III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

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

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

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

BEAN

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

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

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

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

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

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

BACTERIAL BLIGHT - Pseudomonas Phaseoli E.F. Sm.

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

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

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

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

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

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

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

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

STREAK - ?Virus

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

BROAD BEAN

BACTERIAL BLIGHT - Bacillus Lathyri Manns. & Taub.

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

BEET

SCAB - Actinomyces scabies (Thaxt.) Gussow

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

LEAF SPOT - Cercospora beticola Sacc.

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

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

BROCCOLI

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

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

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

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

BRUSSELS SPROUTS

CLUB ROOT - Plasmodiophora Brassicae Wor.

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

CABBAGE

CLUB ROOT - Plasmodiophora Brassicae Wor.

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

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

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

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

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

SOFT ROT - Bacillus carotovorus L.R. Jones

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

BLACK LEG - Phoma Lingam (Tode) Desm.

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

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

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

DAMPING OFF

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

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

GREY MOULD - Botrytis cinerea Pers.

Que.- Affected specimens were received from East Angus.

CARROT

YELLOWS - Virus

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

SCLEROTIAL ROT - Sclerotinia Sclerotiorum (Lib.) de Bary

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

CAULIFLOWER

CLUB ROOT - Plasmodiophora Brassicae Wor.

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

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

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

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

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

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

SOFT ROT - Bacillus corotovorus L.R. Jones

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

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

CELERY

LATE BLIGHT - Septoria Apii Chester

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

Man.- Celery was moderately infected at Winnipeg.

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

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

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

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

EARLY BLIGHT - Cercospora Apii Fres.

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

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

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

STUNT or YELLOWS - Virus

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

SOFT ROT - Bacillus carotovorus L.R. Jones

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

DROP - Sclerotinia Sclerotiorum (Lib.) de Bary

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

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

BLACK HEART - Physiological

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

FERTILIZER INJURY

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

CUCUMBER

SCAB - Cladosporium cucumerinum Ell. & Arth.

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

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

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

FUSARIUM ROT - Fusarium sp.

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

MOSAIC - Virus

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

EGG PLANT

VERTICILLIUM WILT - Verticillium Dahliae Kleb.

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

DRY FRUIT ROT - Alternaria sp.

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

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

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

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

GINSENG

PAPERY LEAF SPOT - ?Verticillium sp.

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

HOPS

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

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

CHLOROSIS - Virus

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

HORSE RADISH

PALE LEAF SPOT - Ramularia Armoraciae Fuck.
P.E.I.- Pale leaf spot infections varied from a trace to heavy on horse radish in Queens county.

KALE

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

LETTUCE

DROP - Sclerotinia Sclerotiorum (Lib.) de Bary
Alta.- Drop caused severe damage to two plantings of lettuce at Edmonton.
Que.- Traces of drop were found in a planting in Jacques Cartier county.

DOWNY MILDEW - Bremia Lactucae Regel
B.C.- Downy mildew caused moderate damage to lettuce being grown for seed at the Experimental Farm, Agassiz.
Que.- Downy mildew was heavy on lettuce, which was being allowed to go to seed in the Montreal district. It did little damage to marketable lettuce.

DAMPING OFF - Corticium Solani (Prill. & Del.) Bourd. & Galz.
(Rhizoctonia Solani Kühn)
Que.- Damping off caused severe damage to lettuce in a planting in Jacques Cartier county.

CULTIVATED MUSHROOM

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

TRUFFLE DISEASE - Pseudobalsamea microspora Diehl & Lamb.
Man.- The truffle disease caused severe damage in a mushroom bed in Winnipeg. This is the first record of the disease in Canada.

WHITE PLASTER MOULD - Oospora fimicola (Cost. & Matr.) Cub.& Megl.
(=Monilia fimicola Cost. & Matr.)
Ont.- White plaster mould caused a total loss of the beds in a grower's cellar in Welland county. This is the first record to the survey.

ONION

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

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

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

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

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

PEA

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

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

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

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

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

LEAF BLOTCH - Septoria Pisi West

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

Man.- Spot blotch slightly infected peas at Morden.

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

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

RUST - Uromyces Fabae (Pers.) de Bary

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

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

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

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

MOSAIC - Virus

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

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

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

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

WILT and ROOT ROT

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

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

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

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

BACTERIAL BLIGHT - Pseudomonas Pisi Sackett

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

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

PEPPER

ROT - Alternaria sp.

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

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

POTATO

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

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

LATE BLIGHT - Phytophthora infestans (Mont.) de Bary

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

COMMON SCAB - Actinomyces scabies (Thaxt.) Güssow

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

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

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

BLACK LEG - Bacillus phytophthorus Appel

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

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

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

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

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

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

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

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

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

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

LEAF ROLL - Virus

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

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

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

MOSAIC - Virus

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

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

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

SPINDLE TUBER - Virus

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

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

PHOMA ROT - Phoma tuberosa Melhus, Rosenb. & Schultz

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

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

SILVER SCURF - Spondylocladium atrovirens Harz

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

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

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

POWDERY SCAB - Spongospora subterranea (Wallr.) Lagerh.

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

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

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

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

BACTERIAL WILT and ROT - Cause undetermined

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

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

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

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

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

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

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

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

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

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

DRY ROT - Fusarium sp.

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

FUSARIUM WILT - Fusarium oxysporum Schlecht.

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

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

VERTICILLIUM WILT - Verticillium sp.

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

WILT - Cause not determined.

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

STEM ROT - Sclerotinia Sclerotiorum (Lib.) de Bary

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

LEAK - Pythium sp.

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

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

SHOE-STRING FUNGUS - Armillaria mellea Fr.

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

GREY MOULD ROT - Botrytis sp.

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

MAGNESIUM DEFICIENCY

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

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

FERTILIZER INJURY

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

FROST INJURY

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

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

LIGHTNING INJURY

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

RHUBARB

CROWN ROT - Cause unknown

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

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

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

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

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

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

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

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

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

STREAK - Cause unknown

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

SALSIFY

WHITE RUST - Cystopus cubicus (Strauss) Lév.

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

SPINACH

DOWNY MILDEW - Peronospora effusa (Grev.) Rabh.

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

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

ANTHRACNOSE - Colletotrichum Spinaciae Ell. & Halst.

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

SQUASH

GREY MOULD - Botrytis cinerea Pers.

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

SWEET CORN

SMUT - Ustilago Zeae (Beckm.) Unger

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

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

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

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

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

SWISS CHARD

MOSAIC - Virus

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

TOBACCO

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

(1) Seed Bed

DAMPING-OFF - Pythium de Baryanum Hesse

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

BLACK ROOT ROT - Thielavia basicola Zopf

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

(2) Field

MOSAIC - Virus

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

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

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

BLACK ROOT ROT - Thielavia basicola Zopf

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

WILDFIRE - Pseudomonas Tabacum (Wolfe & Foster) Stev.

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

BROWN ROOT ROT - Cause unknown

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

CURLY DWARF - Virus

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

PHYSIOLOGICAL LEAF SPOT

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

FROST

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

HAIL

In Western Ontario there was considerable damage early in August.

WIND

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

DROUGHT and SUNBURN

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

TOMATO

BLOSSOM-END ROT - Non-parasitic

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

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

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

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

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

MOSAIC - Virus

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

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

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

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

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

STREAK- Virus

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

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

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

SPOTTED WILT - Virus

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

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

LEAF MOULD - Cladosporium fulvum Cke.

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

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

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

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

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

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

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

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

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

LATE BLIGHT - Phytophthora infestans (Mont.) de Bary

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

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

LEAF SPOT - Septoria Lycopersici Speg.

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

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

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

WILT - Fusarium sp.

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

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

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

WILT - Verticillium sp.

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

BUCKEYE ROT - Phytophthora terrestria Sherb.

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

BREAKDOWN - Physiological

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

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

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

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

GREY MOULD - Botrytis sp.

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

HAIL

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

ROOT KNOT - Heterodera marioni (Cornu) Goodey

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

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

TURNIP

CLUB ROOT - Plasmodiophora Brassicae Woron.

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

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

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

BROWN HEART - Non-parasitic

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

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

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

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

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

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

DRY ROT - Phoma Lingam (Tode) Desm.

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

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

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

VEGETABLE MARROW

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

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