIPE (Scolecotrichum graminis) moderately infected a plot at Scott, Sask. Leaf spots, of which the cause was undetermined caused moderate damage in 3 fields also in Sask.

RYE

STEM RUST (Puccinia graminis). A trace was noted in one field of fall rye in Sask. and a moderate infection was reported on fall rye from Macdonald College, Que.

LEAF RUST (Puccinia secalina Grove, P. dispersa Erikss. pp). Light infections were reported from Agassiz, B.C.; Beaverlodge, Alta.; at Swift Current and throughout southern Sask.; at Morden, Ste. Agathe, and Winnipeg, Man.; and Macdonald College, Que.

ERGOT (Claviceps purpurea). A trace was found in one field in Sask. and at Starbuck and Birch River, Man. Traces were

present in rye in the Cereal plots, Ottawa, Ont.; Prolific was the heaviest infected. In general, ergot was absent or found in 2 to 5% of the heads in Que., but in one field in Laprairie county ergot was present in 40% of the heads.

POWDERY MILDEW (Erysiphe graminis) moderately infected fall rye at Macdonald College, Que.; it was first observed on May 15.

FOOT ROTS. Common Foot Rot (Helminthosporium and Fusarium spp.) slightly to moderately affected 6 fields out of 8 surveyed in Sask. It also slightly affected 5 fields out of 10 examined in Man.

SPOT BLOTCH (Helminthosporium sativum). A trace was found in a field at Tyndall, Man.

SCALD SPOT (Rhynchosporium Secalis). A trace was observed in zone 10, Alta.

SPECKLED LEAF BLOTCH (Septoria Secalis). A trace to a light infection was found at the Experimental Station, Beaverlodge, Alta., on fall rye.

LEAF SPOTS (Cause undetermined) caused a trace to slight infection in 4 fields out of 8 surveyed in Sask.

II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

COMMON LEAF SPOT (Pseudopeziza Medicaginis) was general both on Vancouver island and in the Okanagan valley, B.C. Light infections were noted in 6 out of 12 fields surveyed in Alta.; at Meadow Lake and Tisdale, Sask.; and at Brandon, Man. Traces to moderate infections were reported widely in Que.; and in York county, N.B. It may cause some defoliation.

YELLOW LEAF BLOTCH (Pseudopeziza Jonesii). A trace was found at Brandon, Man.

DOWNY MILDEW (Peronospora aestivalis) was present in varying amounts on Vancouver island and in the Fraser River valley, B.C. Of all the varieties at Agassiz it most seriously affected Lytton. It was also severe on this variety in the Laboratory plots at Edmonton, Alta., and to a lesser extent in the experimental plots at Lacombe.

ROOT ROT. Isolations from a few diseased plants from the interior of B.C. were identified by Dr. G.B. Sanford as Pleonodomus Meliloti. A Wilt attributed to Sclerotinia sp. also caused slight damage to alfalfa at Saanichton and Duncan, Vancouver island; it was worst where the crop was heavy and lodging. A survey was made on May 17 of the varieties grown at the Experimental Station, Lethbridge, Alta. for Root Rot caused by Cylindrocarpon, Fusarium, Sclerotinia, etc. Damage was most severe in non-hardy varieties as the following list shows: trace in Registered Grimm, Ontario Variegated, and Hardistan; slight in Kansas Common, Ladak and Utah Common; moderate in Lytton; and severe in California Common and Arizona. Root rot also caused moderate damage at Lacombe.

STEM CANKER and LEAF SPOT (Stagonospora Meliloti). As stem canker it caused slight damage in a field in zone 2, Alta. and as a leaf spot at Indian Head, Sask.

MOSAIC (virus). A trace was found in 1 field in zone 2, Alta.

WITCHES' BROOM (Cause undetermined) affected from 1 to 20% of the plants in the irrigated section, Cariboo county, B.C., being worst in older fields. The affected plants are dwarfed and bushy.

COMMON CLOVER

COMMON LEAF SPOT (Pseudopeziza Trifolii). Slight to moderate infections were reported on red clover from Que., N.S. and P.E.I. It was also general on clover in N.B.

POWDERY MILDEW (Erysiphe Polygoni) was reported on clover in N.B., on red clover in P.E.I., and on red and alsike in Que.

RUST (Uromyces Trifolii) was reported on red clover from B.C., Que., and P.E.I.; on alsike from B.C., Que., and N.S.; and on white clover from Man., Que., and P.E.I. The aecia were collected on alsike clover at Ste. Anne de la Pocatière, Que., on May 31, and on white clover in Bellechasse county on August 4. Infections were sometimes moderate to heavy.

SOOTY BLOTCH (Cymadothea Trifolii (Killian.) Wolf) was found on red clover in B.C., and P.E.I. and on alsike clover in Que. Although the disease is general, it causes little damage. F.A. Wolf, as a result of his studies (Mycologia 27:71. 1935) has erected a new genus Cymadothea for this fungus, and has reduced the name Dothidella Trifolii used in the last few reports to synonymy.

ANTHRACNOSE (Kabatiella caulivora) lightly infected red clover in a field in zone 10, Alta.

STAGONOSPORA LEAF SPOT (S. Meliloti) was reported on alsike clover at Ste. Anne de la Pocatière, Que.

ROOT ROT (Sclerotinia sp.) caused light damage in one field in zone 2, Alta.

MOSAIC (virus) was general on red clover in the orchards in Salmon Arm district, B.C. In plots of red clover at Macdonald College, Que., and at Fredericton, N.B. as high as 75 and 95% of plants respectively were affected with Mosaic. In clover fields, however, the percentage of affected plants was around 10-20%.

CERCOSPORA LEAF SPOT (C. zebrina) lightly infected alsike at Indian Head, Sask.

DOWNY MILDEW (Peronospora Trifoliorum) caused slight damage to clover in Prince and Queens counties, P.E.I.

SWEET CLOVER

MOSAIC (virus) slightly affected one field out of 3 surveyed

in zone 2, Alta. A few severely affected plants were observed at the Experimental Farm, Brandon, Man.

LEAF SPOT and STEM CANKER (Stagonospora Meliloti). Light infections of the leaf spot were observed in a field in zone 13, Alta.; at Indian Head, Sask.; Cypress River, St. Claude, St. Francois Xavier, and the Experimental Farm, Brandon, Man. At the latter place a few plants were severely dwarfed from stem canker.

DOWNY MILDEW (Peronospora Meliloti Syd.) occurred on several varieties in the Laboratory plots, Edmonton, Alta. Although it appeared to have spread from a near-by plot of Lytton alfalfa, the pathogen is considered, for the present, to be distinct from P. aestivalis.

CORN

RUST (Puccinia Sorghi) lightly infected the lower leaves of corn at Indian Head, Sask. It moderately infected field corn at Charlottetown, P.E.I.

SMUT (Ustilago Sorghi). A single plant was found smutted in zone 8, Alta. in 1935. It was observed once previously when it was collected by Dr. W.C. Broadfoot at the C.P.R. Farm, Brooks, Alta. in 1929. (G.B. Sanford)

Smut was moderate to severe on 20% of the plants at the Experimental Station, Morden, Man., and was general at the Experimental Farm, Brandon. Smut affected a trace to 2% of the plants at widely scattered points in Que.; a trace in the plots at Fredericton, N.B.

FLAX

RUST (Melampsora Lini) Traces were found at Benito and the Experimental Farm, Brandon, Man., and a moderate infection at Winnipeg.

WILT (Fusarium Lini) slightly affected 4 fields out of 6 examined in Alta. Flax affected with wilt was sent in from Nokomis, zone 9, Sask. to the Saskatoon Laboratory.

BROWNING (Polyspora Lini) caused slight damage at the Experimental Station, Beaverlodge, Alta. (W.C. Broadfoot)

LEAF SPOT (Cause unknown). A trace was found in Cypress at Beaverlodge, Alta.

HEAT CANKER (Non-parasitic). What may have been this disease caused a trace of damage in a field in zone 8, Alta.

FOX-TAIL MILLET

DOWNY MILDEW (Sclerospora graminicola). A trace was present on Siberian millet at Indian Head, Sask.

MANGEL

RUST (Uromyces Betae (Pers.) Lev.) heavily infected the leaves of mangels late in the season in the Saanichton district, B.C., about 2 miles away from where it was originally found on sugar beet. Although the foliage was severely affected it did not appeat to reduce the yield. (W. Jones)

CERCOSPORA LEAF SPOT (C. beticola)slightly to heavily infected the leaves on Vancouver island and in the Fraser River valley, B.C., being somewhat heavier on the mainland. The average damage was 6% (W. Jones). It was also present in the Forage Crop plots, Ottawa, Ont., and at Lennoxville, Que. It was only severe on the older leaves.

STRANGLE (Cause unknown) was found affecting 50% of the plants in a field at Lampley Prairie, B.C. in June, when the seedlings were about 6" high. The root was shrunken at the junction of the leaves to the crown, sometimes to a thin thread. Diseased seedlings transplanted into pots containing sterilized soil made little growth. The cause was physiological or virus. (W. Jones)

In a ¼ acre of mangels examined on October 9, in Northumberland county, N.B., 1-2% of the plants were stunted, apparently by Armillaria mellea, which was fruiting abundantly adjacent to stunted plants. (J.L. Howatt & S. Clarkson)

DAMPING OFF (Rhizoctonia sp., Fusarium sp., Phoma sp.) was severe in seed plants in the northern counties in N.B. and along the St. John River valley. However, due to later environmental conditions (dry weather, etc.) and retarded germination, a fair yield of mangels was harvested. The above mentioned organisms were associated with the damping-off. (J.L. Howatt & E.M. Taylor).

HEART ROT (Non-parasitic) was found in mangels in the plots at Kentville, N.S., but none was present in the limed borate plots and in one of the unlimed borate. In the seedling stage a

damping-off and a canker were present in all but the lime borate and the unlimed manganese sulphate plots.

SUGAR BEET

CERCOSPORA LEAF SPOT (C. beticola) was general in the Fraser valley and more prevalent there than on Vancouver island, B.C. Leaf infection ranged from 80-100%; damage 10%. (W. Jones) It caused a trace of damage in zone 2, Alta.

In a varietal plot in Essex county, Ont., Cercospora leaf spot was severe, many leaves dying and drying up. Infection was also common on the petioles. Some varieties seemed to be more resistant than others. It was also prevalent and widespread in sugar beet fields in Essex county. In the Forage Crop plots at Ottawa this leaf spot was heavy on most varieties. The Cercospora resistant strain, developed by the Great Western Co., produced very vigorous plants, and although some plants were heavily spotted, it appeared to be less severely affected than most varieties. However, the disease developed so unevenly in the four replicates due to inequalities in the ground that it was impossible to discover any clear cut differences. No Cercospora leaf spot was found at Kapuskasing, Ont.

In the plots at L'Assomption, Que., U.S. No. 1 showed only a trace, while some were severely affected. Here, again, the disease was worst in a slight depression running through the plot.

The leaf spot heavily infected a plot at Fredericton, N.B.

BLACK LEG (Phoma Betae) caused in general, only slight damage mostly on the leaves in the Saanichton district and at Agassiz, B.C. In one field where the beets were being grown for seed, it caused nearly 10% damage. As a leaf spot it was severe on the lower leaves of some plants in a seed plot at Morden, Man. In a field plot a trace was present on all varieties. It was also moderately prevalent in the plots at Kapuskasing, Ont.

RUST (Uromyces Betae (Pers.) Lev.) was first observed in the Saanichton district, B.C. on July 24 on sugar beets being grown for seed. The foliage was heavily infected and probably suffered to some extent. It was found on the 14 varieties grown at Saanichton: infection ranged from 60-90% on the foliage. It later spread to mangels and garden beets in the district in a radius of approximately 2 miles. A few rusted plants were also found at Agassiz. (W. Jones) This is the

first report of beet rust in Canada, although it is known in California and Oregon. Incidentally samples of seed imported from Europe were found to carry a heavy spore load of both urediniospores and teliospores.

HEART ROT (Non-parasitic). A trace was found in York county, N.B.

A few plants suspected of being affected with CURLY TOP (virus) were found in a variety plot in Essex county, Ont. (G. C. Chamberlain)

SOY BEAN

MOSAIC (virus) moderately affected soy beans at Morden, Man.; a trace was also present at Winnipeg. A single plant was found at Ottawa, Ont., but about 2% of the Mandarin plants in the plots showed "a bronzing of the young leaves produced by a brown discoloration of short segments of the veins and large splotches on the older leaves produced by a lace-like yellowing or browning of the veins". (J.B. Kendrick and M.W. Gardner, Jour. Agr. Res. 27:91-98. 1924) These symptoms are said to be associated with mosaic. Sometimes only one shoot of the plant was visibly affected.

BACTERIAL BLIGHT (Phytomonas glycinea) was reported on Manitoba Brown from Indian Head, Sask. Manitoba Brown was moderately affected in the Cereal plots, Ottawa, Ont., while Mandarin was relatively free except when growing close to a susceptible variety. Infection was reported as follows at Macdonald College, Que.: severe, Vilno Poland; moderate, Quebec 92, Manitoba Brown; slight, Brooks Poland, Quebec 537, Mandarin, Wisconsin Black; very slight, O.A.C. 211, Hudson Manchu. At L'Assomption, Manitoba Brown was moderately affected and no blight was found on A.K. Harrow and "I" varieties.

DOWNY MILDEW (Peronospora manshurica (Naoum.) Syd. ex. Gaüm. = P. Sojae Lehm. & Wolf) was quite general on seedlings at the Experimental Station, Harrow, Ont. (2974) (G.C. Chamberlain). It has been reported as far north as Indiana, but not previously in Canada.

CURLY TOP (virus) severely affected 15-20% of the soy bean plants at Summerland, B.C. The disease was determined by Dr. B. L. Richards (H.R. McLarty). This is the first report on this host for Canada.

SUDAN GRASS

BACTERIAL LEAF SPOT (Bacillus Sorghi) infected Sudan grass moderately at Indian Head and Swift Current, Sask.; slightly at Brandon, Man.; and was present on Sudan grass and Early Amber fodder cane at Kentville, N.S.

SUNFLOWER

WILT (Sclerotinia sclerotiorum) caused 20% damage in one field in zone 1, Alta.; a trace at Morden, Man., and 5% damage to Mammoth Russian at Brandon. It affected 10% of plants in a field at Ste. Anne de la Pocatière, Que. In 1934 and 1935 as high as 85% of the plants were affected, causing the stems to fall over and making it impossible to use a binder. (E.Campagna)

DOWNY MILDEW (Plasmopara Halstedii) was prevalent at Ste. Anne de la Pocatière, Que.; plants attacked in the seedling stage remain dwarfed.

RUST (Puccinia Helianthi) was reported as follows: moderate to severe on the lower leaves at Indian Head, Sask.; moderate infection at Morden, Man. and a trace at Brandon; moderate infections at Ste. Anne de la Pocatière, Que.

CULTIVATED GRASSES

AWNLESS BROME GRASS (Bromus inermis)

Leaf spot (mostly Septoria bromigena) caused a light infection in a field in zone 10, Alta.; it was widespread in cultivated fields and on roadsides in southern Sask.; and was general along roadsides through Man., infection being slight to severe.

Blotch (Helminthosporium Bromi) slightly infected this grass along roadsides at Fannystile and St. Claude, Man.

Ergot (Claviceps purpurea) caused a trace to slight infection of 95% of the volunteer plants about Winnipeg.

Bacterial blight (?) caused a light infection in a field in zone 13, Alta.

CRESTED WHEAT GRASS (Agropyron cristatum)

Ergot (Claviceps purpurea) was reported as follows: a trace, Fraser valley, B.C.; light infection, Beaverlodge, Alta.; light infection, Ottawa, Ont.

Stem rust (Puccinia graminis) caused slight damage at Indian Head, Sask.

ITALIAN RYE GRASS (Lolium italicum)

Eye spot (Ovularia Lolii) was fairly general in the Fraser

valley and on Vancouver island, B.C.; damage was slight.

KENTUCKY BLUE GRASS (Poa pratensis)

Rust (Puccinia Poae-sudeticae) was fairly general in yards about Edmonton, Alta.

Powdery mildew (Erysiphe graminis) was heavy on every plant of strain Aberyswyth Bp 89 while strain Bp 90 was free on May 31, in the Forage Crop plots, Ottawa, Ont. It was also present on the Guelph strain and a Swedish strain, but absent from the Ottawa one. (L.E. Kirk and I.L. Conners)

ORCHARD GRASS (Dactylis glomerata)

Rust (?Uromyces Dactylidis Otth) was heavy on the second growth in plots at Kentville, N.S.

Powdery mildew (Erysiphe graminis) slightly affected this grass on Vancouver island and in the Fraser valley, B.C.

Brown stripe (Scolecotrichum graminis) was of general occurrence on Vancouver island and in the Fraser valley, B.C.

Purple leaf spot (Mastigosporium album Riess. var. muticum Sacc.) moderately infected orchard grass in the Fraser valley, B.C. (W. Jones). This is a new disease to Canada.

PERENNIAL RYE GRASS (Lolium perenne)

Eye spot (Ovularia Lolii) was fairly general in the Fraser valley, and on Vancouver island, B.C.

RED TOP (Agrostis alba)

Stem rust (Puccinia graminis)was moderate to severe in pastures at Kentville, N.S. (J.F. Hockey)

TIMOTHY (Phleum pratense)

Stem rust (Puccinia graminis) was reported as follows: slight infection in zone 2, Alta.; at Hadashville, and Winnipeg, Man.; infection none to 75% according to the strain in Sept. 1934 at Macdonald College, Que., stem infection being 0-35%; very common on the second growth, Kings county, N.S.; slight infection on volunteer plants, P.E.I.

Smut (Ustilago striaeformis). Abundant infection at Beauséjour, slight at Tyndal and a trace at Winnipeg, Man.

Ergot (Claviceps purpurea) affected 10% of the plants in patches at Winnipeg, Man.

Brown stripe (Scolecotrichum graminis) slightly infected timothy in one field in zone 10, Alta. and was common at Meadow Lake, Sask.

WESTERN RYE GRASS (Agropyron tenerum)

Stem rust (Puccinia graminis) collected at Red Jacket, Sask.; it caused slight damage at Indian Head. Traces were found at Brandon and Winnipeg, Man.

Smut (Ustilago bromivora) was reported as follows: a trace found once in zone 10, Alta.; moderate damage at Swift Current, Sask.; two clumps affected at Winnipeg, 10% of the plants smutted at Brandon, Man.; traces present in plots, Ste. Anne de la Pocatière, Que.

Ergot (Claviceps purpurea). Traces found at Red Jacket, Sask.; and Winnipeg, Man.

Head blight (Fusarium culmorum). Trace in some plots, Brandon, Man.

Powdery mildew (Erysiphe graminis) was fairly general in areas of rank growth, zone 10, Alta., but the damage was nil.

TURF

Brown patch (Rhizoctonia Solani) appeared suddenly in the Forage Crop test greens, Ottawa, Ont., about July 20. The Colonial bents showed large patches with dark borders and light brown centres. These bents were the worst affected, but some spots were visible in Washington bent. Isolations from diseased plants gave typical cultures of R. Solani and the disease disappeared rapidly upon treatment. (R. Hamilton and I.L. Conners) The disease was also reported affecting golf greens near Lennoxville, Que. by Mr. F.S. Browne. Bichloride of mercury was applied with excellent results.

III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

RUST (Puccinia Asparagi) was severe on a plant from Salmon Arm, B.C.; severe at Saskatoon and light at Indian Head, Sask.; a trace at Morden, Man.

ROOT ROT (Rhizoctonia crocorum) destroyed 35% of the plants of Mary Washington in a garden, Saanichton, B.C. (W. Jones). This is the first report of R. crocorum on asparagus in Canada.

BEAN

MOSAIC (virus). Trace found at Kelowna, B.C.; and in zones 2 and 10, Alta.; on 2-35% of plants at scattered points in Que.; trace to 75% in 5 gardens in Queens county, P.E.I.

CURLY TOP (virus) severely affected 15% of the plants in a plot at Summerland, B.C. The disease was determined by Dr. B.L. Richards of Utah. (H.R. McLarty) This is the first report on bean for Canada, although it has been known on tomato for a long time. (see Tomato Yellows)

RUST (Uromyces appendiculatus) was severe on specimens sent from Campbellcroft, Ont.; a low percentage present in 4 gardens in Queens county, P.E.I.

AHTHRACNOSE (Colletotrichum Lindemuthianum) caused light infections in 2 gardens in zone 10, Alta.; it was severe at Yorkton and common in gardens at Indian Head, Sask.; it was severe on Davis White Wax at Brandon, Man. Anthracnose caused moderate damage to yellow wax varieties, especially one imported from France, Horticultural plots, Ottawa, Ont., but it only lightly infected green pod varieties. It was observed in about 50 gardens or fields in Que.; in general the damage was slight, but occasionally it was severe as the following reports indicate: pod infection, 75% in an acre field, Pont Rouge; 30% in 5 half-acre fields, Three Rivers, total loss of pods in garden, which was too often watered. Anthracnose was general and caused moderate to severe damage in York and Sunbury counties, N.B.; a moderate infection reported in the plots at Charlottetown, P.E.I.

BACTERIAL BLIGHT (Phytomonas Phaseoli)was reported in 6 locations out of 12 examined in zones 2, 10 and 13, Alta., causing a trace to slight damage; light infections reported from Swift Current and Indian Head, Sask.; moderate infection at Morden, severe on 2 varieties at Brandon, Man. Bacterial blight was severe on some green poded varieties and one of imported yellow wax in the

Horticultural plots, Ottawa, Ont. The disease was general and caused moderate damage in Laval and Jacques-Cartier counties, Que., but it was much less important than last year when 75-100% of the pods were infected; light to moderate infections were also reported from other widely scattered points in Que. It caused slight to severe damage in York county, N.B. and slight damage at Charlottetown, P.E.I.

WILT (Sclerotinia sclerotiorum) infected 8% of the plants in 2 fields at Laurierville and Ste. Julie, Que. respectively.

WILT (Cause unknown). A trace reported from zone 13, Alta.

BEET

SCAB (Actinomyces scabies) was reported from Ste. Anne de la Pocatière, Que., and Queens county, P.E.I.

CERCOSPORA LEAF SPOT (C. beticola) was prevalent in the Fraser valley and on Vancouver island, B.C.; it slightly infected beets in Que. and in York county, N.B.

BLACK LEG (Phoma Betae) slightly infected the leaves in Queens county, P.E.I. A root canker affected 20% of the roots and caused 5% damage at Saanichton and Agassiz, B.C. An application of borax reduced the amount of disease.

RUST (Uromyces Betae (Pers.) Lév.) spread from sugar beets to garden beets including those grown for seed in the Saanichton district, B.C. The rust caused moderate damage to the foliage and appeared to be more destructive than on mangel or sugar beet (W.Jones).

DAMPING OFF (Pythium de Baryanum) destroyed 5% of the plants in a 5-acre field at Ste. Anne de la Pocatière, Que. and 75% of the plants in a garden, Kentville, N.S.

BRUSSELS SPROUTS

CLUB ROOT (Plasmodiophora Brassicae) lightly infected brussels sprouts in Laval county, Que. Not uncommon on this host on infected soils.

CABBAGE

MOSAIC (virus). A trace was found in a few plants grown for seed at Agassiz, B.C.

BLACK LEG (Phoma lingam) affected 20% of the plants examined in the Fraser valley, B.C. (W. Jones).

BLACK ROT (Phytomonas campestris) destroyed the entire crop in a field near Guelph, Ontario in 1934.

SOFT ROT (Erwinia carotovora) affected a few plants being grown for seed at Agassiz, B.C.; it was severe on cabbage from Montmagny, Que.

CLUB ROOT (Plasmodiophora Brassicae) was of general occurrence especially in truck gardens of Oriental growers in B.C., up to 80% of plants being affected. It is a very serious disease in Laval county, Que. where much cabbage is grown; 50-60% damage was seen in many fields at St. Martin and Ste. Dorothée, Que. Lesser amounts were seen elsewhere, especially at Three Rivers. Club root was severe in 3 gardens on non-treated rows at Fredericton, N.B. Mercuric chloride applied at the rate of 15 lb. per acre gave good control (D.J. MacLeod). About 2.5% of the plants were affected in 10 gardens in P.E.I.

OEDEMA (Non-parasitic) caused some stunting in Lincoln county, Ont., at one end of a cold frame of 30,000 plants, where the frame was shaded somewhat by a building.

LEAF SCORCH (Non-parasitic) affected a few plants in a cold frame in Lincoln county, Ont., due to ammonia fumes from the manure.

CARROT

YELLOWS (virus). Damage was moderate in a field and slight in a garden in York county, N.B.

ROT (Fusarium sp.) destroyed 25% of the roots in a field at Lethbridge, Alta.

LEAF BLIGHT (Macrosporium Carotae Ell. & Langl.) is prevalent at Agassiz, B.C., but causes no damage except where the carrots are being grown for seed (W. Jones). This leaf blight has not previously been reported in Canada.

SOFT ROT (Botrytis sp.) affected 15% of the roots in storage at Saanichton, B.C., Jan. 1935.

SOFT ROT (Erwinia carotovora) affected 3% of the plants being grown for seed at Saanichton, B.C.

CAULIFLOWER

BLACK ROT (Phytomonas campestris) was present on cauliflower from Stoney Creek, Ont., Sept. 1934. Ten per cent of the older leaves were affected at Macdonald College, Que. Aug. 1934.

CLUB ROOT (Plasmodiophora Brassicae) was general in truck gardens of Oriental growers, B.C. It caused much damage in fields at St. Martin and Ste. Dorothée, Que.; cauliflower seems particularly susceptible (E. Lavallée). In a garden at Lincoln, N.B. cauliflower was completely destroyed in the untreated rows, while the disease was effectively controlled in the rows treated with mercury chloride at the rate of 15 lb. per acre (D.J. MacLeod). Club root was destructive in one garden at Charlottetown, P.E.I.

CELERY

LATE BLIGHT (Septoria Apii) was less prevalent than in 1934 and caused 2% damage on Vancouver island and in the Fraser river valley, B.C. (W. Jones). S. Apii-graveolentis was at least present, as an examination of a diseased specimen from Mr. Jones showed (I.L. Conners). It was severe at St. Vital, Man. and on Golden Detroit, Early Blanching and Dwarf Golden (self Blanching) at Morden; only S. Apii observed.

Conditions were extremely favourable for the development of late blight (S. Apii-graveolentis) on all varieties in Lincoln county, Ont., and many growers suffered severe losses for the first time. Many of the spray machines in use maintain inadequate pressure. Similarly, none to light infections were recorded in variety plots, Ottawa, and it was severe on material from Belleville.

Late blight was present in nearly every celery field in the Montreal district, Que., infection varying from a trace to 100% according to how often and thoroughly spray was applied; in general the disease was well controlled on the larger celery farms (E. Lavallée). S. Apii-graveolentis is at least partly responsible for late blight in Que.

Late blight slightly to moderately infected celery in Queens county, P.E.I.

EARLY BLIGHT (Cercospora Apii) heavily infected and caused

moderate damage to an 8-acre field of celery at St. Dorothée, Que. It is found infrequently in the Montreal district.(E. Lavallée).

ROOT ROT (Cause unknown) caused slight to severe damage in zone 13, Alta. It caused severe damage in the low parts of a field in the Montreal district, Que. Diseased plants although much smaller, kept as well in storage as healthy plants. (F. Godbout)

BACTERIAL ROT (Pseudomonas fluorescens (Flugge) Migula) destroyed the entire stock in storage at Campbellville, Ont., Dec. 7, 1933 (D.H. Jones). This organism has not previously been reported to the Survey as causing a rot; see, however, Ch. Elliott, Bact. Plant Pathogens p. 292. 1930.

STEM CRACKING (?Non-parasitic) resulted in several acres of Golden Plume celery being almost a total loss at Bradford, Ont. The stems were so brittle that even swaying in the wind would cause them to crack. (J.K. Richardson)

CHLOROSIS (Non-parasitic) caused slight damage at Lethbridge, Alta.; probably the irrigation water was responsible.

CHINESE CABBAGE

CLUB ROOT (Plasmodiophora Brassicae) affected Chinese cabbage in 2 fields, 20% of the plants being affected at Ste. Dorothée, Que., and 90% at St. Martin. Both fields had yielded cabbage affected with club root last year. The diseased plants always wilt and often dry up completely during dry weather (E. Lavallée). It was also noted in 5 gardens at Ste. Anne de la Pocatière.

CUCUMBER

BACTERIAL WILT (Erwinia tracheiphila) was present in material from Windsor, Ont.; also noted in 1934 from Clarksburg. Bacterial wilt is general in the Montreal district, Que., but losses are seldom heavy on the main cucumber farms as the vines are kept well dusted against the cucumber beetle. At St. Eustache 30% of the vines were destroyed in 6 fields of 2 to 3 acres each, where no control measures had been applied (E. Lavallée). It also killed 50% of the plants in a garden in Timiskaming.

SCAB (Cladosporium cucumerinum) was present in varying amounts in N.B. The crop was a total loss in one greenhouse in Hants county, N.S.; infection was a trace in several others. A trace was found in 7 gardens in Queens county, P.E.I.

MOSAIC (virus). Trace was present in a garden, Charlottetown, P.E.I.

HEAT INJURY. In many gardens about Fredericton, N.B. cucumbers were cooked on the vines by the heat in August.

EGG PLANT

EARLY BLIGHT (Alternaria Solani) slightly affected egg plant at Charlottetown, P.E.I.

HORSE RADISH

LEAF SPOT (Ramularia Armoraciae). Traces found in Queens and Kings counties, P.E.I.

KALE

MOSAIC (virus) affected 10% of the plants in a field near Saanichton, B.C.

LETTUCE

DROP (Sclerotinia sclerotiorum) was severe in one garden in zone 2, and a trace was present in zone 10, Alta. It destroyed 8% of the plants of head lettuce in a planting at Beamsville, Ont. Drop caused heavy damage, often affecting 75% of the plants in many fields in the Montreal district; it is widespread and is most apparent in July and August (E. Lavallée). It caused the total loss of a moderate sized bed as the lettuce was heading at Falmouth, N.S.; it also affected lettuce on soil where it had been previously present on beans at Kentville.

BOTTOM ROT (Rhizoctonia Solani) moderately affected a crop grown on muck soil at Macdonald College, Que. in 1934.

DOWNY MILDEW (Bremia Lactucae) severely infected the lower leaves on 40-50% of the New York plants in a field at Falmouth, N.S.

BOTRYTIS ROT (Botrytis cinerea) caused heavy damage in a

plot at Charlottetown, P.E.I.

TIP BURN (Non-parasitic) affected 50 to 75% of the plants about Armstrong, B.C.; a large portion was still marketable as injury was confined to the outer leaves. (G.E. Woolliams)

DAMPING OFF (No isolations made) was common in hot beds in the Montreal district, Que.

BACTERIAL ROT (?) was severe in a lettuce planting in zone 2, Alta.

ONION

DOWNY MILDEW (Peronospora Schleideniana W.G. Sm.) appeared late, after the seed was harvested in the Saanichton district, B.C. It heavily infected 2 fields at St. Michel, Que., and was probably present in others in the Montreal district; the damage could not be estimated.

SMUT (Urocystis Cepulae) slightly affected 2 fields in the Montreal district. Although it has been present at Rosemont for many years, it does not seem to be spreading, probably because the growers have adopted the planting in place of the sowing method. (E. Lavallée)

NECK ROT (Botrytis Alii) affected less than 1% of the bulbs this year at Kelowna, B.C., as the weather was dry and mild during harvesting (G.E. Woolliams). It moderately affected onions in one field at Rosemont, Que.

BULB ROT (Fusarium oxysporum) was general in the Kelowna district, B.C.; it affected 10% of the plants.

MACROSPORIUM LEAF SPOT (M. parasiticum) slightly infected onions at St. Vital, Man., and at Cyrville, Ont.; and a heavy infection was present at La Pointe-du-Lac, Que. Collapsed conidiophores of Peronospora were present in the lesions examined in the Cyrville material. (I.L. Conners)

PARSLEY

BLIGHT (Septoria Petroseleni) caused slight damage in a garden, Saanichton, B.C.

PARSNIP

EARLY BLIGHT (Cercospora Pastinacae) severely infected half

an acre field at Long Branch, Ont. It caused some defoliation in a field in Pictou county, N.S., but later it disappeared and a large crop was harvested.

PEA

POWDERY MILDEW (Erysiphe Polygoni) was reported as follows: light infection in zone 1, Alta.; light infection at Saskatoon, Sask.; moderate on Laxton Progress, slight on other varieties at Macdonald College, Que., slight infection also at Ste. Anne de la Pocatière; general throughout N.B.; slight to moderate infections in P.E.I.

LEAF and POD SPOT (Ascochyta Pisi). Infection was a trace in a field in zone 1, Alta.; severe at Indian Head and Swift Current, Sask.; and was slight to moderate in Que.

LEAF BLOTCH (Septoria Pisi) was found in 11 field out of 21 surveyed in Alta., and caused light to medium infections in zone 13. It moderately infected peas in a field in Bellechasse county, Que.; and caused moderate damage in P.E.I., although it was less prevalent than in 1934.

RUST (Uromyces Fabae) slightly to moderately infected peas at widely scattered points in Que., including Rimouski. Mr. F.S. Thatcher (unpublished data) has found that the physiologic form on pea in Que., is also abundant on Vicia Cracca (I.L. Conners). The rust was heavy on V. Cracca at Macdonald College, Que. in Sept. and aecia were found on June 7 (R.F. Suit). Rust was slight to severe on peas in Queens and Prince counties, P.E.I.

ROOT ROT (Fusarium sp.) caused slight damage in 5 fields in zone 1, Alta.

ROOT ROT (Pythium sp.) destroyed half a plot in Timiskaming, Que.

ROOT ROT (Undetermined) caused a loss of 30% of the crop in Mr. Ritchie's new variety of Jumbo peas at Lennoxville, Que., and slight loss in Early Blue.

BACTERIAL BLIGHT (Phytomonas Pisi) slightly to moderately affected peas in 3 fields in zones 1 and 10, Alta.

RHIZOCTONIA (Rhizoctonia Solani) caused slight damage in 6 and a trace in 3 fields in zone 1, Alta.

DOWNY MILDEW (Peronospora Pisi). Trace to severe infections were reported from zone 1, Alta.

INTUMESCENCE (Non-parasitic) caused the pods of Black Eye Susan to wither up and fall off the vines, Horticultural greenhouses, Ottawa, Ont. Pods of Native Green (Chinese variety) were similarly affected, but did not fall off. (See Heald, Man. Pl. Diseases, 1st ed. p. 42)

POTATO

As in former years, I am indebted to Mr. John Tucker, Chief Seed Inspector, for data on the extent of the seed potato industry, the reasons why fields failed to pass inspection and the average percentage of the three important diseases, black leg, leaf roll, and mosaic given by provinces. All fields were planted with certified seed.

Table 1 - Seed Potato Certification: Number of Fields and Acres Inspected, 1935.

Province	Number of Fields Entered	Number of Fields Passed	Fields Passed %	Number of Acres Entered	Number of Acres Passed	Acres Passed %
P.E.I.	3,363	2,818	83.8	12,118	10,444	86.2
N.S.	419	351	83.8	613	517	84.3
N.B.	784	635	81.0	3,357	2,789	83.1
Que.	1,719	1,093	63.6	1,356	774	57.1
Ont.	541	427	78.9	1,787	1,302	72.9
Man.	81	73	90.1	226	198	87.6
Sask.	145	133	91.7	356	328	92.1
Alta.	224	194	86.6	205	177	86.3
B.C.	273	170	62.3	356	222	62.4
Total	7,549	5,894	78.1	20,374	16,751	82.2

The number of fields entered for inspection fell from 9,411 fields in 1934 to 7,549 in 1935, with an even greater drop in the acreage, which fell from 28,810 acres in 1934 to 20,374 acres in 1935. Of the fields inspected 1,655 or 21.9% failed to pass inspection on account of disease or other causes. This figure is an improvement over that of 1934, when 27.5% were rejected on inspection. The chief cause of rejection was the presence of mosaic in excess of the amounts permitted, 43.4% of the rejections being on account of mosaic. The percentage of rejections for other diseases or causes are given in Table 2, (p. 33).

Table 2 - Seed Potato Certification: Field Rejected, 1935.

Province	Mosaic	Leaf Roll	Black Leg	Foreign Varieties	Adjacent to Diseased Fields	Misc.	Total
P.E.I.	284	7	33	24	69	128	545
N.S.	28	7	7	6	14	6	68
N.B.	106	1	14	10	6	12	149
Que.	265	23	11	22	79	226	626
Ont.	7	11	25	22	5	44	114
Man.	2		4			2	8
Sask.		2	2	1		7	12
Alta.		3	20	1	2	4	30
B.C.	26	15	11	3	8	40	103
	718	69	127	89	183	469	1,655
Rejections as a percentage of fields:							
Entered	9.5	.9	1.7	1.2	2.4	6.2	21.9%
Rejected	43.5	4.2	7.7	5.4	11.0	28.3	100.0%

Table 3 - Seed Potato Certification: Average Percentage of Disease Found in the Fields by Provinces, 1935.

Average percentage of disease found in -	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
	%	%	%	%	%	%	%	%	%
Fields entered (first inspection)									
Black Leg	.16	.09	.26	.21	.20	.29	.16	1.30	.34
Leaf Roll	.04	.18	.11	1.51	.16	.05	.08	.55	.43
Mosaic	.63	.48	.82	1.06	.13	.14	.01	.01	.85
Fields passed (final inspection)									
Black Leg	.03	.02	.04	.07	.08	.20	.05	.03	.07
Leaf Roll	.01	.06	.02	.15	.12	.06	.01	.05	.10
Mosaic	.08	.10	.20	.36	.06	.10	.01	.01	.10

LATE BLIGHT (Phytophthora infestans) was first observed in the Fraser valley, B.C., Aug. 26, a month later than 1934. By the time it became epidemic the vines were mature and thus the yield was not reduced. Loss from tuber rot was less than 1% compared with 5% in 1934. The disease was not observed on Vancouver island, although present in 1934.

Late blight appeared near Quebec, P.Q., about July 31, but dry weather in August checked its development. The disease was present throughout Que., except on the lower St. Lawrence. From Quebec to Ottawa it was quite severe in some localities, notably at Three Rivers, causing a reduction in yield of 25%, especially in unsprayed fields.

The disease appeared the first week of August in N.B. and spread rapidly for a short time. Dry weather then checked its spread so that tuber rot was practically nil.

Late blight was severe in some fields of Irish Cobbler and moderate on Green Mountain in N.S. reducing the yields 30%. Tuber rot affected up to 5% of the tubers of Irish Cobbler.

The disease was not prevalent in P.E.I. in spite of a wet September and little spraying. Tuber rot affected from 2 to 5% of the tubers, chiefly in Prince county.

RHIZOCTONIA (Rhizoctonia Solani) was not severe in 1935 in B.C. and caused little reduction in yield of marketable potatoes. It was found everywhere in Alta. and was severe in many fields. It was also found everywhere in Que., but in variable amounts; it was severe in Dorchester, Beauce, Megantic and Vercheres counties. Rhizoctonia was general in the potato growing areas of N.B.; the average infection was about 20% and the maximum 70%. The disease was nowhere very noticeable in the field in N.S., but sclerotial infections on the tubers ranged from 0 to 25%. Rhizoctonia was noted in most fields inspected in P.E.I., stem infections varying from 1-5%. On the tubers the disease was more prevalent than usual, probably due to the premature death of the vines in many fields from drought, but it was rarely severe.

COMMON SCAB (Actinomyces scabies) was general in Que., except in Champlain, Dorchester and Montcalm counties; it was most severe at Ile aux Coudres and high infections were noted in a few individual fields. Common scab was general in N.B. and caused slight to severe damage; the average infection was 8%. It was found on all varieties grown in N.S. and affected

from 0 to 24% of the tubers. Scab was present in variable amounts according to soil in P.E.I., but the dry season favoured its development; 1-25% of the tubers were affected.

BLACK LEG (Bacillus phytophthorus). Eleven fields were rejected in B.C. on account of black leg. In a few fields on Vancouver island and in the Fraser valley 10% of the plants were affected. Up to 10% of the plants were affected in 75% of the fields under irrigation at Lethbridge, Alta., chiefly where the water had been allowed to remain too long on the crop. The disease was prevalent in the Peace River area, where rainfall was excessive in the early part of the season; flooded spots in a field often showed 100% of the plants affected. It was also prevalent around Edmonton late in the season. Black leg was found only occasionally in Que. Out of 784 fields inspected 14 were rejected on account of black leg in N.B. The disease was again severe in Colchester county, north of Cobequid bay, N.S., while it was absent from the south side, where seed treatment is a regular practice. In one half of a field of Irish Cobbler, at Lower Onslow, planted with seed from a crop showing 4% black leg last year and which was not treated, black leg affected 7% of the plants, while in the other half, where the seed was treated, only a trace of black leg was found (W.K. McCulloch). Black leg was less prevalent than for several seasons in P.E.I., infections ranging from 1-5%; very few growers treated seed this year.

EARLY BLIGHT (Alternaria Solani) was much less prevalent on Vancouver island and in the Fraser valley, B.C. than in 1934; damage was a trace. Slight to moderate infections were reported from Que. It was general throughout N.B., but caused little damage. Early blight was found in all counties of N.S. and was severe on Irish Cobbler in Colchester county, and slight amounts of Alternaria rot were seen in Colchester and Kings counties. Early blight was less prevalent than usual in P.E.I. in spite of a hot dry midsummer and little spraying; however, it caused moderate damage where present. About 50% of the tubers of one lot of Irish Cobblers were affected with Alternaria rot in Queens county.

PHOMA ROT (Phoma tuberosa) caused severe damage to a lot of Green Mountains in Queens county, P.E.I.

SILVER SCURF (Spondylocladium atrovirens) was general in B.C.; it is more prevalent on the early varieties, but causes no damage. It was prevalent on the white-skinned varieties, especially Irish Cobbler in N.B. It appeared this year much earlier than usual in P.E.I.; infection was moderate.

POWDERY SCAB (Spongospora subterranea) was found on a few tubers grown on peaty land at Cloverdale and Pitt Meadows, B.C. Traces were observed in Que., N.B., N.S. and P.E.I.

BACTERIAL WILT and ROT (Cause undetermined) was less severe in the field in Que. than last year, but the percentage of tuber infection is about as high. At digging time affected tubers showed only reddish spots at both ends and around the eyes, but later the tubers showed rot. From a field showing 12% of wilt and only a few rotted tubers at digging time, 8% of the tubers were completely decayed by the wilt-rot in November (B.Baribeau). A similar tuber rot has been found to a slight extent throughout N.B. Isolations from rotted tubers have yielded a number of very closely related bacteria, which are capable of producing tuber rot. Culture studies are being continued. (J.L. Howatt & S. Clarkson)

SET ROT (Fusarium Solani) was reported from one field in zone 9, Alta.

MOSAIC (virus). Out of 103 fields rejected in B.C., 26 failed to pass on account of mosaic. Several of these fields had been planted with seed containing almost the maximum of disease permitted and the grower had been advised to sell his seed for the production of table stock and obtain better seed for his crop for certification. Mosaic was not general in Alta. and Sask., but large percentages were found in the Peace River area in B.C. Varied amounts up to 25% were reported in fields grown from uncertified seed in Que. Out of 784 fields inspected, 106 were rejected on account of Mosaic in N.B. Fields from uncertified seed showing from 13 to 60% mosaic were reported from N.S.; some mosaic was present in fields from certified seed. It was severe on Bliss Triumph in P.E.I., but was less prevalent on Green Mountain than for some years. It remains a serious factor in the production of certified seed. Several types of mosaic were reported from P.E.I.

LEAF ROLL (virus) resulted in the rejection of 15 fields of the 103 rejected in B.C. Leaf roll has never been general in Alta. and Sask., but it has become prevalent on City lots and in the environs of Edmonton, Calgary, Medicine Hat and to some extent in the irrigated districts about Lethbridge. Small amounts of leaf roll were reported from Que., N.B., N.S., P.E.I.

WITCHES' BROOM (virus) suddenly became prevalent in B.C. in 1935, 13 fields being rejected. Several fields grown from exceptionally good stock showed over 5% of the plants affected. It was generally distributed in Alta., but the percentage of affected plants was small. It was also reported from P.E.I.

PSYLLID YELLOWS (?virus) affected from 35 to 100 plants in several fields about Medicine Hat, Alta.; a trace was also found in zone 2. (J.W. Marritt)

SPINDLE TUBER (virus) resulted in the rejection of 10 fields out of 784 inspected in N.B. It was less prevalent than in former years in P.E.I., the highest infection being 10% in Irish Cobbler in Queens county.

GIANT HILL (virus). Traces were found in one field of Green Mountain in Prince county, P.E.I.

WILT (Fusarium oxysporum) infected a trace of the plants in a 10-acre plot of Irish Cobbler at Charlottetown. Several outbreaks of suspected Fusarium wilt occurred in Prince county.

WILT (Verticillium albo-atrum). Small percentages were found at Medicine Hat, Taber and Lethbridge, Alta. It was severe in some fields of Irish Cobbler in Prince and Queens counties, P.E.I. (S.G. Peppin)

DRY ROT (Fusarium sp.). In 1933 and 1934 considerable dry rot developed in stored potatoes in Alta. Isolations from the tubers yielded F. trichothecioides Wr. (G.B. Sanford & W.L. Gordon). Considerable dry rot was found in storage in March in Queens county, P.E.I.

STEM ROT (Sclerotinia sclerotiorum) affected 1% of the plants in a field of Green Mountains, Ste. Anne de la Pocatière, Que. This disease is rarely found. (B. Baribeau)

GREY MOULD ROT (Botrytis sp.) heavily infected a garden plot in Queens county, P.E.I.

BLACK DOT (Colletotrichum atramentarium) apparently caused the death of 10% of the plants in some fields of Green Mountains and Irish Cobblers at Ste. Anne de la Pocatière, Que. In fields where the plants were killed early, the yield was probably reduced one-third; the tubers were small but sound. Small amounts were observed in many field. (B. Baribeau)

LEAK (Pythium ultimum) caused considerable loss in one field at Grant Forks, B.C., due to rotting of the cut sets after planting.

ARMILLARIA ROT (A. mellea) found on a few tubers from newly cleared land, Milner, B.C.

HEAT INJURY. Through the southern part of N.B. many fields showed a high percentage of cracked tubers due to the high soil temperature.

FLEA BEETLE INJURY. The so-called Flea Beetle injury was quite common on potato tubers in the middle and southern sections of N.B. Injured tubers are characterized by smooth or cankerous swellings or pimples, apparently located at the lenticels. Occasionally superficial tunnel marks are also present on the tuber surface. At the point where the swellings occur, a cavity extends into the tuber flesh or cortex to a depth of about ¼ inch. Such cavities are walled off by cork layers, which appear as thorn-like projections when the potato is sectioned. (J.L. Howatt).

MAGNESIUM DEFICIENCY occurred sporadically in several counties of N.B. Growers in the affected areas are using considerable quantities of magnesium-bearing fertilizers (J.L. Howatt). Its occurrence was also reported in P.E.I.

HOLLOW HEART (Non-parasitic) affected 60% of the tubers in one field examined in P.E.I.

SKIN SPOT (Oospora pustulans) was heavy on two tubers received from Newfoundland at Kentville, N.S.

RADISH

BLACK SPOT (Alternaria Brassicae (Berk.) Sacc. emend. Bolle). Slight infection reported from Ste. Anne de la Pocatière, Que.

CLUB ROOT (Plasmodiophora Brassicae Wor.) affected White Icicle radish in a garden at Kentville, N.S.; only a few clubs were formed on the main roots, but numerous rootlets were swollen.

ROOT ROT (Rhizoctonia Solani) of radish was received from Belleville, Ont. (G.C. Chamberlain)

RHUBARB

CROWN ROT (Cause unknown). Traces were observed in Ruby in Queens county, P.E.I.

LEAF SPOT (Ascochyta Rhei) moderately infected rhubarb at Indian Head, Sask.; Ste. Anne de la Pocatière, Que.; and in P.E.I. Phyllosticta straminella was present at Côte des Neiges, Que.; York county, N.B.; and P.E.I.

STEM ROT (Bacterial) affected 2% of the stems in one patch at Morden, Man.

STREAK (Unknown) was apparently affecting rhubarb received from Toronto, Ont.

FIRING (Unknown) was slight to severe in zone 2 and slight in zone 13, Alta.

SALSIFY

WHITE RUST (*Cystopus cubicus*) was present on leaves from Vernon, B.C. and slightly to heavily infected all 8 fields surveyed in the Montreal district, Que., and also gardens in Kamouraska county.

YELLOWS(virus). A trace was found in a garden in York county, N.B.

SPINACH

DOWNY MILDEW (*Peronospora Spinaciae* Laub. = *P. effusa* p.p.) slightly affected 2 fields at St. Michel and St. Hubert, Que., respectively; and a garden in Hants county, N.S.

WILT (Cause not determined) affected all the plants in a 4-acre field where spinach was being grown for seed at Grand Forks, B.C., and caused severe damage. Plants were attacked through the root and wilted before the seed was mature. (H.R. McLarty)

SQUASH

BACTERIAL WILT (*Erwinia tracheiphila*) affected 3% of the plants in a patch of summer squash in Essex county, Ont.

SWEET CORN

SMUT (*Ustilago Zeae*) affected 10% of the plants in a garden at Indian Head, Sask. Six plants with shoots affected at the ground line were received July 11 from Carleton Place, Ont. Smut was general in the Montreal district and also in other parts of Que.; the highest infection was in a 3-acre field at Laprairie where 15% of the plants bore one or more infections.

RUST (*Puccinia Sorghi*) was heavy on a few leaves at Winnipeg, Man.; it lightly infected corn at Ste. Anne de la

Pocatière, Que.; and was present in P.E.I.

TOBACCO

Besides an increasing number of individual reports, Dr. N. T. Nelson, Chief of the Tobacco Division, Ottawa, Canada, permitted me to draw freely from his "Tobacco disease and insect pest survey, 1935".

(1) Seed Bed

DAMPING OFF (Pythium spp. and Rhizoctonia spp.) was serious in some parts of Essex and Kent counties, Ont., and was fairly prevalent in Que., especially in the northern district.

BLACK ROOT ROT (Thielaviopsis basicola (Berk.) Ferraris) was severe in unsterilized seed beds in Essex and Kent counties, Ont., and was present in several unsterilized beds in Norfolk county. Pythium, Rhizoctonia and certain obligate Phycomycetes were found constantly associated with T. basicola. It was serious in Que., more especially in the northern district. (L.W. Koch)

CHLOROSIS probably due to lack of sunshine and low temperatures in May and June in Ont., was found frequently, especially in Norfolk county. Another chlorotic condition apparently due to the use of fresh muck, was also observed a few times in Ont. Here small necrotic areas containing various organisms are found on the roots. Steaming the soil seems to accentuate the condition. (L.W. Koch)

SLIME MOULD (Undetermined) was present in several seed beds at St. Césaire, Que.; the plants were completely enveloped by the fungus. (L.W. Koch)

(2) Field

MOSAIC (virus) was general throughout the tobacco growing districts in Ont. Fields with 50-75% infection were common, while few fields were free from mosaic. Several strains of mosaic have been isolated from plants growing in the field and a Ring Spot virus was obtained at Harrow, Ont. Several different types of necrotic leaf spotting seemed to be associated with mosaic-affected plants. Mosaic was severe in many fields where tobacco had been the crop the previous year. It was also observed that mosaic was spread to a considerable degree by failure to rogue affected plants previous to cultivation and to some extent by topping operations (G.H. Berkeley).

Although mosaic reduced the value of the crop from many fields of flue tobacco the loss was less than anticipated and probably did not exceed from 5 to 10% of the total crop in Ont.

Mosaic appeared to be increasing in prevalence in both districts in Que.; it affected 60% of the plants in some fields and was present in many others.

BLACK ROOT ROT (Thielaviopsis basicola) was unusually prevalent in the Old Belt of Ont.; several fields failed to make any growth and were finally disced up. It was also severe in both districts in Que. In the Northern district, excessive moisture in the early season added to the damage.

ANGULAR LEAF SPOT (Phytomonas angulata) was severe in the Northern district, Que., especially on Parfum d'Italie, Grand Rouge, and Conn. Broadleaf. Traces were present in Ont.

WILDFIRE (Phytomonas Tabacum) was noted on certain crosses of cigar varieties both at Ottawa, Ont., and Farnham, Que.

BROWN ROOT ROT (Cause unknown) was prevalent in the Old Belt in Ont., and some places in Que. In certain fields it was severe where the land had been in timothy the previous year and in most fields, where the disease was present, the soil was light in character. The higher parts of the fields were most severely affected. (L.W. Koch)

HOLLOW STALK (Erwinia carotovora) was present in a field in Essex county, Ont., and diseased specimens were received from Farnham, Que. (L.W. Koch)

FRENCHING (Cause unknown) was observed several times in Norfolk county, Ont., where drainage was inadequate.

SAND DROWN (Non-parasitic) was found in several fields in the southern district, Que.

HAIL caused moderate damage in the Northern district and about St. Cezaire, Que. WIND and Hail took a smaller toll than usual in Ont., being about 3%.

SUNBURN (Non-parasitic) occurred in many fields in August in Ont.

POTASH STARVATION was noticeable in Ont. in fields which received fertilizer applications with low potash content.

TOMATO

BLOSSOM-END ROT (Non-parasitic) was common in gardens at Saskatoon, Sask.; a slight amount was present at Morden, Man. It caused little damage in 1935 in Montreal district, Que., whereas many fields were severely damaged in 1934. It was common in York county, N.B., affecting up to 25% of the fruit; it occasioned considerable loss in P.E.I., every garden showing some damage.

MOSAIC (virus) affected a few to 25% of the plants in greenhouses in B.C., being most prevalent in greenhouses of Oriental growers. It was reported in a garden from zone 10, Alta. It was abundant on Earliana in the field and greenhouses at St. Vital, Man., and moderately affected Beefsteak, Pink Heart, and Cherry Tomato at Morden, Man. About 5% of the plants in a field at Laprairie, Que., were affected and a trace of mosaic was reported from Queens county, P.E.I.

YELLOWS (virus) was general in the Okanagan valley, B.C. in 1935; up to 10% of the plants were affected.

STREAK (virus) was severe on Best of All at St. Vital,Man.

LEAF MOULD (Cladosporium fulvum). Rather heavy infections were reported in greenhouses at Langley and Summerland, B.C.; severe infections were observed in two greenhouses in the summer in zone 10, Alta.; it was severe on Earliana in greenhouses, St. Vital, Man. A trace was found on several varieties at Macdonald College, Que., in August 1934, and it was reported from Rouville county this year. A heavy infection causing stunting of the plants and delay in maturity was found in a greenhouse at Falmouth, N.S. in June. Bonny Best was moderately infected in a greenhouse in Queens county, P.E.I.

EARLY BLIGHT (Alternaria Solani)heavily infected the foliage and a few of the fruits in the greenhouse at Agassiz, B.C.; Aryox Bonny Best showed less infection than 11 other varieties. The disease was slight in greenhouses at Victoria (W. Jones). A slight infection was found at Morden, Man. A trace to moderate infections were reported from 8 fields in Que. and also in all 3 counties of P.E.I.

BLACK ROT (Alternaria sp.) was reported from Saskatoon,Sask.; and Ottawa, Ont.

LATE BLIGHT (Phytophthora infestans) caused a trace to slight infection in 2 fields in central Que.

SEPTORIA LEAF SPOT (S. Lycopersici) was reported from Lanark,

Ont. It was found in 7 plantings in Que. The heaviest infection was in two 1½-acre fields on Isle Bizard, where the foliage dried up and the crop was almost a total loss; tomatoes had been grown on the same land the two previous years. It caused slight to moderate damage in P.E.I.

WILT (Verticillium spp. and Fusarium spp.). Out of 18 greenhouses visited in B.C., 80% of the plants were destroyed by wilt in one and a trace in another. Fusarium wilt was found in only one greenhouse in the Niagara peninsula, Ont., where 15% of the plants were affected and in one lot of diseased material from Montreal, Que. Wilt was present in a greenhouse at Falmouth, N.S.; isolations yielded Verticillium albo-atrum.

BACTERIAL CANKER (Phytomonas michiganensis) was apparently general in the Kelowna district, B.C.; up to 20% of the plants were affected. (G.E. Woolliams)

TIMBER ROT (Sclerotinia sclerotiorum) affected 6 plants in a greenhouse at West Summerland, B.C. Sclerotia were formed on the lesions. (G.E. Woolliams)

BREAKDOWN (Non-parasitic) was found affecting about 10% of the fruit in a greenhouse at Kelowna, B.C., where the tomatoes had been treated with a gas while still green to hasten the ripening process. The fruit was fully ripe when it began to breakdown.

ROOT KNOT (Heterodera marioni). Out of 18 greenhouses inspected in B.C., the percentage of plants infected were: 100% in 2 greenhouses; 10% in 1, 5% in 1, none in the remainder. Where the plants are 100% infected the loss in crop is about 25%. (J.E. Boscher)

ROOT ROT (Nematode?) moderately affected a greenhouse crop of Grand Rapids in Welland county, Ont. The roots showed extensive injured areas similar to those produced by Rhizoctonia. Microscopic examination revealed the presence of many nematodes, but root knot symptoms were absent. (G.H. Berkeley et al.)

HEAT INJURY. In many garden plots in York and Sunbury counties, N.B., the tomatoes were cooked on the vines due to the high temperatures.

TURNIP

CLUB ROOT (Plasmodiophora Brassicae) occurred commonly throughout N.B., often causing severe losses. It was observed

a few times on turnip in Que. and 5% of the plants were affected in a field of Swede turnips in Colchester county, N.S. The disease was prevalent in P.E.I.; several fields near Charlottetown sown with seed of the resistant Wilhelmsburger variety, imported from Europe in 1934, were entirely free from club root. (R.R. Hurst)

BROWN HEART (Non-parasitic) severely affected 50% of the crop on one farm in the New Westminster district, B.C. It is said to be severe at many points in the district. It caused slight to severe damage depending on the variety of Swede turnips and the particular field on the Macdonald College farm, Que. It was not so destructive in 1935 as it was in the abnormally dry summer of 1934 (J.G. Coulson). About 6% of the turnips were affected with brown heart in a 2-acre field at Laurierville; on another farm where borax was applied in the drill less than ½ of 1% of the turnips showed the disease. The disease was widespread in N.B.; borax applied at the rate of 10 lb. per acre in the drills gave good control (J.L. Howatt). Brown heart was less severe in 1935 in P.E.I. than in recent years; borax applications at 10 to 15 lb. per acre gave commercial control. (R.R. Hurst)

COMMON SCAB (Actinomyces scabies) was heavy on 10% of the crop in a field at St. Julie, Que., which yielded the previous year a crop of scabby potatoes; it also moderately infected 3% of the crop in a field at Laurierville. It was occasionally severe in P.E.I.

BLACK ROT (Phytomonas campestris) slightly infected the varieties grown at Macdonald College, Que.

STORAGE ROT (Rhizoctonia Solani). Sclerotia were present on all the stored roots of Ditmars at Fredericton, N.B. on April 18, but did not appear to cause any damage. (J.L.Howatt)

DRY ROT (Phoma lingam) caused severe injury in many fields as well as considerable loss in storage in P.E.I. It was also destructive in a lot of Ditmars on May 10 in N.B.

DOWNY MILDEW (Peronospora Brassicae Gäum.) was general on the leaves of Swede turnip at Duncan, B.C. and caused a trace of damage (W.Jones). This is a new record for Canada.

IV. DISEASES OF FRUIT CROPS

APPLE

SCAB (Venturia inaequalis). The Salmon Arm and Lavington districts, B.C., experienced the worst epidemic of scab in their history in 1935. In the Salmon Arm district the weather was unfavourable for scab infection almost to the end of June and little scab was found even on unsprayed trees. But around July 1st it rained continuously for 56 hours, 2.26" falling in that period. As a result, 95-100% of the apples became scabby on unsprayed trees. About 50% of the McIntosh crop were culled out due to scab, and 75% of the fruit that was shipped bore scab lesions. Other varieties such as Delicious, were also badly scabbed, but not quite so severely. Scab was nearly as destructive in the Lavinton district (G.E. Woolliams). No data in the other Interior valleys were received, but a slight infection was reported from Vancouver island.

Scab lightly infected the leaves and fruit at Indian Head, Sask.; it was severe on apple seedlings at Morden, Man. and lightly infected one tree at Winnipeg.

Scab was quite severe throughout the Niagara peninsula, Ont., and along the north shore of Lake Ontario; only in the better sprayed orchards was the disease kept well controlled. Ascospore discharge occurred first on April 30 when the trees had reached the pre-pink stage. The critical period for infection was between April 29 and May 11, when cool cloudy and wet weather prevailed as the trees passed from the pre-pink to the pink stage. Primary infection was noted on May 27. In the Laboratory orchard, St. Catharines, foliage infection differed widely on the various varieties, being worst on McIntosh, where 89.5% of the leaves were affected on unsprayed trees and 38.1% on the sprayed. Similar differences were recorded between the infection on unsprayed vs. sprayed trees in other varieties.

At Abbotsford, Que., only traces of scab developed on Fameuse and McIntosh in well sprayed orchards, while early and midsummer infections were present on 40% of the fruit in poorly sprayed orchards. Traces only developed in the College orchard, Ste. Anne de la Pocatière, Que., as a result of 5 years careful spraying. An exceptionally wet season made it difficult to control disease and a few heavy late infections were noted.

Where a complete spray schedule was carried out, little or no scab developed in N.B., but where the schedule was incomplete or no spray applied, scab was severe. (S. Clarkson & J.L.Howatt)

In N.S. well sprayed areas showed usually under 2% of scabby fruit. On the other hand unsprayed areas bore 40-90% scabbed fruit. Heavy ascospore discharge occurred during blooming and about 2 weeks later. First conidia on new lesions were found June 5. Late fruit infection did not exceed 20%, but considerable late foliage infection was observed. (J.F. Hockey)

FIRE BLIGHT (Erwinia amylovora) was found for the first time on Sylvia crab in the University gardens, Saskatoon, Sask.

Relatively heavy blossom infections were encountered on Tolman Sweet, Greening, Gravenstein and Alexander in a few orchards visited in the Niagara peninsula, Ont. It was found chiefly in neglected orchards; in one, however, it was brought in apparently by pollinating insects from neglected pear and apple trees on a neighbouring farm, as no hold-over cankers could be found. It was reported also from Westboro, Gananoque, Willow Beach and Kapuskasing.

Fire blight was about as prevalent this year in the apple growing districts of western Que. as in 1934. A slight amount of both blossom and twig blight was present in almost every orchard. It was apparently disseminated by the rains falling May 27-28, 31 and June 4-7, but after this period practically no spread took place. Nearly all branches bearing old cankers were killed by the winter. The amount of fire blight by district was as follows: Abbotsford, same as last year, moderate in two orchards on Alexander and Winter Arabka and neighbouring trees, slight in other orchards; Rougemont, slight, slight increase especially in orchards containing Alexander and Wolf River trees; St. Hilaire, traces to slight; Chateauguay, traces in most orchards, a decrease from last year; Hemmingford - Covey Hill - Franklin Centre, Oka - St. Joseph du Lac and Cowansville - Frelighsburg districts, traces to slight, no change. Fire blight was severe in 2 orchards on Mt. Shefford and on apple and crab apple trees at Waterloo. At Lennoxville twig infections were severe on Atlas and Pedro, moderate on Winton and slight on Severn. The disease was severe on apple trees at St. Felix, Warwick and Pointe du Lac and slight at St. Paul de Chester (H.N. Racicot et al). Fire blight was induced on Aronia melanocarpa by atomizing the blossoms with a suspension of the bacteria. (B.O. Savile)

Fire blight was severe on several trees in an abandoned orchard in P.E.I.

BLACK ROT (Physalospora obtusa (Sphaeropsis malorum) was severe as a leaf spot on an apple seeding at Morden, Man. Black rot has appeared in most orchards suffering from winter injury in

western Que. Cankers have spread rapidly, but opinion differs whether or not the trees would have recovered if black rot had not developed. Foliage infection was slight to moderate at Macdonald College. The disease is common throughout N.B. on the foliage and sometimes on the fruit. In the Experimental orchard, Fredericton, 90% of the fruit of Crimson Beauty and Dudley were infected at picking time. (J.L. Howatt et al)

RUST (Gymnosporangium clavipes) affected from 0.5% to 40% of the fruit depending on the variety in the College orchard. Ste. Anne de la Pocatière, Que. The most severely rusted were: Alexander, St. Lawrence, Transparent, Excelsior, Greening, McIntosh and Wealthy, while Golden Russet, Pewaukee, Peach Astrachan, Hyslop, and Martha were only slightly affected (E. Campagna). Rust was also found on Gravenstein and Red Siberian crab at Kentville, N.S.

A few rust infections occurred on the leaves of a Fameuse standing near a red cedar affected with G. globosum at Abbotsford, Que. The rust developed normally on hawthorne, but on apple only pycnia developed. This rust has not been previously reported on apple in Canada.

POWDERY MILDEW (Podosphaera leucotricha) caused up to 5% damage on Vancouver island, B.C.; the infection was heavier than in 1934. It was also severe on susceptible varieties, chiefly Jonathan and McIntosh, in the southern Okanagan valley; the damage was 10%. A trace was present on nursery stock at Lennoxville, Que.

ANTHRACNOSE (Pezicula malicorticis) caused up to 50% damage in some orchards at Duncan, B.C.; heavy infections occurred after early fall rains before spraying was begun. Eighty trees were removed from a 10-acre block at Okanagan Centre on account of anthracnose; also nearly every McIntosh tree in a 3-acre block was affected.

PERENNIAL CANKER (Gloeosporium perennans) was severe in an orchard of Newton at Okanagan Centre, B.C.; nearly every canker, often up to ¾" in diameter, was formed where woolly aphis had been present the previous year. The disease was found at Creston on McIntosh by Mr. A.A. Dennys, Dominion Entomological Laboratory, Vernon; this is the first record of its occurrence in the Kootenay district.

BULL'S EYE ROT (Gloeosporium perennans) affected 50% of the apples in a few boxes of Wagner at Okanagan Centre, B.C. (H.R. McLarty)

EUROPEAN CANKER (Nectria galligena) caused slight damage in a few orchards in the Vancouver district, B.C. (J.W.Eastham). At Macdonald College, Que. 80% of the Yellow Transparent trees, 52% of the McIntosh, 18% of the Fameuse and a trace of the Wealthy were affected with European canker, 1 to 28 cankers being present on the trees. None or a trace was present on other varieties. (R.F. Suit)

DROUGHT SPOT (Non-parasitic) was more severe this year than last in the Okanagan valley, B.C. Although loss is difficult to estimate, it is safe to say that 100-125 thousand boxes were affected and most of them would be unfit for sale (H.R. McLarty). The fruit of 5 McIntosh trees in an orchard in a deep sandy soil with low water table in York county, Ont., were discoloured and shrivelled at the calyx end and the tissue below the skin was browned. Two trees affected in 1934 were healthy in 1935.

CROWN ROT (Non-parasitic) affected another 2% of the trees in the Okanagan valley, B.C. this year, but it was not as severe as formerly. (J.C. Roger)

BITTER PIT (Non-parasitic). A spotting affected up to 50% of the Newton apples in some orchards in the Okanagan valley, B.C., about the time the fruit was picked. The trouble was not typical of bitter pit, but would have to be classed here. It was probably a delayed Drought Spot condition. The disease was so severe in some districts that the Fruit Branch held up the shipment of this variety to the export market for several weeks (H.R. McLarty). In two commercial orchards in N.B. up to 20% of the fruit of Baxter, Baldwin, and Wealthy were affected with Bitter Pit or Blotchy Cork. Last year the Baxter in one of these orchards was a total loss (J.L. Howatt & S. Clarkson). Bitter Pit of the Blotchy Cork type caused, in storage, a loss of 10-20% of the fruit in many lots, especially those of Stark and Baldwin; it did not appear until late in the season. (J.F. Hockey)

CORKY CORE (Non-parasitic) was less severe than last year in the Okanagan valley, B.C. It was estimated that 75 to 100 thousand boxes were affected, some of which would be marketable (H.R. McLarty). A trace was found in one commercial orchard in N.B.

SOFT SCALD (Non-parasitic) caused heavy loss in a 100-barrel overseas shipment of 1934 crop of Jonathan from Ontario.

TWIG BLIGHT (Nectria cinnabarina) affected a few twigs at Franklin Centre, Que.; and was occasionally seen on winter injured twigs and branches in N.B.

TWIG ROT (Peniophora cinerea) was abundant on a winter-injured wild apple tree in Joliette county, Que.

WOOD ROT (Schizophyllum commune). This fungus was present in many orchards in western Que. especially on badly injured trees. It was present in frost cankers on all cultivated varieties in orchards showing winter injury in N.B. Following winter injury to Baldwin at Kentville, N.S. the fungus was fruiting freely on limbs that had been completely killed. Where the limb was only partially dead, Stereum purpureum was in fruit. (K.A. Harrison)

SILVER LEAF (Stereum purpureum) was reported from Franklin Centre. Although the fungus was abundant on half-dead limbs of Baldwin at Kentville on May 31, silver leaf symptoms were not in evidence at the time and very little was present upon later examinations (K.A. Harrison). Silver leaf symptoms were also observed on a few seedling trees. Silver leaf varied from a trace to heavy in 15 orchards examined in P.E.I.

DIE BACK (Non-parasitic) has not been severe during the past 2-3 years in the Okanagan valley, B.C., but without an exact survey the amount present is difficult to estimate. It is commonly met with in every district and occasionally whole orchards may be killed outright. Possibly a better water supply has tended to reduce the trouble.

DIE BACK (Cytospora spp. & Valsa spp.) Cystospora was heavy and some Valsa was present on dead limbs in the University orchard, Saskatoon, Sask. Valsa has been collected on dead twigs in a number of orchards in western Que. Cytospora is common on the bark of frost cankers in N.B.

GREY MOULD ROT (Botrytis sp.) was present on several varieties in storage at Okanagan Centre, B.C. and caused slight damage to Wagner. A trace was present on various varieties in storage at Fredericton, N.B.

BROWN ROT (Sclerotinia americana) attacked all the fruit on a tree of Yellow Transparent at St. Jean de Matha, Que.

BLUE MOULD (Penicillium expansum) rotted about 3% of the apples of the varieties in storage at Fredericton, N.B. Between 1 to 2% of the fruit of Gravenstein in an experimental shipment from N.S. showed rot on arrival at Liverpool, England. The infection was usually centred around a break in the skin. A small shipment of McIntosh, domestic grade, from Ont. was severely rotted on arrival at Liverpool. A severe outbreak of

apple scab developed which was followed by the Penicillium. Apparently high temperatures in transit was the cause of its rapid development. (K.A. Harrison)

PINK ROT (Tricothecium roseum), as a severe "pit" type of rot, developed in barrels of Golden Russet, exposed to the high temperature of 65°F. for several days at Kentville, N.S. A large proportion of the tissue cultures made were pure cultures of the above fungus. (J.F. Hockey)

ROT (Rhizopus nigricans). A trace was present in stored apples at Fredericton, N.B.

MOSAIC (?). From 50-75% of the leaves on three young fruit trees of Yellow Siberian crabs showed mosaic symptoms at Kentville, N.S. The trees are under observation in a disease garden. (J.F. Hockey)

CHLOROSIS was general on apple trees under irrigation at the Experimental Station, Lethbridge, Alta. and caused slight to severe damage.

ARSENICAL INJURY. Tolman Sweet apples from Vineland, Ont., showed extensive black areas about the calyx end typical of arsenical injury. Arsenical injury on the fruit was noted as follows in Que.: Abbotsford, a trace; Hemmingford and Mont St. Grégoire a trace to 0.5% on McIntosh.

HEAT INJURY. Windfalls were cooked on the ground in August in York, Sunbury, and Queens counties, N.B. when the air temperature was 102°F. and soil temperature at the surface was 120-130°F.

RUSSETING (Spray?) was common especially on Fameuse, McIntosh, and Dudley throughout the apple growing areas in N.B. (J.L. Howatt and S. Clarkson)

SULPHUR SCALD. A trace was present in most orchards of the St. John valley. The injury is due to fruits sprayed with lime sulphur being exposed to direct sunlight of high intensity. (J. L. Howatt)

SUN SCALD. A small number of the fruit on the south side of Stark trees at Woodville, N.S. were affected. It was also observed in many other orchards especially where a late sulphur dust had been applied. (K.A. Harrison)

APRICOT

BLIGHT (Coryneum Beijerinckii) occurred on a few trees at Long Beach, B.C., and some of the affected fruits were unsaleable. (J.W. Eastham)

DROUGHT SPOT (Non-parasitic) affected all the fruit on some trees and was severe in a few orchards in the Okanagan valley, B.C.; the disease is severe where cultural conditions, especially water supply, are not right. (H.R. McLarty)

BLACKBERRY

RUST (Gymnoconia Peckiana). Diseased specimens were received from Oakville, Ont. and were noted at Kentville, N.S.

CHERRY

SHOT HOLE (Higginsia hiemalis (Cylindrosporium hiemale) caused much less damage than in 1934 on Vancouver island and in the Fraser valley, B.C. At Saanichton the highest infection was 60% on Gros Noir. Shot hole was widespread in the Niagara peninsula, Ont., but it was not severe for spraying had kept disease well in check. In an orchard near Aylmer the trees were practically defoliated and the fruit was small and ripened prematurely (G.C. Chamberlain). Specimens were received from Ste. Adèle en Bas, Que. The disease was widespread in N.B. on both cultivated and wild cherries. It moderately affected cultivated cherries and was severe on wild species in P.E.I.

BLOSSOM BLIGHT (Sclerotinia cinerea) infected 10% of the blossoms and caused 5% damage on Vancouver island, B.C. The disease was frist observed on May 8, a month later than in 1934 and infection was much less than last year (W. Jones). In the Kootenay district it was common on the early varieties Governor Wood and Black Tartarian, while only little was seen on Royal Anne and none on Bing or Lambert. (J.W. Eastham)

BROWN ROT (Sclerotinia americana) destroyed most of the crop on the few sweet cherries at Kentville, N.S. Twig blight was also observed in August. (J.F. Hockey)

BLACK KNOT (Dibotryon morbosum) was moderate to severe at several points in Que. The disease is widespread on wild cherries in N.B. and in abandoned orchards and on wild species in P.E.I.

POWDERY MILDEW (Podosphaera Oxyacanthae) was severe on

seedlings in an orchard in the Oliver district, B.C., but bearing trees did not show infection. It also caused slight damage to Bing at Boswell.

WITCHES' BROOM (Taphrina Cerasi) affected several trees in an orchard at Cloverdale, B.C.

CHLOROSIS (Non-parasitic) was general and caused slight to severe damage to trees under irrigation at Lethbridge, Alta.

MOSAIC (virus) was severe on one tree of Lambert and another of Royal Anne artificially inoculated at Summerland, B.C. The disease has been found in one orchard in the Penticton area (H. R. McLarty). (See Can. Pl. Dis. Survey 14:v. 1935)

SPRAY INJURY. In an orchard of sweet and sour cherries in Lincoln county, Ont., the foliage was severely burned and the trees were becoming defoliated; the fruit was badly pitted and worthless. It is thought that injury resulted from spraying with sulphur fungicides under excessively hot muggy conditions. (G.C. Chamberlain)

CRANBERRY

RED LEAF (Exobasidium Vaccinii) affected a few plants of Howes in a commercial bog at Port Mouton, N.S. (J.F. Hockey). A slight infection was found at Glenfinnan, P.E.I. (E.H.Saunders)

FALSE BLOSSOM (virus) was found in several bogs in N.S. during a survey for healthy bogs. (J.F. Hockey)

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola J.C. Fischer) slightly affected leaves of Boskoop black currant at Lavington, B.C. The currant and gooseberry plantings, Horticultural Division, Ottawa, Ont., were inspected several times throughout the season. No rust was found on June 17; black currants were slightly infected on July 5, but no rust was found on red or white currants or gooseberries; on July 17 some varieties of black currant were heavily infected and nearly all varieties were slightly infected, rust was beginning to show up on red and white currants and was also present on "Worcesterberry"; on August 10 nearly all gooseberry varieties were slightly affected; and on August 17 all gooseberries were rusted, nearly all black currants were badly rusted, and nearly all red and white currants were more or less infected. On the last inspection, September 17,

the only varieties on which no rust was found were: Russian Black Seedling currant, and the red varieties, Red Grape, Franco-German, London Red, Simcoe King, and the New U.S. variety, Viking. (H.J. Read and I.L. Conners)

Rust was slightly infecting black and red currants on July 22 at Macdonald College, Que.; it was severe and causing defoliation by September 10. Infections of varied intensity were reported from Ste. Anne de la Pocatière, Farnham, Magog, and L'Assomption on black and red currants.

Rusted specimens were received from Cumberland Co., N.S. and the disease caused slight defoliation in Kings Co.

The rust slightly to heavily infected red and black currants in P.E.I.

POWDERY MILDEW (Sphaerotheca mors-uvae) was heavy in a garden on black currant in zone 10, and a trace was present in zone 12, Alta. It was heavy on one bush of black currant in the University gardens, Saskatoon, Sask.

ANTHRACNOSE (Gloeosporium Ribis) was reported from zone 13, Alta. on red currant.

SEPTORIA LEAF SPOT (S. Ribis) lightly infected black currant at Swift Current, Sask.

A trace of Nectria ?cinnabarina was found on black currant in zone 10, Alta.

GOOSEBERRY

POWDERY MILDEW (Sphaerotheca mors-uvae) was destructive to Lancashire Lad, but none was present on Leveller, Gainer and Leader at Sardis, B.C. A slight infection was noted on June 5 on an English variety in Lincoln county, Ont.

WHITE PINE BLISTER RUST (Cronartium ribicola J.C. Fischer) slightly infected the gooseberries at Charlottetown, P.E.I. It was also found on gooseberries at Ottawa, Ont.(See under currant)

CLUSTER CUP RUST (Puccinia Pringsheimiana) affected about 15% of the leaves of gooseberry in a patch in zone 10. The rust was general, but light at Winnipeg, Man.

SEPTORIA LEAF SPOT (S. Ribis) slightly infected gooseberries at Indian Head, Sask. It moderately infected gooseberries in Kings county, P.E.I.

GRAPE

DOWNY MILDEW (Plasmopara viticola) very lightly infected several European varieties in a vineyard in Lincoln county, Ont. A slight infection was noted on Green Mountain at Macdonald College, Que.

LOGANBERRY

DRY BERRY (Haplosphaeria deformans) was much less prevalent than in 1934 on Vancouver island, B.C. Up to 10% of the fruit were affected. (W.R. Foster)

PEACH

LEAF CURL (Taphrina deformans) affected 50-80% of the leaves on Triumph and Rochester and a trace was present on Alexander at Saanichton, B.C. The disease was also noticed in the Fraser valley. The disease was present throughout the Niagara peninsula, Ont.; where no spray was applied the disease was epidemic.

POWDERY MILDEW (Sphaerotheca pannosa var. Persicae) caused slight damage to a few trees on Salt Spring island, B.C. It only slightly affected all varieties at Summerland, B.C. and the fruit loss was unimportant Powdery mildew was general in many orchards particularly on cling-stone varieties in the Niagara peninsula; it caused spotting of the fruits.

BROWN ROT (Sclerotinia americana) did very little damage to most varieties in the Niagara peninsula as the weather was warm and dry during the harvest of early varieties; the later varieties suffered slight damage.

BLIGHT (Coryneum Beijerinckii). A moderate infection was observed with a trace of damage at Sardis and Saanichton, B.C. (W. Jones)

YELLOWS (virus) and LITTLE PEACH (virus) caused considerable loss according to the Provincial Inspection Service throughout the Niagara peninsula, Ont.

SPRAY INJURY was severe on young trees at Cedar Springs, Ont., causing severe defoliation, leaf spotting and injury to the wood; although the spray of the recommended strength was applied, warm wet weather followed its application so that the spray did not dry quickly. (R.S. Willison)

BUMPY FRUIT (Undetermined, probably non-parasitic). Ripe fruit from several young trees just coming into bearing, had a peculiar bumpy appearance, sometimes over the whole surface, sometimes on one side only, in an orchard in Lincoln county, Ont. The pulp was partially disintegrated and gum pockets were evident just beneath the skin. The trees made enormous growth in the early season, but it was extremely dry in July and August. Possibly excessive transpiration from the heavy foliage may have resulted in withdrawal of water from the fruit. (R.S. Willison)

WINTER INJURY, which occurred during the winter of 1933-34 is still showing up in the orchards in the Niagara peninsula. Places on the trunks, where bark was slightly cracked, have become cankered. (R.S. Willison)

POTASH DEFICIENCY. Scattered trees, 1-2 years old, of different varieties were decidedly stunted, the foliage was a poor pale colour and the leaves tended to curl upward and become scorched on the margins, characteristic of potash deficiency, in a nursery in Lincoln county, Ont. (G.C. Chamberlain)

PEAR

FIRE BLIGHT (Erwinia amylovora). Scattered small infections were found in the Okanagan valley, B.C. Traces to moderate blossom and twig infections and some limb and trunk cankers were reported from the Niagara peninsula, Ont.

SCAB (Venturia pirina) was severe in an orchard of Flemish Beauty at Salmon Arm, B.C., although the trees had been sprayed regularly beginning with a pre-blossom spray. It was severe on a few fruits where the spray had not reached them at St. Anne de la Pocatière, Que. Scab was slight to severe on pears in storage at Kentville, N.S. It was heavy on one tree in an abandoned orchard in P.E.I.

PLUM

BLACK KNOT (Dibotryon morbosum). A specimen was received from Mimico, Ont., and 1% of the trees were affected in an orchard at St. Philippe de Néri, Que. A few knots were observed at Kentville, N.S., and it was destructive in abandoned orchards in P.E.I.

PLUM POCKETS (Taphrina Pruni) affected 10% of the plums in the orchard at Agassiz, B.C.; it was severe in an orchard in

zone 10, Alta.; slight infection was noted in the orchard at Brandon, Man. Plum pockets was severe on Prunus nigra in the Arboretum, Ottawa, Ont. It was severe in 7 small orchards out of 9 surveyed at widely scattered points in Que. Specimens were received from Apohaqui, N.B. The complete crop on several Burbank trees was destroyed in Shelburne county, N.S., but the disease was not found on dormant sprayed trees in Kings county. It was severe on German Prune at Charlottetown, P.E.I.

BROWN ROT (Sclerotinia americana). A trace was found at Winnipeg, Man.; diseased specimens were received from Braeside and Perth, Ont.; it was heavy in an abandoned orchard, P.E.I.

SHOT HOLE (Higginsia prunophorae (Cylindrosporium prunophorae) was heavy on Shropshire Damson, Santa Rosa and Columbia and slight on all other varieties at Saanichton, B.C. It was severe on Prunus opata, but slight on Redwing at Brandon, Man. Specimens were received from Almonte, Ont. The disease was severe at Macdonald College, Que. and was light elsewhere.
It was widely distributed in P.E.I., being severe on some trees.

FIRE BLIGHT (Erwinia amylovora) moderately infected a tree of Mammoth in the University orchard, Saskatoon, Sask., but this was the only variety on which it was observed.

CHLOROSIS (Non-parasitic) was general and caused slight to severe damage to trees under irrigation at Lethbridge, Alta.

RASPBERRY

SPUR BLIGHT (Didymella applanata) was reported from zone 13, Alta. The disease was conspicuous in the variety plot, St. Catharines, Ont., where the following infections were recorded: Lloyd George, 23%, lesions extensive; Brighton, 24%; Herbert, 27%; Viking, Cuthbert, Chief and Latham, a trace (G.C. Chamberlain). In Que. spur blight was slightly less prevalent than in 1934. On Herbert it was moderate in one plantation in Champlain county, slight in a few others, and traces in the rest. Traces were also observed on Cuthbert, Viking, Newburg, Latham, Chief and Count and none on Newman, Brighton and Golden Queen. Traces were found on Herbert and Viking in P.E.I.

SEPTORIA LEAF SPOT (S. Rubi) was observed at Indian Head, Sask. A general infection was present at St. Catharines, Ont., on Viking and to a lesser extent on Herbert. The disease was less prevalent than in 1934 in Que. A moderate infection was present on Herbert in Portneuf, Champlain and L'Assomption counties and on wild raspberries in St. Maurice Co. Traces were observed on

Cuthbert in Champlain Co., and on Viking and Newburg in Laval Co.

MOSAIC (virus). Two per cent of mosaic was found on Cuthbert, and 0.5% on Count at Agassiz, B.C. It slightly affected raspberries in zone 2, Alta., and a trace was found in zones 10 and 13. There was only about ½ as much mosaic present in plantations in Que. this year as last. In 25 plantations of Newman, infection varied from 0-15%, with an average of 2.2%. In plantations of other varieties mosaic varied from 8% on Latham to 0.5% on Cuthbert. On one fruiting plantation of Latham in Sherbrooke Co., however, there was 100% mosaic. In one commercial planting 2% of the plants showed mosaic. A trace to severe infections were noted in P.E.I.

LEAF CURL (virus) affected a trace of the plants in a planting in zone 10, Alta. It was found affecting one plant of Lloyd George, in Lincoln county, Ont., which is the first record on this variety in Ontario. The disease was also found on Viking and Chief varieties, which are rarely found to be affected (G.C. Chamberlain). Traces to 1% were observed on Latham, Cuthbert and Viking in Que.

ANTHRACNOSE (Elsinoe veneta) markedly infected canes and petioles causing slight defoliation on Lloyd George in a planting in Lincoln county, Ont. Badly diseased black raspberry canes were received from Harriston. The disease was severe on 65% of the canes in a fruiting plantation of Newman in Yamaska county, Que., while a near-by nursery had only 1% of canes slightly infected. Traces to moderate infections were noted in other Newman plantations inspected, while none or a trace was present on the other varieties. In general the disease was more prevalent than usual. It was reported from East Bay, N.S.

YELLOW RUST (Phragmidium Rubi-idaei). Affected leaves bearing aecia were collected by Mr. J.J. Wood at Agassiz, B.C. on May 21, and the aecia probably opened 2-3 days before. It was less severe than last year. It caused 50-100% infection on Viking, Cuthbert, Franconia, Herbert, and Antwerp, but none was found on Lloyd George, Latham, Newburgh, Count, and Newman.

LATE YELLOW RUST (Pucciniastrum americanum) moderately infected Viking near Cedar Springs, Ont.; Chief and Newburgh alongside were practically free from infection. It was also severe on leaves of Viking received from Scarboro Junction. The rust was reported from Ste. Anne de la Pocatière, Que.

POWDERY MILDEW (Sphaerotheca Humuli) was very widespread and common throughout Ont., in all Latham plantations inspected; in

many stunting of the growth was severe. Latham is very subject to mildew under Ontario conditions. On the other hand, Viking, Cuthbert, Herbert and Lloyd George were infected only occassionally, and Chief and Brighton showed slightly greater susceptibility (G.C. Chamberlain). Powdery mildew was more abundant than usual in Que. It was severe in 2 nurseries and in a fruiting plantation of Latham in Rouville county and it was present in slight to moderate amounts on Latham in 8 other counties.

CANE BLIGHT (Leptospheria Coniothyrium) was present on canes received from Perth, Ont., and East Bay, N.S.

VERTICILLIUM WILT (V. sp.) was found in small amounts in many Cuthbert and Viking plantations in Ont., especially in younger plantings. Chief, Latham, and Newburgh are also susceptible, but to a less extent while Herbert, Brighton, and Lloyd George are rarely affected. Its presence in a planting of Perfection black raspberry has made the planting unprofitable. (G.C. Chamberlain).

CROWN GALL (Phytomonas tumefaciens) was commonly found in nursery plantings in Ont. When they were being rogued for virus diseases. Latham, Cuthbert and Viking appear very susceptible (G.C. Chamberlain). It was noted on Cuthbert in a garden in P.E.I.

WINTER INJURY caused considerable damage in several plantations in Ont. It first was evident when the growth of the buds was well advanced. It was possibly due to the late open growing season in 1934 and consequently the wood of the canes was not fully ripened when winter set in.

SAND and PIN CHERRIES

POWDERY MILDEW (Podosphaera Oxyacanthae) was heavy on sand cherry received from Parkside, Sask.

SHOT HOLE (Higginsia prunophorae (Cylindrosporium prunophorae)was present on all the leaves of sand cherry planted at Brandon, Man.

BROWN ROT (Sclerotinia americana) rotted the fruit and caused a twig blight on sand cherry planted at Morden, Man.

WITCHES' BROOM (Taphrina Insititiae) was present et La Pointe du Lac, Que. on pin cherry.

Tubercularia vulgaris was reported on pin cherry from zone

13, Alta.

STRAWBERRY

LEAF SCORCH (Diplocarpon Earliana (Marssonina Fragariae). Traces only were found on British Sovereign at Saanichton, B.C., although it was severe in 1934.

LEAF SPOT (Mycosphaerella Fragariae (Ramularia Tulasnei) reported from Lanark, Ont. It caused slight to heavy infection in 5 plantings in Que. It was widely distributed in N.B. and P.E.I.

POWDERY MILDEW (Sphaerotheca Humuli) was noted in several plantings in Ont. after several seasons when mildew was not evident. Moisture conditions were apparently favourable for its development. The disease varied from a trace to heavy in 25 plantings surveyed. It caused a crop failure in a few of the worst outbreaks.

ROOT ROT (Pythium sp.) caused the loss of half a planting at Lyn, Ont.

FRUIT ROT (Botrytis cinerea) affected 2% of the blossoms and a few of the fruits, on June 28, at Berwick, N.S.

CHLOROSIS (Non-parasitic) caused slight to severe damage to strawberries under irrigation, Lethbridge, Alta.

MOSAIC (virus) affected 1% of the British Sovereign plants at Agassiz, B.C.

JUNE YELLOWS (Undetermined) affected a few scattered plants in a planting of Olga Petrova in Lincoln county, Ont. (G.C. Chamberlain).

V. DISEASES OF FOREST AND SHADE TREES

ASH (Fraxinus)

Leaf spot (Piggotia Fraxini) was found on ash planted at the Forestry Station and the Experimental Farm, Indian Head, Sask., as well as on native trees in the valleys.

BALSAM FIR (Abies balsamea)

Witches' broom (Melampsorella Caryophyllacearum) slightly affected balsam fir in Kamouraska county, Que. It was reported to be widespread in N.B. It was prevalent in young stands in Kings and Annapolis counties, N.S.; the brooms were of varying sizes. It was also reported from P.E.I.

Canker (Aleurodiscus amorphus). The fungus was common on dead and living branches and on lesions at the base of branches in the Timagami Forest Reserve, Ont. The fungus is perhaps a saprophyte on frost-killed spots. (W.R. Haddow)

BASSWOOD (Tilia)

Leaf spot (Cercospora microsora) found on Mt. Yamaska, Que. (B.O. Savile)

BEECH (Fagus)

Canker (Nectria coccinea). Large trees under forest conditions have been killed at Kentville, N.S., while large trees in the open have survived although cankers are present on the trunks of many. Small trees in the forest are living although badly cankered. (K.A. Harrison)

BIRCH (Betula)

Stereum purpureum is common on living paper birch in the Timagami Forest Reserve, Ont. It is apparently associated with a canker.

BUTTERNUT

Nectria sp. was found on a few butternut trees at the Experimental Station, Fredericton, N.B., following winter injury.

ELM (Ulmus)

Black spot (Gnomonia Ulmi) was reported at Indian Head, Sask.; on several roadside trees in Lincoln county, Ont.; it was severe at Macdonald College, Que.

HORSE CHESTNUT (Aesculus)

Canker (Nectria cinnabarina) affected several trees, which are rapidly dying, in York and St. John counties, N.B.

Leaf blight (Guignardia Aesculi (Phyllosticta Paviae) caused severe injury to the leaves and may have caused the death of twigs and branches, which appear as if they had been winter killed in Queens county, P.E.I.

MAPLE (Acer)

Tar spot (Rhytisma acerinum) was reported as very common on Acer saccharinum in N.B. and as heavily infecting A. spicatum at Ste. Anne de la Pocatière, Que.

Leaf spot (Phyllosticta minima (Berk. & Curt.) Ell. & Ev.) moderately affected the leaves of A. rubrum and A. saccharum at La Pointe du Lac, Que.

Bark canker (Nectria sp.). Considerable areas of cankered bark were noticed on dying trees at Kentville, N.S. (J.F. Hockey)

MOUNTAIN ASH (Sorbus)

Fire blight (Erwinia amylovora). Diseased specimens were received in 1934 from Richmond Hill, Ont. (D.H. Jones). A trace of blossom blight was reported from Farnham, Que. It was heavy on 2 trees at Charlottetown, P.E.I.

Rust (Gymnosporangium Juniperi) was found several times on leaves at Ste. Anne de la Pocatière, Que.

Nectria sp. was present on a few trees at the Experimental Station, Fredericton, N.B. It may have developed following frost injury. (J.L. Howatt)

OAK (Quercus)

Powdery mildew (Microsphaera Alni var. extensa). Traces only found on Q. alba in Queens county, P.E.I., whereas it heavily infected the leaves in 1934.

Leaf curl (Taphrina caerulescens) slightly infected Q. macrocarpa planted at the Experimental Station, Beaverlodge, Alta. It was severe on Q. dentata, but none was found on Q. macrocarpa growing 15 feet away at the Experimental Farm, Indian Head, Sask.

PINE (Pinus)

White pine blister rust (Cronartium ribicola J.C. Fischer). An investigation conducted at three localities located in Peterborough county, Ont., showed about 6% of the white pines rusted. It is approximately 20 years since the rust first appeared in this region and as yet the mortality is very slight and only among small trees (W.R. Haddow). In a Que. plantation of 3,000 trees from 3 to 5 years old, 68% were affected with rust. It was noted on one young tree in about 15 planted at L'Assomption. A few trees were found heavily infected at Oromocto, N.B. It is developing slowly on older trees while many young trees are dying at Kentville, N.S. Trees are severely affected at Charlottetown, P.E.I., and it is prevalent in Queens and Prince counties.

Blister rust (Cronartium ?quercuum) was noted on Pinus Banksiana at Ste. Anne de la Pocatière, Que. (E. Campagna)

POPLAR (Populus)

Leaf blight (Fusicladium radiosum) found on P. tremuloides at Sinnet, Sask., and was severe on young trees at Benito, Man.; diseased specimens of P. sp. were received from Gananoque, Ont.

Galls (Cucurbitaria staphula) were collected at Dana, Sask., on P. balsamifera.

Powdery mildew (Uncinula Salicis) was found at Indian Head and Kamsack, Sask., on P. angustifolia.

Canker (Hypoxolon pruinatum) was found infecting about 40% of the trees of P. tremuloides in a ½-acre bluff at Vonda, Sask.; some trees were dead. Several trees bearing cankers were seen at different points in the Timagami Forest Reserve, Ont.

Taphrina Johansonii Sadeb. was found affecting 80% of the fruits of P. tremuloides at Ste. Anne de la Pocatière, Que. (E. Campagna). This species was previously represented in the Division of Botany herbarium by a Dearness collection from London, Ont.

Leaf spot (Septoria populicola) reported on P. angustifolia at Indian Head, Sask. It was heavy on P. balsamifera causing defoliation at Ponemah, Man.

Leaves affected with Sclerotium bifrons were received from Riley Brook, N.B.

Canker (Cytospora sp.) was found on cultivated poplar at Maple Creek, Sask.

SPRUCE (Picea)

Witches' broom (Arceuthobium pusillum) was heavy on 50 acres of Picea glauca at Ste. Anne de la Pocatière and on 30 acres of P. mariana at the edge of Lake St. John, Saguenay county, Que.

Rust (Chrysomyxa ledicola) was heavy on needles of P. glauca in Kings county, P.E.I.

WILLOW (Salix)

Tar spot (Rhytisma salicinum) was noted at Katewpa, Sask., and in Queens county, P.E.I.

Rust (Melampsora Abieti-capraearum) on Salix pellita at Watson and Attica, Sask.; and on Salix sp. at Mount Burnet, Que.

Scab (Fusicladium saliciperdum) was found at Cap Rouge, Que. along with Diplodina Salicis West. It was widespread in N.B. and caused moderate to severe damage.

Scab was noted on Salix vitillina at Grand Pré, N.S. Both scab and "black canker" are present in N.S. Few trees have died during the past 2 years as conditions were not favourable for the rapid spread of the disease. (K.A. Harrison)

Blight (Physalospora Miyabeana). A few lesions of blight were found extending from last year's infections on S. vitillina at Grand Pré, N.S. (K.A. Harrison)

Ramularia rosea Fuck. was collected on Salix at Indian Head, Sask.

Powdery mildew (Uncinula Salicis)was collected on willow at Indian Head, Sask.

Diaporthe tessella (Pers.) Rehm was collected on Salix at Saskatoon, Sask. (Det. G.R. Bisby)

VI. DISEASES OF ORNAMENTAL PLANTS

ASTER

Rust (Coleosporium Solidaginis) was severe on the lower leaves of cultivated A. novae-angliae at L'Assomption, Que.

BARBERRY (Berberis)

Stem rust (Puccinia graminis) moderately infected the common barberry at Ottawa, Ont.; pycnia were exuding nectar on May 29 and aecia were mature on June 5. A slight infection was reported on B. vulgaris from Macdonald College, Que.; aecia were mature on June 7. Rust affected 5% of the leaves and aecia were shedding spores on June 20 in Kings county, N.S. Traces of stem rust were noted on the barberry in July at Charlottetown, P.E.I.

BEGONIA

The eelworm, Aphelenchoides fragariae, was found on a few greenhouse plants at Langley, B.C.; symptoms were: veins brownish and necrotic, leaves with light coloured areas, and margins of leaves brown. (R. Hastings)

BELL FLOWER (Campanula)

A trace of yellows (virus) was found at the Experimental Station, Fredericton, N.B.

BUCKTHORN (Rhamnus)

Aecia of rust (Puccinia coronata) were present at Macdonald College, Que., on June 7.

CALENDULA

Yellows (virus) affected 70-85% of the plants at the Experimental Station at Fredericton, N.B., and Charlottetown, P.E.I. respectively; the damage was severe.

CARAGANA

Leaf spot (Septoria Caraganae) was reported as follows: from Edmonton, Alta.; moderate infection with some defoliation at Saskatoon and in many localities in southern Sask., in the latter part of the seaaon.

CARNATION (Dianthus)

Rust (Uromyces caryophillinus) caused 1% damage at Langley, B.C. and slightly infected the leaves and stems in a greenhouse at Falmouth, N.S.

Blossom blight (Botrytis sp.) was severe on buds and blossoms on plants grown under glass at Sussex, N.B.

CHINA ASTER (Callistephus)

Yellows (virus) was severe in a garden at Saskatoon, Sask.;

it caused considerable trouble at Harrow, Ont.; traces were present at L'Assomption, Que.; it was common in York and Sunbury counties, N.B., and the damage was severe; 100% of plants were affected in 10 gardens surveyed in P.E.I.

Wilt (Fusarium conglutinans var. Callistephi) was destructive in some beds and absent in others about Summerland, B.C.; a trace was found in a garden at Saskatoon. A part of one bed at Harrow, Ont. was completely killed out by wilt; other reports were 5% in one garden at Ste. Anne de la Pocatière, Que.; 20% in 2 gardens in York county, N.B. and in one at Middleton, N.S.

Rust (Coleosporium Solidaginis) moderately infected a tenth of a long border bed at L'Assomption, Que.

Root rot (Sclerotinia sclerotiorum) killed a few plants in zone 10, Alta.

CHRYSANTHEMUM

Leaf spot (Septoria chrysanthemella) caused 10% infection in a greenhouse at Victoria, B.C.

Powdery mildew (Oidium Chrysanthemi) caused a trace of damage in greenhouses at Victoria, B.C.

Blight (Botrytis cinerea) slightly infected the older blooms in a greenhouse at Falmouth, N.S.

CLARKIA

A trace of yellows (virus) was found on Clarkia at Fredericton, N.B.

COLEUS

Yellows (virus) severely affected 78% of the plants at the Experimental Station, Fredericton, N.B.

COLUMBINE (Aquilegia)

Powdery mildew (Erysiphe Polygoni) was found on a few plants at Saanichton, N.B. and Lennoxville, Que.

CONEFLOWER (Rudbeckia)

Yellows (virus) slightly affected 3 plants at the Experimental Station, Fredericton, N.B.

DAHLIA

Three plants out of 30 were affected with mosaic (virus) at Fredericton, N.B.

Stunt (virus) was found on Daily Mail, Jane Cowl, Treasure Island and was prevalent on some of the Pompom types at Charlottetown, P.E.I.

FLOWERING CURRANT (Ribes aureum)

Rust (Cronartium ribicola) slightly affected this shrub at L'Assomption and Lennoxville, Que.

FRENCH MARIGOLD (Tagetes patula)

Yellows (virus) severely affected the 65 plants growing at the Station, Fredericton, N.B.

GAILLARDIA

A trace of yellows (virus) was present on Gaillardia at the Station, Fredericton, N.B.

GERANIUM

Rust (Uromyces Geranii (DC.) Fr.) was heavy on named plants of G. sylvaticum, G. albiflorum, G. platypetalum, and G. anemmaefolium in the Arboretum, C.E.F., Ottawa, Ont.; a little rust was also developed on G. Andressi, G. pratense, and G. Londessi, but none was found on G. sibiricum, G. sanguineum, G. sanguineum var. prostratum, and G. tuberosum. The rust was also collected by H. D. House on G. pratense near Williamsburg, Ont. and communicated by H.S. Jackson, who also confirmed the identification of the Ottawa collections. This is the first report of this rust in North America outside of Alaska. (M. Timonin & I.L. Conners)

GERANIUM (Pelargonium)

Bacterial leaf spot (Phytomonas Erodii) was received from London, Ont. in June 1934. (D.H. Jones)

GLACIER LILY (Erythronium grandiflorum)

Rust (Uromyces heterodermus) was found on a few plants in the Victoria district, B.C.

GLADIOLUS

Bacterial blight (Phytomonas gummisudans) moderately affected Gladiolus at Winnipeg, Man. It has been previously reported from Ont. (Ann. Rept. Pl. Dis. Survey 13:68. 1934)

Scab (Phytomonas marginata) was affecting corms received from Brantford and Watford, Ont., in 1934. (D.H. Jones)

Hard rot (Septoria Gladioli) affected 10% of the corms in beds in Queens county, P.E.I.

Root rot (Cause undetermined) affected 100% of the plants in one garden in P.E.I. and a trace to 50% was reported in others.

GOLDENGLOW (Rudbeckia laciniata)

Wilt (Sclerotinia sclerotiorum) was heavy in a few clumps at Winnipeg, Man.

HAWTHORN (Crataegus)

Powdery mildew (Podosphaera Oxyacanthae) heavily infected hawthorn at the Experimental Station, Charlottetown, P.E.I.

HOLLYHOCK (Althaea)

Rust (Puccinia Malvacearum) was severe at Grand Forks, B.C.; it was noted at St. Catharines, Ont.; it was moderate to severe at Lennoxville, Farnham, and Beaumont, Que.; it was slight to severe in the southern half of N.B.; and was moderate to severe in P.E.I., spraying weekly with Bordeaux 4-4-40 gave reasonable control.

Leaf spot (Cercospora altheina) was severe at Winnipeg, Man.

HONEYSUCKLE (Lonicera)

Powdery mildew (Microsphaera Alni). Trace found at Lennoxville, Que.

Blight (Glomerularia Lonicerae) was severe on L. tatarica and a trace to moderate infections occurred on other species and varieties at Lennoxville and L'Assomption, Que., and a trace was also noted at Farnham.

HOUSE LEEK (Sempervivum)

Rust (Endophyllum Sempervivi). A few plants of S. Finchii and S. juratense were affected in a rockery at Victoria, B.C. (W. Jones)

IRIS

Leaf spot (Didymellina macrospora) Heterosporium gracile) was reported as follows: general but rate of infection variable on Vancouver island and in the Fraser valley, B.C.; moderate infection, Grand Forks, B.C.; moderate at Indian Head and Swift Current, Sask.; moderate at Morden, slight at Brandon, Man.; present in several gardens at St. Catharines, Ont.; moderate at L'Assomption, and Macdonald College, Que., severe on a few clumps but otherwise moderate at Lennoxville, Que.; moderate to severe in Queens county, P.E.I.

Rhizome rot (Erwinia carotovora) was severe in one garden and slight in 2 others in Queens county, P.E.I.

Eelworm (Anguillulina dipsaci) infested from 0-15% of the iris in the Victoria district, B.C. The highest infestation was on Supreme.

Mosaic (virus) affected up to 80% of the bulbous iris being forced in greenhouses at Victoria and Vancouver, B.C. Observations indicate that more of the imported bulbs are affected than those being grown locally. It was, however, present in all plantings inspected.

JERUSALEM CHERRY (Solanum)

A specimen showing Oedema (Non-parasitic) was collected in a greenhouse at Calgary, Alta.

LARKSPUR (Delphinium)

Powdery mildew (Erysiphe Polygoni) was noted on many plants in garden and nursery in Lincoln county, Ont. It was also present at Lennoxville and Ste. Anne de la Pocatière, Que., and at Shelbourne, N.S.

Bacterial blight (Phytomonas Delphinii) was severe at Deschambault, moderate at Lennoxville and L'Assomption, Que.; it was slight to severe in the southern half of N.B.

Yellows (virus). A trace was observed on annual larkspur at Fredericton, N.B.

LILAC (Syringa)

Powdery mildew (Microsphaera Alni) was noted several times in Lincoln county, Ont.; common at Lennoxville, Que.; severe on a large lilac hedge in St. John county, N.B.; trace in Queens county, P.E.I.

Blight (Phytomonas Syringae). A disease corresponding to the description of lilac blight has been found in York and St. John counties, N.B.

LILY (Lilium)

Blight (Botrytis elliptica) was injurious to several plants in a garden at Winnipeg, Man.

Root rot (Cylindrocarpon radicicola) was present on L. longiflorum brought from Toronto, Ont. (G.C. Chamberlain)

LOBELIA

A trace of yellows (virus) was found on Lobelia at the Station, Fredericton, N.B.

LUPINE (Lupinus)

Powdery mildew (Erysiphe Polygoni) was of general occurrence in the Saanichton district, B.C.

Fusarium wilt (Fusarium oxysporum) killed one plant at the Station, Charlottetown, P.E.I.

MALTESE CROSS (Lychnis)

Leaf spot (Phyllosticta Lychnidis) was moderate at Indian Head, Sask.; a trace was present on the lower leaves of L. Chalcedonica at Lennoxville, Que.

A leaf spot (Septoria noctiflorae) moderately infected L. Chalcedonica at Morden, Man.

Another leaf spot (Septoria Lychnidis) was reported from L'Assomption, Que.

NARCISSUS

Mosaic, or Grey disease (virus) affected up to 10% of the plants on Vancouver island, B.C. (W. Jones)

Leaf Scorch (Stagonospora Curtisii) was general but the infection was slight on Vancouver island and the Fraser valley, B.C. (R.J. Hastings)

White mould (Ramularia vallisumbrosae) slightly infected narcissus in crowded plantings in home gardens on Vancouver island, B.C., but was seldom found in commercial plantings.

Eelworm (Anguillulina dipsaci) affected up to 3% of plants on 55 acres on Vancouver island, B.C., and up to 10% on the mainland. On Vancouver island most growers use the hot water treatment, which has proved fairly effective. (R.J. Hastings)

PANSY (Viola)

Leaf spot (Colletotrichum Violae-tricoloris) severely stunted 75% of the plants in a garden in Lunenburg county, N.S.

PEONY (Paeonia)

Blight (Botrytis Paeoniae) was affecting a specimen received from Vernon, B.C. from Mr. A.A. Dennys, Entomological Laboratory. The disease was evident on a few plants in zone 13, Alta. A trace was found at Morden and a slight infection at Brandon, Man. A few diseases plants were noted in the Arboretum, Ottawa, Ont. Moderate infections were reported from Lennoxville and Ste. Anne de la Pocatière, Que. The disease was conspicuous on the 68 varieties in the plots at Fredericton, N.B. after blooming. Least affected were Reine Hortense and Festiva Maxima.

Ring spot (virus) was reported at Swift Current, Sask.; severe on David Copperfield, Triomphe de l'Exposition de Lille, Rachel and Ivanhoe at Morden, Man., and slight infection found at Brandon. A trace was found at Farnham, Que., and Mme. d'Hour and Mme. Auguste Dessert were moderately affected at L'Assomption. In addition to the varieties reported last year it was found on

Alice de Julenecourt, Claire Dubois, Marie Crousse and Duchesse d'Orleans at Fredericton, N.B. Attempts to artificially transmit the virus to tobacco and petunia by the rubbing method failed. (J.L. Howatt and S. Clarkson). A single plant has shown the symptoms at Kentville, N.S. each spring. (K.A. Harrison)

Lemoine's Disease has been noted in 4 peony plantings in zone 10, Alta.; buds failed to open, roots were deformed and plants were stunted. (G.B. Sanford)

Septoria leaf spot (S. Paeoniae var. berolinensis) developed slightly on Ivanhoe at Morden, Man.

Leaf blotch (Cladosporium Paeoniae) slightly to moderately infected the varieties of peonies at Macdonald College, Que.

Hail injury. A hail storm cut off about 5% of the buds at Fredericton, N.B. on June 12.

PETUNIA

Yellows (virus) was severe on a few plants at the Station, Fredericton, N.B.

PHLOX

Yellows (virus) was severe on 30% of the plants at the Station, Fredericton, N.B.

Septoria leaf spot caused by S. divaricata moderately affected the lower leaves of Rosenberg at Brandon, Man.

Leaf spot caused by Septoria sp. was heavy on P. Drummondi var. sanguinea at L'Assomption, Que., and on P. Drummondi at Kentville, N.S.

Powdery mildew (Erysiphe Cichoracearu) was abundant on phlox in a garden at Ottawa, Ont., and at Lennoxville, Que.

POPPY (Papaver sp.)

A trace of yellows was found on poppy at the Station, Fredericton, N.B.

PRIMROSE (Primula polyantha)

Yellows (virus) was severe on 70% of the plants at the Station, Fredericton, N.B. Attempts to transmit this disease to 4 species of Solanaceae and to healthy P. polyantha failed. (D. J. MacLeod)

RED CEDAR

Rust (Gymnosporangium globosum). Fresh galls were received on May 29 from Simcoe, Ont. A small tree, heavily infected was

brought from Beaver Mills, Ont. The small galls were not noticed until rainy weather expanded the telia horns. It was also found on red cedar at Abbotsford, Que.

ROSE

Rust (Phragmidium spp.) was heavy on Betty Bland, moderate on Tetonkaha and slight on Banshee in the University garden, Saskatoon, Sask.; slight to moderate infections were reported from Lennoxville, Macdonald College, and Kamouraska county, Que.; a trace to moderate infections were noted on varieties in the plots at Fredericton, N.B. It was common on several varieties at Kentville, N.S. and moderate to severe in Queens county, P.E.I.

Powdery mildew (Sphaerotheca pannosa) was heavy in a greenhouse at Langley, B.C.; it was general on Vancouver island and the Fraser valley, B.C.; the mildew was heavy on a Crimson Rambler in Lincoln county, Ont. A slight amount was noted at Macdonald College, Que.; it was severe on Pauls Scarlet and Dorothy Perkins in Queens county, P.E.I.

Black spot (Diplocarpon Rosae (Marssonina Rosae) was fairly general on Vancouver island and in the Fraser valley, B.C.; it was controlled in greenhouses by regulating the ventilation and temperature. It slightly infected yellow roses at Indian Head, Sask., and Harrison's Yellow at Swift Current, while it caused severe defoliation of Persian Yellow and Austrian Copper at Saskatoon. Black spot did not appear to be as prevalent or severe as usual in Lincoln county, Ont. The disease moderately infected roses at Macdonald College, and was rather severe at L'Assomption and Deschambault, Que.; about Fredericton, N.B.; and Charlottetown, P.E.I.

Crown gall (Phytomonas tumefaciens) affected 60% of the plants in a garden in Prince county, P.E.I.

Cercospora leaf spot (C. rosaecola) was general, but slight at the Farm at Brandon and at the Station at Morden, Man. It was also reported from Chamberlain, Sask.

Chlorosis (?virus) slightly affected a few bushes of Mme. Ed. Herriot at Sardis, B.C.

SAFFLOWER (Carthamus tinctorius)

Root rot (?) slightly affected this plant in a garden in zone 2, Alta.

SNAPDRAGON

Rust (Puccinia Antirrhini) appeared about September 1 in the Saanichton district, B.C. much later than in 1934. Infection was less than in any season for the past 5 years. The damage was

slight. It was severe on all the plants in a garden at Penticton. The rust was heavy in a greenhouse and was affecting all the plants in a garden at Edmonton, Alta. A slight infection was reported from Estevan, Sask. It was severe on plants at Abbotsford, Que., which had been grown from seed in a Montreal greenhouse and then transplanted outdoors. A dozen plants were killed by rust at Kentville, N.S.

Leaf spot (Phyllosticta Antirrhini) slightly affected snapdragons at Saanichton, B.C.

SPIREA

Winter killing. About 4/5 of the above ground parts of S. arguta plants were killed at Saskatoon, Sask.

STOCK (Mathiola)

Yellows (virus) affected slightly 9 plants at Fredericton, N.B.

SWEET PEA (Lathyrus)

Root rot (Thielaviopsis and Fusarium spp.). Specimens were received from various parts of N.S. Traces to 25% of the plants were severely affected by root rot, chiefly caused by Rhizoctonia, in Queens county, P.E.I.

Powdery mildew (Microsphaera diffusa) was very destructive in gardens in Queens county, P.E.I.

TULIP (Tulipa)

Blight (Botrytis Tulipae) slightly infected tulips and caused only a trace of damage on Vancouver island on account of dry weather and the practise of roguing. On the mainland infection was 50% and the damage 20% as roguing is not generally practised. It infected 95% of the plants in a garden in Kamloops, B.C.; the white varieties were ruined, the reds were moderately affected while the yellows appeared resistant. Severely affected specimens said to be representative of a planting of 20,000 tulips, were received from Pickering, Ont., at Ottawa. Lesions were present all over the petals. Blight was also noted at Abbotsford, Que.

Grey bulb rot (Sclerotium Tuliparum) almost completely destroyed the tulips in 5 beds at Rockcliffe, Ont. It began in one 2 years ago and since has spread to others although the soil was removed and fresh soil put in. (F.L. Drayton)

Basal dry rot (Sclerotium Delphinii) was found on 1% of the bulbs in an importation of Prince of Orange at Saanichton, B.C. (W. Jones and F.L. Drayton)

Break (virus) affected up to 100% of the tulips on Vancouver island, B.C. It was fairly general in many fields where no roguing was done. It is less prevalent in early varieties.

VIRGINIA CREEPER (Ampelopsis)

Powdery mildew (Uncinula necator) injured slightly virginia creeper at Saskatoon, Sask.

WALLFLOWER (Cheiranthus)

Downy mildew (Peronospora Cheiranthi Gäum.) affected a few plants in Victoria, B.C. This is the first report of its occurrence in Canada.

ZINNIA

Wilt (Sclerotinia sclerotiorum) affected 10% of the plants in a bed at Summerland, B.C.

Wilt (Fusarium sp.) infected 15 to 50% of the plants depending on the location at Summerland, B.C. (G.E. Woolliams)

Blight (Botrytis sp.) severely affected 2% of the plants in a garden in Queens county, P.E.I.

Yellows (virus). A trace was present in zinnias at Fredericton, N.B.

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