III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

RUST - Puccinia Asparagi DC.

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

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

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

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

BASAL STEM ROT - Fusarium sp.

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

BEAN

RUST - Uromyces appendiculatus (Pers.) Lév.

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

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

MOSAIC - Virus

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

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

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

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

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

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

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

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

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

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

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

BACTERIAL BLIGHT - Pseudomonas Phasecli E.F.Sm.

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

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

Man.- Bacterial blight was found at Killarney.

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

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

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

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

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

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

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

BROAD BEAN

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

BEET

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

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

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

CABBAGE

CLUB ROOT - Plasmodiophora Brassicae Woron.

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

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

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

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

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

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

BLACK LEG - Phoma Lingam (Tode) Desm.

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

CANTALOUPE

INTERNAL BREAKDOWN - Non-parasitic

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

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

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

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

CARROT

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

CAULIFLOWER

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

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

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

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

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

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

CELERY

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

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

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

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

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

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

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

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

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

CUCUMBER

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

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

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

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

BACTERIAL WILT - Bacillus tracheiphilus E.F.Sm.
Ont.- Ten per cent of the plants were affected with wilt in a field in Wentworth county.

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

DAMPING OFF - Pythium de Baryanum Hesse
N.B.- Ninety per cent of the plants were destroyed by damping off in a garden in Fredericton.

EGG PLANT

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

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

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

that several plants were affected.

HOP

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

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

INFECTIOUS CHLOROSIS - Virus

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

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

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

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

NETTLE HEAD - Virus

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

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

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

KOHLRABI

LEAF SPOT - Alternaria Brassicae (Berk.) Sacc.

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

LETTUCE

DROP - Sclerotinia Sclerotiorum (Lib.) de Bary

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

TIP BURN - Non-parasitic

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

RUST - Puccinia patruelis Arth.

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

ONION

NECK ROT - Botrytis Allii Munn

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

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

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

BULB ROT - Fusarium sp.

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

SMUT - Urocystis Cepulae Frost

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

SMUDGE - Colletotrichum circinans (Berk.) Vogl.

N.S.- Smudge was stated to be common on onions in storage, which had been grown at the Experimental Station, Kentville.

PEA

POWDERY MILDEW - Erysiphe Polygoni DC.

B.C.- Powdery mildew was general and severe at the Experimental Station, Saanichton.

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

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

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

DOWNY MILDEW - Peronospora Viciae (Berk.) de Bary

B.C.- Downy mildew was prevalent on peas in the Fraser River valley. From 20 to 30 per cent of the plants were infected in some fields.

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

developed late in the season and caused no apparent damage.

LEAF AND POD SPOT - Ascochyta Pisi Lib.

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

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

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

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

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

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

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

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

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

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

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

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

BACTERIAL LEAF SPOT - ?Pseudomonas Pisi Sackett

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

MOSAIC - Virus

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

RUST - Uromyces Fabae (Pers.) de Bary

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

LEAF BLOTCH - Septoria Pisi West.

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

WIND INJURY

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

POTATO

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

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

LATE BLIGHT - Phytophthora infestans (Mont.) de Bary

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

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

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

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

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

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

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

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

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

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

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

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

COMMON SCAB - Actinomyces scabies (Thaxt.) Güssow

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

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

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

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

BLACK LEG - Bacillus phytophthorus Appel

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

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

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

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

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

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

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

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

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

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

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

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

LEAF ROLL - Virus

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

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

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

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

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

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

MOSAIC - Virus

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

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

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

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

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

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

SHOE STRING MOSAIC - Virus

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

WITCHES' BROOM - Virus

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

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

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

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

SPINDLE TUBER - Virus

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

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

STEM-END HARD ROT - Phomopsis tuberivora Gussow & Foster

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

DRY ROT - Fusarium spp.

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

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

FUSARIUM WILT - Fusarium oxysporum Schlecht.

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

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

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

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

SILVER SCURF - Spondylocladium atrovirens Harz

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

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

POWDERY SCAB - Spongospora subterranea (Wallr.) Lagerh.

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

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

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

PHOMA ROT - Phoma tuberosa Melhus, Rosenbaum & Schultz

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

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

GIANT HILL - Virus

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

NET NECROSIS - Cause undetermined

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

LEAF AND STEM NECROSIS - Cause undetermined

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

BICHLORIDE INJURY

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

SOFT ROT OR LEAK - Pythium sp.

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

LEAT SPOT - Botrytis sp.

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

STEM ROT - Botrytis sp.

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

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

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

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

FLEA BEETLE INJURY

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

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

RHUBARB

CROWN ROT - Cause unknown

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

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

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

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

LEAF SPOT - Cause unknown

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

SALSIFY

ROOT ROT - Sclerotinia Sclerotiorum (Lib.) de Bary

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

SPINACH

DOWNY MILDEW - Peronospora effusa (Grev.) Rabh.

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

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

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

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

ROOT ROT - Fusarium sp.

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

SUGAR BEET

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

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

ROOT ROT - Cause undetermined

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

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

SWEET CORN

COMMON SMUT - Ustilago Zeae (Beckm.) Unger

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

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

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

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

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

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

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

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

TOBACCO

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

(1) Seed-Bed

DAMPING-OFF - *Pythium de Baryanum* Hesse

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

BLACK ROOT ROT - *Thielavia basicola* Zopf

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

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

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

(2) Field

BLACK ROOT ROT - *Thielavia basicola* Zopf

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

remarkable recovery was noticed in other varieties.

WILDFIRE - Pseudomonas tabacum (Wolfe and Foster) Stev.

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

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

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

MOSAIC - Virus

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

FRENCHING - Nitrogen deficiency

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

PHYSIOLOGICAL LEAF SPOTS

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

WIND & HAIL

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

IMMATURE SUN-YELLOWING & FIRING

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

(3) Curing Barn

POLE BURN

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

TOMATO

BLOSSOM-END ROT - Non-parasitic

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

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

MOSAIC - Virus

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

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

STREAK - Virus

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

LEAF MOULD - Cladosporium fulvum Cke.

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

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

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

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

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

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

LEAF SPOT - Septoria Lycopersici Speg.

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

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

LATE BLIGHT - Phytophthora infestans (Mont.) de Bary

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

BACTERIAL SPOT - Pseudomonas vesicatoria (Doidge) Stapp

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

WILT - Verticillium sp.

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

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

SPOTTED WILT - Virus

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

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

TURNIP

CLUB ROOT - Plasmodiophora Brassicae Woron.

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

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

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

BROWN HEART - Non-parasitic

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

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

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

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

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

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

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

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

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

VEGETABLE MARROW

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

TRANSPORTATION DISEASES

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

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

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

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

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

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

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

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

No diseases were noted in carrots and celery.