

### III. DISEASES OF VEGETABLE AND FIELD CROPS

#### ASPARAGUS

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

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

#### BEAN

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

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

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

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

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

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

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

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

#### BEET

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

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

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

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

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

#### BRUSSELS SPROUTS

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

CABBAGE

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

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

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

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

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

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

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

CARROT

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

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

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

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

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

#### CAULIFLOWER

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

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

#### CELERY

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

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

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

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

EARLY BLIGHT (Cercospora Apii) heavily infected and caused

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

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

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

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

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

#### CHINESE CABBAGE

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

#### CUCUMBER

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

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

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

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

#### EGG PLANT

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

#### HORSE RADISH

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

#### KALE

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

#### LETTUCE

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

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

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

BOTRYTIS ROT (Botrytis cinerea) caused heavy damage in a

plot at Charlottetown, P.E.I.

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

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

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

### ONION

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

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

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

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

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

### PARSLEY

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

### PARSNIP

EARLY BLIGHT (Cercospora Pastinacae) severely infected half

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

PEA

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

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

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

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

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

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

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

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

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



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

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

### POTATO

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

FLEA BEETLE INJURY. The so-called Flea Beetle injury was quite common on potato tubers in the middle and southern sections of N.B. Injured tubers are characterized by smooth or cankerous swellings or pimples, apparently located at the lenticels. Occasionally superficial tunnel marks are also present on the tuber surface. At the point where the swellings occur, a cavity extends into the tuber flesh or cortex to a depth of about  $\frac{1}{4}$  inch. Such cavities are walled off by cork layers, which appear as thorn-like projections when the potato is sectioned. (J.L. Howatt).

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

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

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

#### RADISH

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

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

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

#### RHUBARB

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

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

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

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

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

#### SALSIFY

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

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

#### SPINACH

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

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

#### SQUASH

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

#### SWEET CORN

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

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



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

### TOBACCO

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

#### (1) Seed Bed

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

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

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

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

#### (2) Field

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

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

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

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

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

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

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

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

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

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

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

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

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

TOMATO

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

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

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

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

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

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

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

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

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

Ont. It was found in 7 plantings in Que. The heaviest infection was in two  $1\frac{1}{2}$ -acre fields on Isle Bizard, where the foliage dried up and the crop was almost a total loss; tomatoes had been grown on the same land the two previous years. It caused slight to moderate damage in P.E.I.

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

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

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

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

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

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

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

#### TURNIP

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

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

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

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

BLACK ROT (*Phytophthora campestri*) slightly infected the varieties grown at Macdonald College, Que.

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

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

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