III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

RUST (Puccinia Asparagi) caused slight to moderate damage in the Horticultural plots, Saskatoon, Sask. It was worse than for several years (T.C. Vanterpool). It was severe at Davidson and Indian Head. Rust was general in the vicinity of Winnipeg, Man., and the infection was severe, but it was not observed in other parts of the province. Rust was severe on susceptible varieties in Lincoln county, Ont., the tops being practically dead by the middle of September. (J.K. Richardson)

WILT and CROWN ROT (Fusarium sp.). A trace was present in the Horticultural plots, Saskatoon, Sask.

YELLOWING and FOOT ROT (Fusarium spp. associated). Odd plants were severely affected at Morden, Man. The disease is striking as the whole plant turns prematurely yellow. Examination shows the presence of a severe foot rot. Odd plants were also found affected at Brandon and Fort Garry.

FASCIATION was rather common at Morden, Man. It was also noted at Ste. Anne de la Pocatiere, Que.

BEAN

MOSAIC (virus) affected 50% of the plants in a garden at Saskatoon, Sask., and a trace occurred at Scott. A slight infection was present in pole beans at Morden, Man.

ANTHRACNOSE (Colletotrichum Lindemuthianum). A trace to a slight infection was observed on several varieties at Olds, Alta. Fifty-one fields of Brittle Wax and Pencil Pod grown for seed were inspected twice in the growing season. They were located at St. Eustache, Lanoraie, Lacole and St. Valerien, Que. Seven fields were affected, infection varying from 5-10% (E. Lavallee). The disease was much more prevalent in the heavy sowing than in the light at Lennoxville, although only a trace occurred in either plot of Hudson Wax x Stringless Refugee Ott. 5017. Anthracnose was severe on some garden varieties at Ste. Anne de la Pocatiere, but not more than a trace was recorded in field beans. It was severe in York and Westmoreland counties, N.B., but not at the Fredericton Station. Anthracnose was general and quite severe in most fields and gardens about Kentville, N.S. In a few gardens the entire crop was destroyed. (J.A. Boyle)

BACTERIAL BLIGHT (Phytomonas Phaseoli). Several varieties were moderately to severely affected at Brooks, Olds, Medicine Hat, and Lethbridge, Alta. The Associated Seed Growers with headquarters at Brooks, are not able to grow beans successfully in Alberta on account of bacterial blight. It was estimated by an officer of the Association that the farmers lost $25,000 and the industry an equivalent amount on the 500 acres of beans planted in the irrigated areas of southern Alta. in 1938.

Bacterial blight was severe in a few cases in Saskatoon, but it was not as common as usual. Specimens were received from Fleming and Allan. The disease was severe in 7 and slight in 3 of the 10 fields visited. One variety was severely affected at Morden and a slight infection occurred at Brandon, Man. It was also severe on White Paris pole beans at Morden. Diseased plants were received from Kingston, Ont.

In Western Que. bacterial blight is a very troublesome disease. Out of 51 fields inspected, all but one were more or less infected. Infection was as follows: 1-10% in 11 fields; 10-25% in 20; 25-50% in 12, and 50% and over in 7. Fields with well spaced rows were the cleanest again this year; fields with seed sown in hills were less diseased than those where the seed was sown in rows, although some hills were severely attacked (E. Lavallee). It destroyed 25% of the pods in a garden at Pont Rouge and traces occurred on Burbank and Navy field beans. Bacterial blight was severe on Golden Wax and slight on Refugee at Port Elgin and Sackville, N.B., where beans are being grown for canning (S.F. Clarkson). Gardens at Kentville, N.S., showed less injury than in 1937, due to a slower spread from the original points of infection. Traces to 1% infection occurred in gardens at Charlottetown, P.E.I.

RUST (Uromyces appendiculatus) caused considerable damage to two plantings at Pitt Meadows, B.C. (J.W. Eastham). Three varieties of pole beans were very heavily infected after the crop was harvested at Kentville, N.S.

GREY MOULD (Botrytis cinerea). Leaf and pod infections were observed at Kentville, N.S. The disease in combination with anthracnose and sclerotial rot caused moderate defoliation. About 15% of the pods were also affected.

SCLEROTIAL ROT (Sclerotinia sclerotiorum) rotted about 5% of the pods in a garden at Kentville, N.S., where the plants were rank and closely planted.

BEET

CERCOSPORA LEAF SPOT (C. beticola) moderately infected beets in a garden near Winnipeg, Man. Other reports were: slight infection at Ste. Anne de la Pocatiere, Que.; moderate at Kentville, N.S., and heavy at Charlottetown, P.E.I. It was also noted at Souris.

BLACK LEG (Phoma Betae). A slight leaf infection was recorded at Morden, Man.

SCAB (Actinomyces scabies). Traces of scab were seen in gardens and on roots at the market at Charlottetown, P.E.I.

CROWN GALL (Phytomonas tumefaciens) was fairly general in a garden at Langley Prairie, B.C.

CANKER or DRY ROT (non-parasitic) was found this year at Courtenay and Milner, B.C. It was rather serious in the latter area for the roots were unmarketable. The condition was less at one grower's, who applied boron. The disease is considered physiological, but sometimes it is followed by Phoma infection. It has been observed from 1934 onwards. (W. Jones)

CABBAGE

CLUB ROOT (Plasmodiophora Brassicae) was very severe and destructive in many cabbage and cauliflower fields in Laval county, Que. Some crops were a total loss. Several home gardens were also affected (E. Lavallee). A small field of cabbages were almost a total loss at Charny (C. Perrault). Club root was reported from several gardens at Kentville, N.S.; infection ranged from a trace in some to 50% in one garden (J.A. Boyle). The disease was troublesome this year in Queens and Kings counties, P.E.I. Infection ranged from a trace to 40%.

SCLEROTIAL ROT (Sclerotinia sclerotiorum) affected a few heads at the Saanichton Station, B.C. It also rotted a few heads in a garden near Winnipeg, Man.

BLACK ROT (Phytomonas campestris). A single specimen was brought to the St. Catharines Laboratory by a grower from Middlesex county, who claims the disease is causing severe damage in his district (J.K. Richardson). A specimen was received from Cap Rouge, Que.

FUMIGATION INJURY was considerable on seedling plants on Mar. 2, at a greenhouse in Lincoln county, Ont.

CARROT

YELLOWS (virus). About 5% of the plants were affected with yellows in a 10-acre field in Queens county, N.B. According to the owner infected carrots do not keep well and are useless for seed production. Yellows seems to be on the increase and occurs also in York and Sunbury counties. (J.L. Howatt). Yellows affected 10% of plants in a garden plot at Auburn, N.S.

LEAF BLIGHT (Macrosporium Carotae) caused considerable loss of foliage in some commercial fields in Annapolis county, N.S. It was also found at Kentville, but it caused no appreciable damage. This is the first report of the disease in Nova Scotia. (J.F. Hockey)

BACTERIAL BLIGHT (Phytomonas Carotae Kendr.). A slight infection of bacterial blight (Kendrick, J.B. Bacterial blight of carrot. Jour. Agr. Res. 49:493-510. 1934) was present at Brandon, Man., on varieties Chantenay and Touchon; a trace was also observed in East St. Paul. The pathogen was identified by Dr. W.A.F. Hagborg. The disease was first found at Brandon in 1935. This is the first Canadian report of the disease. (W.L. Gordon)

WILT and ROOT ROT (Fusarium spp.). Odd plants particularly of the variety Chantenay (Ottawa strain) were affected at Brandon, Man. A few plants were also injured in a garden at St. Vital. Fusarium spp., incompletely identified, were isolated from the Brandon specimens. (W.L. Gordon)

SCLEROTIAL ROT (Sclerotinia sclerotiorum) caused considerable damage in storage at Cotton Wood, B.C. It was reported by a University extension officer to have caused severe rotting of carrots in storage in two farms in Brooksby district, Sask. It was severe in 1937 also. This disease is usually uncommon as a severe storage rot in Sask. (T.C. Vanterpool). It destroyed 10% of the carrots in a 5-barrel lot from a garden at Kentville, N.S. (J.A. Boyle)

CAULIFLOWER

CLUB ROOT (Plasmodiophora Brassicae) completely destroyed the cauliflowers in a garden at Charny, Que. (C. Perrault). It destroyed 50% of the plants in one garden at Kentville, N.S., and it was also observed in several other gardens (J.A. Boyle). Club root affected a trace to 10% of the plants in gardens at Charlottetown, P.E.I.

WIRE STEM (Rhizoctonia Solani) has become a serious disease in the cauliflower seed beds in the Montreal district, Que. Cauliflower seems to be more susceptible than cabbage. (E. Lavallee)

WHIPTAIL (non-parasitic). Although this trouble can be found in most cauliflower fields of the Montreal district, Que., a few fields at Ste. Dorothee were particularly affected (E. Lavallee)

SOFT ROT. During July and early August cauliflowers were severely affected by a soft rot in the Montreal district, Que. The trouble was attributed to excessive heat and high air humidity. (E. Lavallee)

BLACK ROT (Phytomonas campestris) severely affected 50% of the plants in a five-acre field at St. Laurent, Que. (E. Lavallee)

CELERY

LATE BLIGHT (Septoria Apii). A slight to moderate infection was recorded at Lethbridge, Alta. Late blight was severe in patches in one garden and moderate in another in East St. Paul, Man. It was moderate in a garden in St. Vital.

Late blight (S. Apii-graveolentis) was moderately severe in hotbeds and traces already occurred in the field on June 15 at Cyrville, Ont. (H.N. Racicot). Early and late blight developed very heavily on early celery which had not been sprayed at Vineland Experimental Station (D.L. Bailey). The disease appeared to be more severe this year in Lincoln county than in 1937 and more difficult to control when established. (J.K. Richardson)

Through improved spraying methods, commercial celery fields were less infected in the Montreal district, Que., than last year. However, small plantings, where no spraying was done, were heavily

infected (E. Lavallee). It was severe in a field at Lennoxville, Que., where spraying began only after the celery had been transplanted for a week (H.N. Racicot). A moderate infection developed at Charlottetown, P.E.I.

EARLY BLIGHT (Cercospora Apii) was severe at Middlechurch, Man.; moderate at Morden, and slight at Fort Garry. The development of the two blights appeared to be simultaneous and was heavy at Vineland Experimental Station (D.L. Bailey). In the Montreal district, Que., the only field heavily infected with early blight was at Ste. Dorothee. For the third successive year this field has been severely attacked. Traces were observed in 6 other fields (E. Lavallee). A slight infection occurred on sprayed plants which had been boarded for early blanching at Kentville, N.S. (J.F. Hockey)

SOFT ROT (Erwinia carotovora). Several samples were received from Middlesex county, Ont., but no mention of its prevalence was made. (J.K. Richardson)

STEM CRACKING (boron deficiency). Quite a quantity of heads were so severely affected in Middlesex county, Ont., as to be unsaleable (J.K. Richardson). It was observed in a few fields in Laval county, Que. Some growers did not apply boron as a preventative measure. (E. Lavallee)

HEART ROT (unknown) was very severe in all celery fields of the Montreal district, Que. Losses varied from 50% to a total loss. This trouble is attributed by some to bad water relations and by some entomologists, to tarnished plant bug injury. The population of this insect was high in the diseased fields and in the one field that was free from heart rot the bug was absent. (E. Lavallee)

CRESS

WHITE RUST (Cystopus candidus) was collected once at Saskatoon, Sask., on garden cress, Lepidium sativum.

CUCUMBER

BACTERIAL WILT (Erwinia tracheiphila) was not severe this year in the Montreal district, Que., although it was found in a few fields. (E. Lavallee)

WILT. About 1% of the plants wilted in a garden; a few plants were affected in a greenhouse in St. Vital, Man. Odd plants of the varieties Davis Perfect and National Pickle also wilted at Brandon. Fusarium spp. were associated with the Brandon material. (W.L. Gordon)

VERTICILLIUM WILT. Concerning the possible occurrence of Verticillium wilt in cucumbers in Ontario, Dr. G.H. Berkeley wrote: "I have observed Verticillium wilt on cucumbers in a greenhouse where cucumbers were used to fill in where tomato plants had been removed because of wilt or streak in the tomato plants. Also in one other case a crop of tomatoes was put in a new section of a greenhouse in soil that had grown cucumbers just before the erection of the greenhouse. There was a high percentage of Verticillium wilt in the tomatoes in that part only of the greenhouse where the cucumbers had been grown.

FRUIT ROT. Pythium sp., Fusarium Scirpi and F. Scirpi var. acuminatum were isolated from decayed fruits from Morden, Man., and were able to induce decay separately when inoculated through wounds. Most rapid decay was caused by the Pythium sp. The fruit rot followed damage due to hail. (W.L. Gordon)

SCAB (Cladosporium cucumerinum). Two fields were heavily infected at St. Laurent, Que. (E. Lavallee). Scab was severe on 25% of the fruit and present on another 50% of the crop in a greenhouse at Halifax, N.S. The foliage was also moderately spotted (J.F. Hockey). It was reported in several gardens at Charlottetown, P.E.I.

SCLEROTIAL ROT (Sclerotinia sclerotiorum). Diseased material was received from Mr. G.R. Thorpe, in charge of the Creston Sub-Station, B.C. The disease appeared on plants in the greenhouse (G.E. Woolliams). A slight infection was found in a greenhouse at Medicine Hat, Alta.

MOSAIC (virus). A slight infection was found on wild cucumber, Echinocystis lobata, at Edmonton, Alta. (A.W. Henry)

EGGPLANT

BLIGHT (Phomopsis vexans). Diseased specimens were brought in by a grower at Fenwick, Ont. He reported that 5 acres of crop were almost a total loss. At the Vineland Experimental Station the disease was present as scattered leaf infections as well as

on the fruit (D.L. Bailey). It affected 80% of the fruits at Macdonald College, Que. (J.G. Coulson)

WILT (Fusarium sp.) In one garden in Fort Garry, Man., 15% of the plants wilted and in another in St. Vital, 35% were affected. Fusarium Scirpi was isolated from the latter material. (W.L. Gordon)

DOWNY MILDEW (Pseudoperonospora Humuli). Some basal spike infection was found during the early growing period at Sardis, Sumas, and Agassiz, B.C. Dry weather inhibited development during the season and damage was only slight. Mr. J.W. Eastham found some diseased spikes on escaped hops along the roadside near Nelson. This is the first record from the Kootenay district. A few basal spikes were located in the spring in a newly established yard near Kamloops. (W. Jones)

CHLOROSIS (virus) is present on the Golding variety in the commercial hop yards of B.C. Plants are being continually rogued out. Symptoms of the disease have been found on varieties introduced from England. In Sardis it was observed on Brewers Favourite, Brewers Gold, and East Kent Golding. (W. Jones)

HORSE RADISH

LEAF SPOT (Ramularia Armoraciae). One patch was severely infected at Edmonton, Alta.

LETTUCE

DROP (Sclerotinia sclerotiorum) was moderate to severe in gardens at Edmonton, Lacombe and Olds, Alta. It was severe in plantings gone to seed in one garden and on the early crop in another in St. Vital, Man.

TIP BURN (non-parasitic) was severe in a crop of Big Boston in Lincoln county, Ont.

MELON

BACTERIAL WILT (Erwinia tracheiphila) caused slight damage in Essex county, Ont. (L.W. Koch). In two fields at St. Angele, Que., wilt caused at least 30% damage. A few fields were slightly infected in Laval county. (E. Lavallee)

LEAF BLIGHT (Macrosporium cucumerinum). A field of about 6 acres was virtually defoliated in Wentworth county, Ont. The chief damage was in the premature ripening resulting in poor flavour. Other fields in the immediate vicinity were much less heavily infected with practically no defoliation. (D.L. Bailey)

ANTHRACNOSE (Colletotrichum lagenarium) occurred in epidemic proportions in nearly all melon plantings in the Leamington district, Ont. The disease was present to a lesser extent in all plantings examined in other districts. (L.W. Koch)

WILT (Fusarium sp.) Citrons were moderately damaged by F. bulbigenum var. niveum in a market garden near Edmonton, Alta.

A wilt of muskmelons was more or less destructive at Morden, Man. A number of Fusarium spp. were isolated, but are not fully identified as yet. (W.L. Gordon)

Wilt (F. bulbigenum var. niveum) affected 5% of the vines in a field in Wentworth county, Ont. The trouble was reported by the grower at picking as a stem-end rot. Fusarium was fruiting abundantly on the stem end of the fruits and they were found attached to wilted vines. (D.L. Bailey)

STEM-END ROT. A rot of cantaloupe originating at the stem end was found on the market at Winnipeg, Man., in Oct. 1938. Isolations yielded primarily, a fungus as yet unidentified, Fusarium Scirpi, and F. sambucinum. (W.L. Gordon)

FRUIT ROT developed at Morden, Man., on odd fruits of honey dew melons following hail injury. Isolations from diseased fruit yield at bacterium, two apparently different Alternaria spp., and Pythium sp. All were pathogenic when inoculated separately, particularly the bacterium and Pythium. (W.L. Gordon)

ONION

DOWNY MILDEW (Peronospora Schleideniana) appeared suddenly the first week in July in a field of Yellow Globe in Kent county, Ont., and in a very few days the leaves were severely blighted. The plants recovered to some extent, but the yield was seriously reduced (J.K. Richardson). It caused considerable damage to onions grown from sets on the Pelee marshes. (J.E. Howitt)

BLACK MOULD (Aspergillus niger) caused severe damage to onions placed in storage in Essex and Kent counties, Ont. (L.W. Koch)

NECK ROT (Botrytis Allii) was injurious in a seed planting on part of a field previously planted to onions in St. Vital, Man. One per cent of neck rot was noted in a lot at Charlottetown, P.E.I.

LEAF SPOT. Some stalks of shallots were severely infected at Morden, Man. An associated Alternaria sp. appeared to be the cause.

SOFT ROT (Erwinia carotovora). Some loss from soft rot was reported in Essex and Kent counties, Ont., after onions had been in storage for a time (L.W. Koch). A carload of onions from Leamington, Ont., showed 8% of the onions affected on arrival at New Glasgow, N.S. (D.B.O. Savile)

BRITTLE (Fusarium sp.). A trace was found by Prof. J.E. Howitt in a planting in the Humberstone marsh, Port Colborne, Ont. The symptoms agree with the description given by Chupp, (C. Chupp. Manual Veg. -Garden Diseases, p. 304, 1925) and a Fusarium sp. was isolated from the affected plants (J.K. Richardson)

PARSNIP

MOSAIC (virus). A few plants apparently affected by mosaic were seen in a field at Middlechurch, Man.

LEAF SPOT (Cylindrosporium crescentum) was severe in a field at Middlechurch, Man. The parasite apparently hibernated in escaped plants at the edge of the field. A slight infection was also present at East St. Paul and St. Vital.

WILT and ROOT ROT. A small patch of plants were definitely wilted with the lateral roots rotted in a field at Middlechurch, Man. Fusarium spp. were isolated, but are not yet identified. (W.L. Gordon)

PEA

POWDERY MILDEW (Erysiphe Polygoni) was severe in one small patch sown earlier and thicker than the rest at the Windermere Station, B.C. It was severe at Rosedale, Alta., and slight to moderate at Edmonton. Powdery mildew was severe at Gonor, East St. Paul, St. Vital and St. Norbert, Man., during August.

Powdery mildew was reported by L. Verret, inspector, to be the most destructive disease in the Gaspe pea district, Que., this year (E. Lavallee). Trace to heavy infection was reported at Ste. Anne de la Pocatiere, Que., and Charlottetown, P.E.I.

LEAF and POD SPOT (Ascochyta Pisi) was moderate to severe in several gardens at Edmonton, Alta. It was rather severe in field peas at Olds. A trace to slight infection occurred on late peas in gardens at Saskatoon, Sask.

About 30 fields were examined in the Gaspe area, Que., in August. At that time the disease was observed in every field, but in none had it caused any damage as yet (C. Perrault). In an acre field near Kentville, N.S., 10% of the pods were unmarketable and 25% were affected on July 2 (J.A. Boyle). It was also noted at Charlottetown, P.E.I.

RUST (Uromyces Fabae) slightly infected many canning pea fields about Ste. Martine, Que. (E. Lavallee). It was recorded at Ste. Clothilde, Abbotsford, Cap Rouge, Ste. Anne de la Pocatiere, and at New Carlisle. There appeared to be some difference in varietal behaviour. Traces of rust were seen in Prince county, P.E.I.

BACTERIAL BLIGHT (Phytomonas Pisi). A slight infection was found at Brooks, Alta.

ROOT ROT. Traces of root rot (?Fusarium sp.) were present in 3 out of 16 varieties of field peas at Ste. Anne de la Pocatiere, Que. Root rot (Rhizoctonia Solani) was severe in Ryders Universal at Charlottetown, P.E.I.

WILT (cause unknown) was severe in one garden at Gonor, Man., August 19.

DOWNY MILDEW (Peronospora Pisi) was fairly general and caused slight damage at the Sidney Station, B.C. (W. Jones)

LEAF BLOTCH (Septoria Pisi) was prevalent on garden peas at the Abbotsford Station, Que. A trace occurred at Cap Rouge. It caused some reduction in yield in one garden at Charlottetown, P.E.I.

PEPPER

MOSAIC (virus) was found affecting plants in patches at St. Vital, Man.; infection was moderate.

WILT (Fusarium Scirpi associated) affected a few plants in low spots in a field in St. Vital, Man.

FRUIT ROT. A few fruits were rotted at Morden, Man. An Alternaria sp. was isolated (W.L. Gordon).

POTATO

Mr. John Tucker, Chief Potato Inspector, Plant Inspection Division, Production Service, has provided the usual tabulations on the extent of the seed potato industry, the acreages of the leading varieties passing inspection, the extent that fields failed to pass inspection, and the average percentage of the three diseases: black leg, leaf roll, and mosaic. All fields entered for certification are planted with certified seed.

Table 2 - Seed Potato Certification: Number of Fields and Acres Inspected, 1938.

Province	Number of Fields		Fields Passed %	Number of Acres		Acres Passed %
	Entered	Passed		Entered	Passed	
P.E.I.	4,354	3,418	78.5	17,656	14,120	80.0
N.S.	627	478	76.2	1,311	1,065	81.2
N.B.	3,188	1,842	57.8	15,054	9,374	62.3
Que.	1,035	506	48.9	1,540	600	38.9
Ont.	937	751	80.1	1,899	1,533	80.7
Man.	121	109	90.1	273	221	80.9
Sask.	191	177	92.6	258	230	89.1
Alta.	261	212	81.2	355	268	75.3
B.C.	291	242	83.1	479	406	84.7
TOTAL	11,005	7,735	70.3	38,825	27,817	71.7

Acres Entered		Acres Passed	
1937	30,378	1937	25,711
1938	38,825	1938	27,817

Increase of 8,447 acres or 27.8%

Increase of 2,106 acres or 8.2%

Table 3 - Seed Potato Certification: Acreages passed by Varieties, 1938.

Variety	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.-B.C.	Total
Green Mountain	5,540	107	6,984	519	129	66	13,345
Irish Cobbler	8,181	207	264	47	261	58	8,998
Bliss Triumph	292	583	1,452			7	2,334
Katahdin	111	121	463	21	638	1	1,355
Netted Gem					4	497	501
Rural New Yorker				1	356		357
Warba		1	1		63	131	196
Spaulding Rose	11		184				195
Early Ohio						167	167
Chippewa		2	13		71	36	122
Gold Nugget					6	33	39
President		16	10				26
Garnet Chile		26					26
Early Rose		1		4		6	11
Others	5	1	3	8	5	123	145
TOTAL	14,120	1,065	9,374	600	1,533	1,125	27,817

The acreage planted for certification was substantially enlarged for the second successive year. It has increased from 20,083 acres in 1936 to 30,378 acres in 1937 and 38,825 acres in 1938. The acreage passing inspection has not kept pace due to severe outbreaks of disease, chiefly in Que. and N.B. Bacterial wilt and rot has been prevalent in Que. for several years, while the presence of other diseases, particularly mosaic, has caused the rejection of more fields than in the other provinces. Leaf roll was epidemic in N.B. in 1938 and accounted for three-quarters of the rejections in the province (Table 4). Its incidence was also very high since upon first inspection the average leaf roll infection was 4.4%. In the other provinces mosaic continued to be the major cause of rejection, so that for the Dominion as a whole, the presence of mosaic and leaf roll in excess of the amounts permitted, caused the rejection of over 1,000 fields for each disease, or the two virus diseases combined, caused 63.1% of all the rejections. The acreage of Green Mountain passing inspection was again increased, but more important was the increase in Katahdin, which would have been much larger but for bacterial wilt and rot.

Table 4 - Seed Potato Certification: Fields Rejected, 1938

Province	Mosaic	Leaf Roll	Black Leg	Bacterial Wilt & Rot	Foreign Varieties	Adjacent Diseased Fields	Misc.	Total
P.E.I.	597	8	11	7	79	114	120	936
N.S.	69	22	2	0	14	19	23	149
N.B.	178	935	8	81	8	71	65	1,346
Que.	195	13	15	187	4	34	81	529
Ont.	8	12	19	4	34	8	101	186
Man.	0	0	4	0	2	1	5	12
Sask.	1	2	2	0	4	1	4	14
Alta.	0	6	15	4	7	7	10	49
B.C.	10	6	1	0	5	16	11	49
TOTAL	1,058	1,004	77	283	157	271	420	3,270
Rejections as a percentage of fields:								
Entered	9.6	9.1	0.7	2.6	1.4	2.5	3.8	29.7%
Rejected	32.4	30.7	2.4	8.6	4.8	8.3	12.8	100.0%

Table 5 - Seed Potato Certification: Average Percentage of Disease found in the Fields, 1938

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	.09	.02	.3	.06	.15	.24	.15	.30	.05
Leaf Roll	.06	.50	4.4	.20	.12	.01	.07	.14	.42
Mosaic	1.11	1.37	1.2	1.26	.09	.04	.15	.01	.52
Fields passed (final inspection)									
Black Leg	.03	.01	.1	.04	.09	.10	.02	.06	.01
Leaf Roll	.02	.37	.2	.28	.08	.01	.01	.01	.11
Mosaic	.14	.49	.1	.48	.04	.04	.03	.01	.06

LATE BLIGHT (Phytophthora infestans) was found in most of the potato areas in the Fraser valley, B.C., this year and also in several districts on Vancouver island. It did not appear as early in the season nor was it as severe or widespread as in 1936 and 1937. It was first observed on July 26, the latest date in the 3 years. Moreover, rainfall was less in the 1938 season than in the other two years. Late blight damage to the foliage caused an estimated reduction in yield of marketable potatoes of 4% as compared to a 15% loss in 1937.

Most of the potatoes were harvested while the weather was fine and the soil dry. In a few late fields late blight was severe and affected up to 10% of the tubers. In general late blight rot did not cause a loss of over 1.5% of the tubers in B.C.

Spraying potatoes for late blight is not yet general in B.C. as many growers think the loss is insufficient to justify the trouble and expense. However, the number who spray following our recommendations are increasing and where spray is applied properly with an efficient machine, good results are obtained. In our spraying experiment on Lulu island this year, the sprayed plots yielded an average increase of 15% in marketable potatoes over that of the unsprayed check plots, while late blight rot in the tubers was 0 and 1%, respectively. Bordeaux gave the best results, although several other sprays were fairly satisfactory, while copper lime dust was about half as effective as Bordeaux. (H.S. MacLeod)

Late blight was found in practically all sections of Ont., where late potatoes are grown. Damage this year was comparable to that suffered from the general infection in 1928 (O.W. Lachaine). To judge from samples received at Ottawa, the loss wass considerable and extended well into Northern Ont. (H.N. Racicot)

Late blight was found in all potato areas in Que. It was recorded in the Three Rivers district on July 16, the earliest date on record. In some parts of the province, it spread very rapidly and many fields were severely attacked. Defoliation in some cases caused 40% reduction in yield of marketable potatoes. In the lower St. Lawrence district late blight was first observed about August 15, but it was of little consequence until September, when an outbreak developed to cause considerable loss, the worst ever experienced in that section. Tuber infection for the province ranged from a trace to 90%, the average loss being about 12%.

In a trial to determine the behaviour of a number of potato varieties to late blight at St. Arsene, the potatoes were planted on good, well fertilized soil and were sprayed twice for insects, but no fungicide was applied. Of 17 varieties under trial, Arran Consul, Garnet Chile, Conard, Arran Chief, and Prolific were but slightly affected by late blight, while Green Mountain, Chippewa, Dunbar Yeoman, and Bally Doon were some of the worst affected. It may be noted that Dunbar Yeoman and Bally Doon are as susceptible to late blight in Que. as they are in Ireland, while Arran Consul, Arran Chief and Donard are fairly resistant in both, if the Que. results are comparable with those published by W.D. Davidson, Dublin, Ireland, in his book, "Potato Growing for Seed Purposes".

Spraying for late blight in Que. is not a general practice, but many growers agree that spraying is desirable. Very good results were obtained in Matane, Rimouski, Temiscouata, L'Islet, Chicoutimi, and other counties, where the spraying was properly done with a good machine. (B. Baribeau)

Late blight was present in all fields in N.B. It was first observed about July 15 and became severe as the season advanced. In some fields a loss of half the crop was reported, and a high percentage of rot was found in the tubers from fields that were not properly sprayed. The highest percentage on record was 65%. From tuber inspection reports on 500 bins of certified seed in Carleton and Victoria counties an average of 2% of rot was recorded. (C.H. Godwin)

Late blight was found in Colchester county, N.S. on July 28, and in Kings county on July 30. By August 15 it had become general and more or less severe in all potato growing sections of the province.

In spite of heavy and frequent rains, which kept the ground sodden and hindered spraying, good yields were produced, but there were heavy losses from rot. Fields in which 60% of the tubers rotted were not uncommon in Cumberland, Colchester, and Pictou counties. Green Mountain, Irish Cobbler, and Bliss Triumph were all severely affected, but late blight was not found in Katahdin before Aug. 10 and rot was slight. Tuber rot averaged 1.2% in certified seed, but in Bliss Triumph the loss was 10% due to rot aggravated by premature handling.

The effects of thorough spraying were more evident than usual. Many large fields sprayed seven times were practically free from rot. (W.K. McCulloch)

Late blight was general in P.E.I. and losses ranged from a little or no decrease in yield in well sprayed fields to a 30-40% reduction in fields that had not been sprayed. Late blight first appeared at Charlottetown on July 29, more than a month earlier than in 1937. Reports indicate that it reached the western end of the Island sometime earlier and the eastern portion somewhat later than this date. In August the mean temperature was 67°F., rain fell on 12 days and many others were overcast. Thus conditions were favourable for the rapid development and spread of the fungus. By August 15 severe leaf infection was general and before August 31, many fields were dead in western P.E.I. This early killing of the tops coupled with the fact that planting had been delayed in many instances until late in June due to rainy weather resulted in a marked reduction in the yield of marketable tubers.

It was estimated that the average loss from tuber rot was not less than 10% of the total yield. Due to rot being prevalent in seed stocks upon bin inspection, many growers were forced to delay shipment to allow time for the development of decay and subsequent sorting and grading.

Results from spraying were disappointing due in most instances to poor machinery or inefficient spraying methods. In seasons, such as 1938, infrequent spraying and poor equipment have proven to be a false economy and more competent methods of applying Bordeaux will have to be adopted. (E.H. Saunders)

RHIZOCTONIA (Corticium Solani (Rhizoctonia Solani) was quite prevalent on the plants in B.C., but it was less severe than usual. Sclerotial development on the tubers also appears to be less than usual. No conclusive results were obtained in our seed treatment experiment (H.S. MacLeod). Rhizoctonia was fairly prevalent in Sask. and Man.; tubers were freer of sclerotia than usual, probably because the vines were not frozen down before the potatoes were harvested. (J.W. Scannell)

A slight infection of rhizoctonia was common in the field in Que., while tuber infection ranged from a trace to 90% (in St. Maurice county). The average infection was 4% (B. Baribeau). Inspection reports of 500 bins in Carleton and Victoria counties, N.B., gave an average tuber infection of 4.6% for rhizoctonia (C.H. Godwin). The disease was more severe than usual in N.S. All varieties were affected, but it was most severe on Katahdin. An average of 8% of the Katahdin plants showed aerial tuber symptoms by August 20, and were almost a complete loss. The

average percentage of tubers showing sclerotia was Colchester county, 7.5%; Kings, 6.3%; Cumberland, 4.0% and Pictou, 1.4%. (W.K. McCulloch). Practically every field showed up to 5% of the plants affected by rhizoctonia in July in P.E.I., and in several fields every plant was affected. The leaves were often severely rolled and a purplish colour and aerial tubers were abundant. Stolons and underground parts showed severe lesioning. Sclerotia were less common than usual on the tubers, although an occasional bin showed 50% of the tubers affected. (R.R. Hurst and S.G. Peppin)

BLACK LEG (Erwinia phytophthora) was found in only 18 fields out of 284 fields of certified seed in B.C.; the percentages present were low (H.S. MacLeod). Climatic conditions were ideal for the development of black leg in the black soils from Lacombe to Edmonton, Alta. Of the fields inspected in the area, 40% showed the presence of black leg and 9 of the 15 fields that failed to pass on account of the disease in Alta. were located here (J.W. Marritt). Black leg was not common in Man. and Sask., but it was severe in 2 fields in Man. (J.W. Scannell)

Black leg is present in Ont., but it appears to be on the decrease (O.W. Lachaine). The disease was found in 212 fields out of 1035 inspected in Que. and resulted in the rejection of 15. In general the percentage of plants affected was small, the highest infection recorded being 5%. The disease was most prevalent in Northern Que. (B. Baribeau). Black leg was particularly noticeable in Katahdin in N.B. In all 8 fields were rejected on account of the disease; 11% was the highest infection recorded (C.H. Godwin). Black leg was less common in N.S. than last year. It was present in 3.5% of the fields this year as compared with 9% in 1937. Bliss Triumph, which comprised about 50% of the total acreage, was again practically free. The highest infection was 6% in a field of Garnet Chile, which was often under water during the growing season. The disease occurred most frequently in Irish Cobbler, but it was not present in fields where the seed had been efficiently treated (W.K. McCulloch). Black leg was more prevalent in P.E.I. than in 1937, probably because of the wet season and the lack of seed treatment. In all, 11 fields were rejected out of 4,354 inspected. (S.G. Peppin)

EARLY BLIGHT (Alternaria Solani) was quite prevalent again in 1938 in B.C., especially in areas near the coast, but it was not nearly as severe nor caused as much damage as in 1937 (H.S. MacLeod). Early blight was a trace to moderate in the variety plots at Olds, Alta. It was present to a limited extent in Sask. and Man. (J.W. Scannell). A trace was present at St. Vital, and a moderate infection occurred at Shoal Lake, Man.

Early blight was widespread in Que. and caused some reduction in yield in certain localities, but in general the infection was slight (B. Baribeau). Early blight was found in a few fields in early July in N.B. (C.H. Godwin). Early blight was first reported on July 19 in Kings county, N.S. A moderate infection occurred in mid-August in all potato districts. Ketahdin was apparently less affected than other varieties. Yields were little reduced due apparently to an abundance of moisture and only a trace of Alternaria rot was seen (W.K. McCulloch). Early blight developed rapidly the first week in August on Irish Cobbler in P.E.I. and caused the premature death of the plants in some sections in early September. On Green Mountain the effects of early blight were showing in late September. A few tubers of Bliss Triumph were sent in showing Alternaria rot (R.R. Hurst). Alternaria rot affected 25% of the tubers in April in a lot of Warba grown in 1937 at Spencerville, Ont. (H.N. Racicot)

BACTERIAL WILT and ROT (Phytomonas sepedonica (Spieckermann & Kotthoff) Magrou). Recently W.H. Burkholder (Am. Pot. Jour. 15:243-245. 1938) studied the disease in and isolated the pathogen from tubers collected in Maine. He concluded that the disease was identical with the bacterial ring rot caused by Bacterium sepedonicum, "which has been known to occur for some time in Europe, especially in Germany". Savile and Racicot (Sci. Agric. 17:518-522. 1937) have already pointed out the close resemblance of the bacterial wilt and rot organism to P. sepedonica, and since the disease in Canada is identical with that in the United States, I have decided to follow Burkholder. The combination Phytomonas sepedonica appears to have been made first by Magrou in Hauduroy et al. Dictionnaire des bactéries pathogènes, p. 411. 1937.

In the United States (Plant Dis. Reporter 22:444-445. Dec. 1, 1938) bacterial wilt and rot has been found in Maine, Florida, Pennsylvania, and Wyoming and it may be present in Colorado. No doubt its occurrence in Maine is the most important.

Bacterial wilt and rot has not been found in B.C., although a sharp look-out has been kept for it (H.S. MacLeod). The disease was found in 4 fields entered for certification and in 19 fields for table stock comprising 87 acres. All were in the Lethbridge district, Alta., and all except one were planted with Netted Gem variety. The latter stock had all originated from a single source. The disease was also found in 1937 in stored tubers. (J.W. Marritt and H.N. Racicot)

Bacterial wilt and rot was found in one lot of Netted Gem at Swift Current, Sask. The seed had been obtained from Lethbridge. It was also observed near Selkirk, Man., by Mr. E.T. Howe, Agricultural Representative, in a small plot planted with seed of Irish Cobbler, that originally came from P.E.I. in 1937. The presence of the disease in the tubers was confirmed at Ottawa. (J.W. Scannell)

The disease was located on 5 farms in Simcoe county, and 4 farms in Dufferin county, Ont. The disease was apparently introduced in Katahdin potatoes in 1936 from N.B., although Irish Cobbler, Green Mountain and Dooley were also found infected. (O. W. Lachaine and H.N. Racicot)

Bacterial wilt and rot is widely distributed in Que., but it appears to be more prevalent in the eastern part of the province. It was found in 187 fields out of 1,035 entered for certification. First symptoms of the disease were observed on many plants in a 2-acre field of Green Mountain on July 6, which was but 42 days after planting. The disease has appeared in some old stocks grown for many years on the same farms; how it has gained entrance into these stocks is unknown. It was observed in President grown as table stock. (B. Baribeau)

Bacterial wilt and rot was found in more fields in N.B. this year than in 1937. Most of the Katadhin variety imported from Maine this season developed the disease. During field inspection the disease was found in 11 fields in Restigouche county, one in York, 48 in Madawaska and Victoria, and 21 in Carleton, a total of 81 fields out of 3,188 entered for inspection. Since field inspections were completed the disease has been reported found on 63 farms in Carleton, Victoria, and Madawaska counties. (C.H. Godwin)

Although suspicious looking specimens have been examined by Mr. J. Tucker and by the Kentville Laboratory, no trace of the disease has been found in N.S. (W.K. McCulloch)

Bacterial wilt and rot was found on 7 farms in a limited area in the Monticello district, P.E.I., but nowhere else. On all the farms it occurred on Irish Cobbler seed stock, except on one farm where it occurred in addition in a field of Green Mountain table stock. (S.G. Peppin and R.R. Hurst)

Bacterial wilt and rot is here reported for the first time in Alta., Sask., Man., Ont., and P.E.I., although it was detected in Alta. in tubers of the 1937 crop.

FUSARIUM WILT (F. sp.). A trace was found in a few fields in Alta. It was quite prevalent in Man., and Sask., although it was not as severe as in 1937. Wilt seems to be on the increase in Ont., being especially noticeable in varieties of the Rural group.

VERTICILLIUM WILT (V. sp.) was not nearly so evident this year in P.E.I. as in the preceding season. Last year 40 fields were rejected, while only 17 were turned down in 1938. Because the summer of 1938 was very wet, symptoms of wilt were not readily detectable and late blight was so severe that most fields of Irish Cobbler were dead by the end of August. It is believed that wilt is on the increase, because considerable wilt infected stock passes inspection, due to the symptoms being undeveloped or masked at the time of inspection and thus it is being spread more and more (G.W. Ayers). Verticillium albo-atrum was isolated from a plant from a garden at Saskatoon, Sask., and the isolate was identified by Dr. G.R. Bisby.

WILT (cause undetermined) affected 5% of the plants in a field at St. Vital, Man. It was reported in small amounts in Cumberland county, N.S. Tubers from affected plants were collected and will be grown next season.

JELLY-END ROT (Fusarium sp.) was found in shipments of potatoes from the interior of B.C., mostly from where the crop was grown under irrigation. The loss was estimated at 1%.

COMMON SCAB (Actinomyces scabies) is not serious on potatoes in B.C., although in some areas it may develop to an appreciable extent. Netted Gem, the main variety in B.C., is highly resistant (H.S. MacLeod). Common scab was slightly more prevalent than usual in Man., and Sask. In the Red River valley, Man., the disease was found in almost every field, although usually it is prevalent only on bush soils. In Sask. the disease occurred in every field, 1 to 75% of the tubers being affected. (J.W. Scannell)

Common scab is most prevalent in Temiscouata and Montcalm counties, Que., although it is present in many counties. Tuber infection ranged from a trace to 60% and averaged 2%. Tuber infection averaged also about 2% in N.B., N.S., and P.E.I. In N.S. it was prevalent on Bliss Triumph and Irish Cobbler, and was less common on Green Mountain and Katahdin.

POWDERY SCAB (Spongospora subterranea) was observed in Gaspe, Megantic, Chicoutimi and Temiscouata counties, Que. It was

most prevalent in Temiscouata. Infection ranged from a trace to 10% and averaged 0.6%. It was noticed in a few lots of seed potatoes in Carleton, Victoria, and Madawaska counties, N.B. Powdery scab was reported only in Kings county, N.S., but it was more prevalent than usual. It was found in 17 fields, mostly Bliss Triumph, out of 150 inspected. Infection ranged from a trace to 15% and averaged 4%. Up to 75% of the tubers were affected in certain parts of a field at West Glenmount, and 5% were unfit for table stock. The disease was reported only once or twice this year in P.E.I.

SILVER SCURF (Spondylocladium atrovirens) was reported a few times last spring in Que., on Irish Cobbler, Green Mountain, and Katahdin. It was present in N.S. to a slight extent last spring. By Nov. 30, a very slight infection was seen particularly on Irish Cobbler.

PHOMA ROT (Phoma tuberosa) caused slight to moderate damage in a bin in the Edmonton district, Alta. The fungus was identified by Dr. G.R. Bisby (G.B. Sanford). Phoma rot was severe in 5 lots of Green Mountain kept at the Charlottetown Laboratory, P.E.I. until April. (R.R. Hurst)

MOSAIC (virus) was found in 95 fields out of 284 inspected in B.C. and was responsible for the rejection of 10. Mosaic was prevalent only in and about Calgary and Edmonton, Alta. A severe infection was reported in a field at St. Norbert, Man. Mosaic was responsible for the rejection of 195 fields or 18% of the total rejections in Que. This figure is about double that for the Dominion. Infection varied in the individual fields from a trace to 20%. In N.B. 178 fields, a slight increase over last year, were refused certification on account of mosaic. Mosaic was found in 68% of the fields inspected in N.S. and caused the rejection of 11%. While mosaic was formerly most severe in Bliss Triumph and Green Mountain, Irish Cobbler was also severely affected this year. It appears with the acreage of Bliss Triumph increasing, that mosaic is gradually increasing in Irish Cobbler. In P.E.I. 597 fields were rejected on account of mosaic in 1938 as compared with 286 in 1937. Better growth, more moisture, and less sunshine than in the dry season of 1937 probably made it easier to detect. Some allowance must also be made for increased acreages.

LEAF ROLL (virus) was present in 126 fields out of 284 inspected in B.C. and was responsible for the rejection of 6. Leaf roll, like mosaic, was prevalent only about Calgary and Edmonton, Alta. Leaf roll was not found to any extent in Sask. and Man. Leaf roll caused the rejection of 13 fields in Que. Infection ranged from a trace to 8%.

A severe outbreak of leaf roll occurred in York, Carleton, and Victoria counties, N.B. Indeed it is the severest outbreak on record. It was responsible for the rejection of 935 fields out of 3,188 entered for inspection. (C.H. Godwin)

Leaf roll was found in 59% of the fields inspected in N.S., and caused the rejection of 22. In one commercial field 90% of the plants were severely affected and the crop was later found to be not worth digging. (W.K. McCulloch)

While only 8 fields were rejected on account of leaf roll in P.E.I., there was a decided increase in the number of leaf-roll infected plants. (S.G. Peppin)

GIANT HILL (virus) was present in 50% of the fields inspected in B.C., but the percentage of affected plants was always small. The odd plant was affected in a few fields in Alta. It was reported in a few fields of Green Mountain in Carleton and Victoria counties, N.B. and in P.E.I. Core grafts using Green Mountain failed to transmit the trouble at Charlottetown, P.E.I. (R.R.Hurst)

SPINDLE TUBER (virus) was found in a few fields in Alta., and generally only a trace was present. It occurred in 13 fields out of 119 in Man. and one field was rejected on account of the disease. A mere trace was found in Sask. It was noted in a few fields in Que. and one was rejected. Spindle tuber was particularly common in Irish Cobbler and some fields of Katahdin in N.B. Fields were found where 5% of the plants were affected and 26 fields were rejected on account of the disease (C.H. Godwin). In P.E.I. 4 fields of Irish Cobbler were rejected due to spindle tuber, and while tuber type was generally poor this year, it is believed that the disease is not on the increase. A number of off-type tubers have been retained for planting in 1939 (S.G. Peppin). In table stock the disease is general and the percentage of affected plants varied from a trace to 25%. (R.R. Hurst)

WITCHES' BROOM (virus) was found in 8 fields in B.C., but the percentage of plants affected was low. A trace was present in a few fields in Alta. A single affected plant was found in a field in Man. A trace was recorded in P.E.I.

YELLOW DWARF (virus) has made its appearance in Ont., in the last few years, but as yet, it has been of little economic importance (O.W. Lachaine). A single affected plant was observed in a 3-acre field of Green Mountain at L'Annonciation, Que. This is the first time it has been found in Que. (B. Baribeau and H.N. Racicot)

PSYLLID YELLOWS. What appears to have been this trouble has been observed in central Alberta with more or less regularity since 1919 (G.B. Sanford, Sci. Agric. 15: 46-48. 1934). He found that the plants were usually widely scattered in the field and did not show the advanced symptoms characterized by pronounced axillary shoots and aerial tubers. In 1932, however, a severe outbreak occurred at Medicine Hat, where the crop was a total failure on over 100 acres.

Since 1935 the disease has been reported regularly to the Survey by Mr. J.W. Marritt (see P.D.S. Reports 15:37, 16:36, and 17:38). It has been more or less severe at Medicine Hat, Calgary, Edmonton, Drumheller, and the Experimental Station, Lethbridge in these three years. Its occurrence was closely associated in 1936, according to him, with the growing of tomatoes in greenhouses. In 1938, he found psyllid yellows severe early in the season on potatoes in the vicinity of psyllid-infested greenhouses in the Riverside area, Calgary, and elsewhere. "For the first time psyllids were found to be general in potato fields in southern and central Alberta, and as far north as Edmonton. Definite symptoms of psyllid yellows did not develop in these fields until after second inspection of the crop. In September, however, severe symptoms were general in the Taber, Barnwell, and White School districts of southern Alberta. Mild symptoms were also found at Edmonton in October".

Mr. G.F. Manson has kindly summarized the observations made by members of the Entomological Laboratory, Lethbridge, Alta., as follows:

"Psyllid yellows has existed in Alberta in varying degrees of severity since 1932. Loss during the years 1932 to 1938 has been limited to greenhouse tomatoes and susceptible crops in the areas immediately adjacent to greenhouses producing favourable host plants throughout the winter months. The loss in greenhouse tomatoes is evident in reduced yield and quality. In potatoes the loss was greatest in late varieties.

"In 1938 the association between injury and greenhouse areas was not apparent. The infestation spread far beyond the former limits to include most of Alberta south of Edmonton and in Saskatchewan south of Prince Albert. Infestation was also observed in eastern British Columbia.

"The insect associated with psyllid yellows was definitely determined as Paratrioza cockerelli Sulc. but much remains to be determined as to the nature of the disease".

Psyllid yellows was found near Swift Current, the first record of its occurrence in Sask. Psyllids were found in a number of other fields, but no evidence of yellows was noted. (J.W. Scannell)

It would appear that the epidemic of psyllid yellows in Canada was only the northern extension of a much larger epidemic centering in the States to the south. It was unusually severe and widespread in 1938; in Montana it was estimated that it caused a loss of 25% of the potato crop. (Pl. Dis. Reporter 23:1-4, 18, 35. 1939).

PURPLE TOP (cause unknown) was found in 20% of the fields in Alta. and northwestern Sask., while it was present in most fields in Sask., Man. and north-western Ont. Usually the percentage of affected plants did not exceed a trace to one per cent. (J.W. Marritt and J.W. Scannell)

DR. G.B. Sanford has described the symptoms of the trouble as follows:

"External symptoms, vine: General distortion from normal shape, with strong tendency to swollen nodes, short internodes, zig-zag direction of stem, abnormal axilliary shoots with aerial tubers in several cases, and similar to what is often associated with extreme case of Rhizoctonia stem canker. Distorted shape of vine is the outstanding diagnostic feature.

"Pigmentation (reddish to purple) on upper parts of vines and sometimes pigment on leaves at and toward the top usually appears in those varieties which carry a genetic factor for pigment, and is absent on those in which the factor is weak or lacking. In severe cases the terminal leaves may be colored. In general, the expression of vine distortion for each variety is more or less characteristic, as might be expected, and naturally there are all gradations of expression. It would appear that the degree of pigmentation of vine or leaf depends on light intensity, in addition to the primary cause. Judging from present knowledge, the size of plant and yield of tubers do not appear to be greatly affected.

"Internal symptoms, vine: Yellowish vascular strands in lower sections of vine, in contrast to the normal greenish color. This is most marked in the strands at the lower end of the stalk, and may or may not wholly disappear toward the top. The pith appears normal.

"Tubers and stolons: Outwardly sound, yellowish vascular strands of stem tend to decrease in stolon, and usually disappear in the tuber. Tubers usually normal. I would expect considerable variability in this connection."

The distortion of the vine is very similar to that found in psyllid yellows, so that it is not always possible to tell the two troubles apart from individual plants. As a result of field experiments in 1938, Leach considers that the wilt of potato plants produced in the greenhouse by the tarnish plant bug is not identical with the prevalent "purple-top wilt". (J.G. Leach. Further experiments on the cause of "purple-top wilt" of potatoes. Abstract. Phytopathology 29:14. 1939). Instead he found that typical symptoms were produced in 6 of 8 cages into which were introduced aster leaf hoppers (Macrosteles divisa) taken from a variety of plants in nature. From this and other experiments reported, together with circumstantial evidence, he concludes that the disease may be aster yellows, although there is no evidence of its transmission through the tubers.

NET NECROSIS (cause unknown) was quite prevalent this year in B.C. (H.S. MacLeod). The trouble was unusually severe at Lethbridge, Medicine Hat and intermediate points in Alta. Besides severel reports of its occurrence from Calgary and Edmonton, it is believed there were many unreported cases. It was economically important for much of the crop was unsaleable. Although necrosis of tubers may be associated with purple top, the two troubles are considered distinct. Mr. H. Lyons, potato buyer, Lethbridge, who examined about 4,000 of the 6,000 acres under irrigation, estimated the occurrence as follows: in 1,970 acres, 0-2% tubers affected; 712 acres, 2-4%; 969 acres, 4-10%; 400 acres, 10-15% (G.B. Sanford). In two fields of certified seed in the Lethbridge area, 15% of the tubers were showing severe net necrosis on second inspection. In other fields in the same district a trace to 2% of the tubers were showing severe net necrosis on second inspection. In other fields in the same district, a trace to 2% of the tubers were affected (J.W. Marritt). Tubers from two lots of certified Green Mountain seed, which showed 4% stem-end browning and net necrosis in 1937, were planted at St. Anne de la Pocatiere, Que. The resulting plants were all weak and small, with typical symptoms of leaf roll. It was estimated that the yield was reduced 65%. Only 2% of the tubers from the affected plants showed stem-end browning and necrosis (B. Baribeau). Net necrosis was quite severe in several lots of Green Mountains in Carleton and York counties, N.B., during the spring shipping season (C.H. Godwin). A trace to 5% of the Green Mountain tubers were reported affected by net necrosis in the Northern district, P.E.I. Some strains of Green

Mountain in the Laboratory plots, Charlottetown, P.E.I., showed up to 75% of the tubers affected. (R.R. Hurst)

INTERNAL DISCOLORATION. Some 7% of the tubers in a field of the Irish Cobbler in Colchester county, N.S., were affected. Laboratory tests suggested the trouble was physiological. Weeds and wild grasses formed only a scanty cover on the field the previous year. (W.K. McCulloch)

INTERNAL BROWN SPOT (cause unknown) is prevalent in potatoes in many areas in B.C., especially in the Fraser valley. Frequently the trouble is confined to tubers from certain parts of a field, while those from other parts of the same field are normal. Its greater prevalence this year is believed to be due to the soil being much drier during the growing season than usual. This defect is very objectionable when the tubers are for table use. (H.S.MacLeod)

INTERNAL SOFT ROT (Fusarium ?radicicola). On several occasions a slimy soft internal rot has been found in B.C., although they look sound or only slightly affected on the outside. This season a few tubers were received from Smithers, and sent to Mr. J.W. Eastham. He states this condition is fairly common in the Interior and generally associated with immaturity of the tubers at digging time. The fungus apparently enters through wounds, followed by secondary bacterial saprophytes. (H.S. MacLeod)

DEEP STEM-END BROWNING (cause unknown) was found to affect up to 15% of the tubers in some lots in Queens county, P.E.I. It was also reported from Souris, St. Peters, and Freetown, (R.R.Hurst)

HOLLOW HEART (Non-parasitic) was more prevalent in the 1938 crop in B.C. than in that of the previous year. In some carloads from the Interior 20% of the tubers were affected. Ten per cent of the tubers showed hollow heart in one field in P.E.I.

TIP BURN (?leaf hoppers) was severe in many districts of Que. and caused the death of many plants and a reduction in yields.

BLACK HEART (Non-parasitic) affected 75% of the tubers in a few bags of Katahdin, which had been under water for several days at Merrickville, Ont.

FROST INJURY was very small in P.E.I. in 1938, but one bag from Prince county showed 75% of tubers injured. (R.R. Hurst)

FLEA BEETLE INJURY was reported once in P.E.I.

SKIN SPOT (Oospora pustulans). Traces were found in Irish Cobbler on the market at Charlottetown, P.E.I.

ROOT KNOT (Heterodera marioni). About 60% of the tubers in storage from a ½-acre field of Early St. George at Sooke, B.C., were affected. Volunteer plants in the spring were also diseased. It is considered that the eelworm was carried to the field on tomato plants from an infested greenhouse. (W.R. Foster)

STEM ROT (Sclerotinia sclerotiorum). One plant was slightly infected at Edmonton, Alta. (G.B. Sanford)

JELLY-END ROT (Fusarium sp.) was found in shipments from the Interior of B.C. this year, mostly from areas where potatoes are grown under irrigation. The loss was about 1%.

LEAK (Pythium sp.) was prevalent in the August-September shipments from the Ashcroft and Kamloops districts, B.C.

Leak and Soft Rot separately or in combination were present in about 10% of the bins inspected in Man. Infection ranged from a trace to 10%. These diseases were also present in many lots of table stock. (J.W. Scannell)

SPINDLING SPROUT (cause unknown) occurs commonly in P.E.I. Infection ranged from 0.5 to 12% in several varieties. (R.R. Hurst)

SEED-PIECE DECAY affected 75% of the sets in 15 fields. The trouble appears when sets are planted directly from a cool storage. If the sets are held for a time in a warm place before planting, the trouble is corrected. (R.R. Hurst)

MAGNESIUM DEFICIENCY severely affected half the plants in a field in Kings county, P.E.I.

POTASH DEFICIENCY was severe in one field of Irish Cobbler at Murray River, P.E.I.

LIGHTNING INJURY was reported to have severely affected Irish Cobbler plants in an area 50 feet square in a field in P.E.I.

PUMPKIN

POWDERY MILDEW (Erysiphe Cichoracearum) caused a little damage to pumpkins at the Ste. Anne de la Pocatiere Station, Que., although the vines became infected late.

RADISH

CLUB ROOT (*Plasmodiophora Brassicae*). A few diseased plants were found at several places in Laval county, Que. (E. Lavallee). Only a few radish plants were affected in a garden, where half the other crucifers were destroyed, at Kentville, N.S. (J.A. Boyle)

WHITE RUST (*Cystopus candidus*) was severe in a field at Winnipeg, Man.

BLACK ROOT (*Aphanomyces Raphani* Kendrick). About 2% of the plants were affected and rendered unsalable at Macdonald College, Que. (I.H. Crowell). This disease has not been previously reported in Canada.

RHUBARB

CROWN ROT (unknown) destroyed several plants in the University gardens, Saskatoon, Sask.

A crown rot (?bacterial origin) was reported from Birds Hill and Middlechurch, Man. Infection was moderate.

STREAK (probably virus) caused slight damage in the University garden, Saskatoon, Sask.

LEAF SPOT (*Phyllosticta straminella*) caused severe infection at Middlechurch, Man.

GREY MOULD (*Botrytis* sp.). Some of the growers of forcing rhubarb near Islington, Ont., lost a large percentage of their crop because the leaves became disfigured by a *Botrytis* sp., which developed very rapidly owing to the high temperature and excess moisture of the forcing house. (J.E. Howitt)

SALSIFY

WHITE RUST (*Cystopus cubicus*) moderately infected 2 fields in Jacques Cartier county, Que. (E. Lavallee)

SPINACH

DOWNY MILDEW (*Peronospora Spinaciae*) caused serious damage to spinach being grown for canning purposes at Vancouver, B.C. (J.W.

Eastham). It was general in a field at Port Dalhousie, Ont., on May 18, and it was reported affecting a fall crop on September 21, near Vineland. (D.L. Bailey)

WILT (Fusarium sp.) was destructive on all varieties of spinach at Grand Forks, B.C. Infection varied from 10-100% depending on location. It appeared to be less destructive at the higher elevations, where lower soil temperatures may be the deciding factor. (G.E. Woolliams)

MOSAIC (virus). Diseased plants were received in November from the London district, Ont. (G.H. Berkeley). Two plants in a garden at Charlottetown, P.E.I., were affected.

SQUASH

STORAGE ROT (Alternaria sp. and Fusarium Scirpi var. acuminatum). A rot was found on the Winnipeg Market during the winter months of 1936-37, and again during 1937-38. Isolations and inoculations each year showed Alternaria sp. to be the primary cause and the Fusarium, a contributory cause. The Alternaria "pitted" the fruit, which later cracked, allowing entrance of the Fusarium. The latter produced a slow dry rot when inoculated alone through wounds. (W.L. Gordon)

SWEET CORN

SMUT (Ustilago Zeae). A trace to slight damage occurred in gardens at Saskatoon, Sask. A trace to 2% of the plants of the garden varieties were also smutty at Indian Head. Smut was severe and destructive in 7 out of the 8 gardens examined in Man. Gills Golden, Early Market, and Pickaninny were the varieties most severely affected at Brandon. Traces of smut were found in many plantings in Laval and Jacques Cartier counties, Que.; 2 ears were found in a 2-acre field in Kamouraska county. Traces of smut were present in plantings in Charlotte, Saint John, Carleton, and York counties, N.B. The disease was more widespread than usual, but the damage was slight. (J.L. Howatt)

RUST (Puccinia Sorghi). Traces were present at Indian Head, Sask. Rust was present in all 8 fields examined in Man. as follows: severe in 2, moderate in 2, slight in 3, trace in one. Rust was unusually heavy this season on the sweet corn hybrids at the Vineland Station, Ont., although it occurs each year (D.L. Bailey). Rust was found in a garden planting at Kentville, N.S. Rust infection was a trace to heavy in Queens county, P.E.I.

TOBACCO

The "Tobacco Disease Survey, 1938" which is presented below was prepared by Dr. G.H. Berkeley from notes gathered by himself or supplied to him by Dr. N.T. Nelson, Ottawa, Ont.; Mr. P.G. Newell, St. Catharines; Dr. L.W. Koch and Mr. P.J. Haslam, Harrow, Ont.; Mr. F.A. Stinson, Delhi, Ont; Mr. R.J. Stallwood, Tillsonsburg, Ont.; Mr. G.E. Turcotte, L'Assomption, Que., and Mr. R. Bordeleau, Farnham, Que.

MOSAIC (virus) was about as widely distributed as last year in Ont., except in the old belt, where it was less prevalent. In the new belt, the average infection was estimated at 3.5-5%. In the northern district in Quebec the average infection on flue-cured was slightly above 2%, while on the air-cured types it was not above 1%. In the southern district in Quebec, the average infection was estimated at 2-5%. In all districts, however, individual fields were observed where the infection ranged from 50-75%. As in the past seasons, so again this year, mosaic was more general and severe in fields which were cropped to tobacco the previous year.

RING SPOT (virus) was common in both Essex and Kent counties, particularly on burley tobacco. Two cases of ring spot were observed in the new belt on flue-cured tobacco.

A VIRUS DISEASE NEW TO ONTARIO. An unusual diseased condition of tobacco plants was reported from the old belt in Ontario, (L.W. Koch) and what appears to be the same disease, was observed in experimental plots at St. Catharines in 1937 as well as 1938, (P.G. Newell). In the old belt the disease was limited almost entirely to the Kelley variety, whereas it was observed on yellow mammoth at St. Catharines. In two fields near Blenheim and Woodslee, Dr. Koch reports that "60% and 40% of the plants, respectively, were affected". The outstanding symptoms are necrosis of the stem tissue, fine dot and line necrosis of leaf tissue, with distortion of the top of the plant. Innoculation tests carried out at St. Catharines, indicate that this is a virus disease, (G.H. Berkeley). It has been successfully transferred to tobacco, N. rustica, N. glutinosa and tomato by patch grafting, and to N. rustica and tobacco by means of juice transfer. The sumptoms of this "new" disease are in some respects similar to those associated with "tobacco streak", as described by James Johnson, or "crooked top", as it occurs in Brazil. There are also some points of similarity between this new disease and "spotted wilt", though the symptoms it produces on tomato under

our conditions, are quite different from those associated with "spotted wilt". Under green-house conditions the symptoms observed to date, take the form mainly of top necrosis, affecting either foliage or stem or both.

BLACK ROOT ROT (Thielaviopsis basicola) caused more damage than any other disease in the old belt in Ont. in 1938. While damage was most severe in fields where tobacco followed tobacco, some was also found in longer rotations. A few fields in the vicinity of Woodslee and Essex were ploughed under because of root rot infection. In comparison, black root rot was unimportant in the new belt since only a few mild infections were observed. In the northern district in Quebec, black root rot was more general than in 1937, when it was conspicuous by its absence. Root rot developed on old tobacco soils early in June, but because of favourable growing conditions later in the season, much of the infected tobacco recovered, so that by the end of the season the damage was not important. In the southern Quebec district black root rot was prevalent at the beginning of the season in poorly drained areas, but its progress was also checked by favourable growing conditions later in the season.

BROWN ROOT ROT (non-parasitic) was again prevalent in the old belt of Ontario but was less severe than in 1937. Fourteen out of thirty-seven cases observed occurred where tobacco followed either a crop of corn or corn added with the manure. Tobacco was not harvested from some fields because of this disease. Harrow Velvet and Yellow Mammoth again manifested a high degree of susceptibility. In the new belt brown root rot was found in only a few fields, and infection was mild in all but two cases. In Quebec brown root rot was not observed or reported.

FRENCHING (non-parasitic) was unusually prevalent in the new belt of Ontario this season. A survey indicated that this disease was widespread, with 22% of the fields visited containing frenching, which varied from a trace to one case where 100% of the plants were affected with a severe type which rendered the plants useless. Though the most general type of frenching was confined to the tip leaves and suckers, nevertheless, numerous cases were observed where the plants were severely stunted and distorted. In the old belt of Ontario several cases of frenching were observed, but the symptoms largely disappeared by the time the plants were harvested. In the two districts of Quebec only a few cases of frenching were observed.

LEAF SPOTS (non-parasitic) were prevalent in the new belt in Ontario, ranging from a trace to severe spotting of the lower four

or five leaves. In the old belt and the two districts in Quebec, non-parasitic leaf spots were scarce and unimportant.

ANGULAR LEAF SPOT (Phytomonas angulata) was observed in a few fields in the new belt of Ontario, but infection was mild. Late infections also occurred in the two districts in Quebec, but no appreciable damage resulted. In the old belt in Ontario, angular leaf spot was more prevalent than last year, but caused little damage.

WILDFIRE (Phytomonas Tabacum) was not observed or reported in 1938.

HOLLOW STALK (?Erwinia carotovora) was observed both in Quebec and Ontario though in only a few fields. It was of no importance.

LIGHTNING INJURY was observed in both the old and new districts of Ontario.

HAIL DAMAGE was more widely distributed than in 1937. The damage caused by one storm was estimated at $250,000.

MINERAL DEFICIENCIES. Potash and magnesium deficiencies were noticed in many fields, particularly in the new belt.

Diseases of the Seedbed

DAMPING-OFF (Rhizoctonia and Pythium) was the most common disease encountered in the seedbed. In the majority of cases, damage was limited to small patches of a bed, and satisfactory control was obtained by adequate ventilation and care in watering. In a few cases, however, damping-off was responsible for considerable loss of stand. In the old belt this disease was responsible for considerable thinning out of the seedlings in the early stages of germination. Damping-off, though commonly found in both the tobacco growing districts of Quebec, did not cause a great deal of damage.

YELLOW PATCH (cause undetermined), a condition, the cause of which has not yet been definitely ascertained, was the most important seedbed trouble in both the old and new belts in Ontario. Though Yellow Patch was widespread and considerable loss of seedlings was observed in individual cases, its gross effect on seedling production for the district as a whole, was comparatively unimportant. Only a few cases of yellow patch were observed in Quebec.

DOWNY MILDEW or BLUE MOULD (Peronospora tabacina Adam) was reported for the first time in Canada, when it was found in the old belt in Ontario by Dr. L.W. Koch. It was observed in eight seedbeds and in four fields. The seedlings in the infected seedbeds were destroyed.

BLACK ROOT-ROT (Thielaviopsis basicola) was possibly the most troublesome disease in seedbeds in Quebec, and though present, it was of no particular consequence in the old belt in Ontario. One case of black root-rot in the seedbed was observed in the new belt.

BLACK LEG (?Erwinia Aroideae) caused some damage in seedbeds at the transplanting season in the old belt.

In addition to the report on tobacco diseases covering the tobacco areas in Ontario and Quebec, a report on a special survey in the New Belt of Ontario made by Dr. Berkeley, Mr. Stallwood and Mr. Newell is presented below.

Special Survey of Tobacco Diseases in Norfolk, Elgin, and Oxford Counties, 1938

G.H. Berkeley, R.J. Stallwood, and P.G. Newell

This year an attempt was made to ascertain the prevalence of disease in the seedbed and in the field. Seedbeds on 137 farms were carefully inspected and the prevalence of disease estimated. In the field survey 100 fields were carefully inspected and percentage counts were made in four or more sections of each field. It should be pointed out that the fields were not specially selected, but were taken in order as we drove through the different sections of the new belt. The area covered extended from Tillsonburg westward to south and west of St. Thomas, and from Tillsonburg eastward through the Teeterville and Windham sections, then to the Delhi and Simcoe districts and finally south and west of Delhi to Houghton and Bayham townships. Thus a fairly comprehensive survey was made.

Seedbed Survey

DAMPING-OFF, due mainly to Rhizoctonia sp. and to some extent to Pythium sp., was the most prevalent seedbed disease occurring on 44.5% of the farms visited, but was of importance on less than 10%. Usually the disease was limited to small patches in the beds and satisfactory control was obtained by adequate ventilation and care in

watering. However, on 3 farms, the disease was general in the bed, so that the grower had to purchase plants to meet his own needs.

YELLOW PATCH. The stunting and yellowing of seedlings in patches, or generally throughout the bed, caused loss of plants in 26% of the beds inspected. Plant beds so affected could be divided according to the complete symptomatological picture of the diseased plants into three classes.

1. In many cases the root systems showed a brown discoloration, similar to that of the brown root-rot disease. An abundance of adventitious roots from the hypocotyledonary area were being formed, and were being similarly affected. Factors which appeared to have some significance in the production of this type of retardation of growth and chlorosis, were: (a) Poor drainage and too compact a condition of the muck. (b) Mixing quantities of cow, pig, or sheep manure in with the muck before seeding. (c) Heavy applications of sheep manure or liquid cow manure shortly after the seed had germinated.

2. In certain other beds, though the foliage of the plants was yellowed, the root systems were well developed. However, dark brown lesions on the roots and lower hypocotyl were in evidence. Microscopic examination of the lesioned tissues revealed the presence of fungus mycelium and nematodes. Weeds were generally quite prevalent in these beds, and in most cases it was evident that the soil had been poorly steamed.

3. Several other beds were inspected in which the yellowed and stunted plants had well-developed, normal white roots in which no parasitic organisms could be observed.

The abnormal growth of plants in a particular bed, apparently as a result of a previous application of weed-killer (sodium chlorate), was of special interest. The grower had been troubled for the past few years by bindweed, Convolvulus sp., which he was unable to kill by steaming. In the fall he had removed the soil to a depth of eighteen inches, applied the weed-killer and put in fresh soil. The seedlings growing in this soil were stunted and had an upright type of growth. Their leaves had a pale whitish cast and were unusually hairy, reminding one of mullein leaves. The root systems of the plants appeared to be normal. An analysis of the seedbed muck showed a chlorine content of 150 p.p.m. which could be highly toxic to the plants. However, these plants did not show symptoms of excess of chlorine. Plants from this bed were later transplanted to the field, outgrew the condition, and produced a good crop of tobacco.

Out of 137 beds examined, damping off, yellow patch, or both, were found in 61 beds or 44.5%. Therefore, it is of interest to note that the 61 affected beds, 24 had received sheep manure or manure in some form after steaming, while only 14 received no manure after steaming. For the other 23 affected beds no information on their manurial treatment was obtained.[1]

MOSAIC (virus). One case of mosaic infection was observed in a bed where the workmen had been smoking.

Field Survey

MOSAIC (virus) was found in 57% of the fields visited, and infection ranged in the diseased fields from a trace to 56%. From Table 6 it can be readily seen that the incidence of mosaic was greatly influenced by crop rotation.

Table 6 - Incidence of mosaic as influenced by crop rotation.

Rotation	Mosaic		Total	Amount of mosaic in affected fields	
	Present	Absent		Highest	Average
	fields	fields	fields	%	%
Tobacco after tobacco	31	2	33	56	5.9
Tobacco after other crops	11	29	40	14	1.1
Unknown	15	12	27	10.7	1.0
	57	43	100		3.5

[1] The Author's observations appear to bear out the recommendation of the Standing Committee on Fertilizers that if 125 lb. of 2-10-8 tobacco fertilizer to 1,000 sq. feet of bed is mixed with the muck before seeding, no additional fertilizers or manures are usually required. (Tobacco Fertilizer Recommendations for 1939, prepared Dec. 7, 1938). However, no mention of the manurial treatment of healthy beds is made, so a real comparison between manure vs. no manure is impossible. - I.L.C.

Mosaic is not only present in more fields where tobacco follows tobacco than where it follows other crops, but the percentage of affected plants is often very much higher. The average infection in the 100 fields examined was 2.1%.

NON-PARASITIC LEAF SPOT. A small brown spotting, which later may turn white was observed in 44% of the fields visited. Spotting ranged from a trace to general and severe with the loss of from four to five lower leaves. In seven fields white speck was present on every plant, being very severe on the lower leaves. In eight additional fields, though infection was general, it was of a milder type. It was observed that frenching and white speck often occurred in the same field. White speck caused appreciable loss in many fields.

FRENCHING. This disease was unusually prevalent throughout the new belt with 22% of all fields visited containing it. In most fields the percentage was low, though infection ranged from a trace to 100%. Though the top leaf and sucker type of frenching was most general, numerous cases were observed where the plants were severely stunted and distorted. The records of a few specific cases may be of interest. In field A, frenching was so severe that only a few leaves were harvested. In field B, frenching was confined in the lighter higher areas, in which 60% of the plants were affected. In field C frenching occurred on a high knoll only, whereas in field D it was confined to the lower section of the field. In two other fields frenching occurred mainly on the lower areas. These and other observations would suggest that frenching may occur on either high or low areas of a field. Frenching was of economic importance in 1938.

ROOT ROTS. Eleven per cent of the fields visited were mildly affected with root rots. With two exceptions, there were no instances in 1938 where root rots caused severe stunting over widespread areas. In one case, brown root rot was responsible for the loss of one quarter of a five acre field, while in a 3-acre field near Vienna, brown root rot was general and severe. In five additional fields brown root rot occurred in comparatively limited areas. In one instance it was localized to that part of the field which had been planted to corn the previous season, while in another case a mild attack of brown root rot occurred on land planted to timothy in 1937.

In 5 fields black root rot was confined to small, low areas. In another field 12 adjacent rows were observed which were evidently recovering from a severe attack of black root rot.

ANGULAR LEAF SPOT (Phytomonas angulata). Only a few mild cases of this bacterial disease were observed.

UNEVEN RIPENING. This condition was observed as early as July, and became widespread throughout the flue-cured district by harvest time. Areas in the leaf remained in a green, active condition, while the rest of the leaf matured normally. These green areas had no definite shape, were variable in size, and appeared anywhere on the leaf. In the first curings of affected leaves, the green areas remained green or greenish brown, while in later curings the green areas sometimes seemed to cure normally, like the remainder of the leaf. No particular sets of conditions appeared to be conducive to the development of this disorder, though it was observed that it occurred independent of fertilizer treatments.

In addition to the above diseases, several cases of ring spot, sore shin, potash and magnesium deficiencies were encountered.

At the Central Experimental Farm, Ottawa, Ont., Mr. E.T. McEvoy reported the occurrence of the following diseases.

BLACK ROOT ROT occurred in a few poorly-drained areas planted to susceptible varieties; however, a partial recovery was noted and the loss of yield was not great. It was about as severe as in 1937.

MOSAIC was quite general but not severe, the infection ranging from 1-2%, which was about half what it was in 1937.

JOHN WILLIAMS LEAF SPOT (cause unknown) was present to a moderate degree only on broadleaf varieties.

TOMATO

BLOSSOM-END ROT (non-parasitic) caused slight damage in a market garden at Medicine Hat, Alta. It was moderate in gardens at Saskatoon, Sask. The disease was very severe on Best of All in East St. Paul, Man. It affected 30% of the fruit in a planting in Lincoln county, Ont.

Blossom-end rot was often observed in the Montreal district, Que., but it was not generally serious. However, at Ste. Julie on a gray sandy soil, losses ranged from 5 to 10% (E. Lavallee). Only a trace was seen at Kentville, N.S., where heavy rains supplied abundant moisture. The trouble was seen or reported from several points in P.E.I.

MOSAIC (virus). Mosaic and streak was less prevalent on Vancouver island, B.C., than in past years due, it is believed, to more growers now steaming their soil (W.R. Foster). The disease was severe in one greenhouse at Edmonton and another at Medicine Hat, Alta. Fern-Leaf Mosaic affected 5 and 25% of the plants, respectively, in two greenhouses at Medicine Hat. Mosaic was moderate at the Indian Head Station, Sask., and a trace was recorded in a planting at Fort Garry, Man. While damage from mosaic was, in general, slight in Essex and Kent counties, Ont., 50-80% of the plants were affected and resulted in appreciable loss in several plantings in the Leamington district (L.W. Koch). Mosaic was prevalent and causing the plants to be stunted in a fall greenhouse planting near Byron. The variety was unknown, but was supposedly resistant to Cladosporium. Mosaic was observed in other greenhouse and field crops, but the damage was slight (G.C. Chamberlain). About 20% of the plants were affected with mosaic in two gardens at St. Thomas de Joliette, Que. About 50% of the plants were affected in a garden at Charlottetown, P.E.I., but damage was not apparent.

STREAK (virus) affected 25% and 50% of the plants, respectively in two greenhouses in Lincoln county, Ont.; it was causing severe necrosis and loss in growth. (G.C. Chamberlain)

SPOTTED WILT (virus) caused slight to severe losses in greenhouses at Medicine Hat and Lethbridge, Alta. It was also found in gardens at Edmonton and Lethbridge. Mr. W.H. Fairfield, Superintendent of the Lethbridge Station, stated that disease was quite serious there this year. It was also observed in the field near Montreal, Que., and diseased fruit were received from a grower in Toronto, Ont., who stated the trouble had been serious for several years. (H.N. Racicot)

YELLOWS (virus) affected 25% of the plants in an isolated block of plants at the Summerland Station.

LEAF MOULD (Cladosporium fulvum) was prevalent in many greenhouses about Victoria, B.C., and on the mainland. It caused slight to moderate damage. Weekly sulphur vaporization beginning about three weeks before the disease normally appears has proved effective with one large grower at Victoria. Leaf mould infection was slight on greenhouse tomatoes at Edmonton, Alta., moderate at St. Norbert, Man., and severe at St. Vital. The disease became quite general in the field in Essex and Kent counties, Ont., in September and resulted in considerable defoliation (L.W. Koch). Leaf mould caused noticeable damage to several plantings at Ste.

Anne de Bellevue, Que. The disease was severe in commercial greenhouses at Dartmouth, N.S., and caused 25% damage. It was present, but to a lesser extent, in greenhouses in Halifax and Falmouth (J.F. Hockey). Leaf mould was present to some extent in gardens in Charlottetown, P.E.I.

EARLY BLIGHT (Alternaria Solani) was moderate in East St. Paul, Man., and severe on the lower leaves in gardens in Fort Garry. The disease was prevalent but not serious on some varieties in a planting in Northumberland county, Ont., while John Baer and Chalks Jewel were relatively free. It was reported to have caused severe loss for several years by a grower at Sudbury. It was severe on some varieties at Ste. Anne de la Pocatiere, Que., while other varieties were slightly infected or clean. Early blight caused severe defoliation in a garden at Kentville, N.S.; the fruit ripened unevenly and were of poor quality. The disease was rather heavy and caused some injury to the fruit in gardens at Charlottetown, P.E.I.

LATE BLIGHT (Phytophthora infestans) was severe in several gardens at Charlottetown, P.E.I.

SEPTORIA LEAF SPOT (S. Lycopersici) was slight at Morden, Man. The disease occurred in epidemic proportions in the Leamington district, Ont., again this year. The damage was usually not as severe as in 1937, because infection came later in the season (L.W. Koch). At the Vineland Experiment Station this leaf spot was particularly widespread and destructive this year as compared with recent years (D.L. Bailey). The disease was severe in a home garden in Huntingdon county, Que. (E. Lavallee)

VERTICILLIUM WILT (V. sp.) was present in 50% of the greenhouses in the Victoria district, B.C.; the maximum damage in any establishment was 5%. (W.R. Foster)

FUSARIUM WILT was reported as severe at Melita, Man., on June 27. Isolations from the diseased plants yielded a Fusarium sp. (Elegans section), but doubtfully F. Lycopersici. Wilt also occurred in a few plants in St. Vital, but the cause was undetermined. (W.L. Gordon)

DAMPING OFF and ROOT ROT. A root rot of seedlings, sometimes accompanied by damping off, became quite severe in Essex and Kent counties, Ont., when the plants were 6-8 inches high. The roots were found in most cases to be filled with bacteria. Rhizoctonia Solani was present and caused damage in some instances. (L.W.Koch)

Damping off caused slight damage in two greenhouses during periods of dull weather this spring in Lincoln county, Ont. (G.C. Chamberlain). The cause in the one greenhouse was attributed to Pythium and in the second to Rhizoctonia.

GREY MOULD (Botrytis sp.). Specimens of a stem rot were received from the Ridgetown Farm, Ont. (G.C. Chamberlain)

NAILHEAD (Macrosporium tomato) was not generally severe this year in Essex and Kent counties, Ont., although a moderate loss was observed or reported in a number of individual cases. (L.W. Koch)

ANTHRACNOSE (Colletotrichum phomoides) became epidemic in Essex and Kent counties, Ont., and all the canning companies refused numerous loads of tomatoes on account of the fruit being severely infected. Growers reported individual losses as high as $1,000. (L.W. Koch)

BACTERIAL CANKER (Phytomonas michiganensis) was reported by Mr. H.H. Evans, Provincial Field Inspector, as severe on Earliana in a field at Vernon, B.C., while no disease was seen on John Baer, which was growing adjacent to the Earliana in the same field. However, a slight infection was seen on John Baer at Osoyoos. (G.E. Woolliams)

BACTERIAL SPOT (Phytomonas vesicatoria). A mild infection was observed in numerous plantings towards the end of the early crop in Essex and Kent counties, Ont. Only one instance was reported, where the grower complained of inability to market his crop due to the disease (L.W. Koch). Bacterial spot heavily infected a 5-acre field at St. Cesaire, Que. The grower estimated the loss at 50% of the crop. The disease was identified by Dr. G.H. Berkeley. This is the first of its occurrence in Quebec. (E. Lavallee)

OEDEMA (non-parasitic) was general on seedling plants at Brampton, Ont., and caused some checking of the growth. (G.C. Chamberlain)

BLOTCHY RIPENING (non-parasitic) was observed in the Victoria district, B.C. Blotchy, light-coloured areas occur on the fruits, which reduces their market value (W.R. Foster). The trouble has been observed in both field and greenhouse tomatoes in Lincoln county, Ont. The fruits ripen unevenly with the immature areas varying in size up to 40-50% of the entire fruit. These areas have

a glossy appearance and are quite distinctly pitted. It is thought that it is similar to the trouble described in England (W.F. Bewley and H.L. White. Ann. Appl. Biol. 13:323-338, pl. 6, 1923). Its physiological nature is still being investigated. (H.L. White. Ann. Appl. Biol. 25:544-557. 1938). (G.C. Chamberlain)

POTASH HUNGER (non-parasitic). Specimens from a field at St. Laurent showed definite symptoms of the lack of potash. The loss was said to be considerable. (F. Godbout)

LIGHTNING INJURY. About 20 plants in a small area were variously affected in a field in Haldimand county, Ont.

TURNIP

CLUB ROOT (Plasmodiophora Brassicae) is widespread and destructive in N.B. The so-called resistant varieties, Wilhelmsburger and Bangholm, differ widely in their behaviour to club root from field to field, varying from complete resistance to complete susceptibility. (J.L. Howatt)

Conditions were particularly favourable for club root development in P.E.I. in 1938. On the club root area at the Experimental Station, Charlottetown, most of the susceptible varieties were killed in the seedling stage or shortly after, while resistant varieties such as Bangholm and Wilhelmsburger showed considerable club root infection. Heavy precipitation, no doubt, favoured increased infection. Traces of club root were found in the brown heart plots on an elevated area at York, where turnips had not been planted for 9 years. (G.W. Ayers)

BROWN HEART (non-parasitic) was fairly general on one farm at Campbell River, B.C. It affected 10-75% of the roots of several varieties at Macdonald College, Que. Despite the ease of control of brown heart by borax applications, this disorder is still commonly seen in N.B., where most of the soils appear low in boron. In general only growers of turnips for table use practice control. Almost complete control of brown heart was obtained by the use of boron at the Kentville Station, N.S.

BORAX INJURY was severe at one end of a field in Prince county, P.E.I., where the farmer reported that he had "thrown on" an extra amount of borax to finish out a few rows.

BLACK LEG (Phoma lingam) caused severe damage to Swedes in storage at Macdonald College, Que. (J.G. Coulson). It is also causing heavy losses along La Riviere des Prairies on Montreal island, some farmers losing between 2,000 and 4,000 bags each in the fall of 1937. The seed was sown in beds and the young plants transplanted to the field. When the seeds were sown directly in the field, the rot appears later. Usually at harvest time, only small soft spots are visible on the upper half of the root (F.S. Thatcher). Black leg appeared to be widespread in P.E.I. as a result of counts made in September and October. It caused severe damage in many cases. The average infection of all fields examined was Ditmar, 1.0%; Bangholm, 1.5%; and Wilhelmsburger, 3.1%. The variety Laurentian may be resistant, for it was clean when it was sown in a field beside Ditmar, which was showing 20% of roots affected in localized areas. (R.R. Hurst and G.W. Ayers)

COMMON SCAB (Actinomyces scabies). Traces were seen in an acre block at the Charlottetown Station, P.E.I.

SOFT ROT (Erwinia carotovora). A trace of soft rot developed in a carload of turnips, which had been waxed in York county, N.B. (J.L. Howatt). Soft rot was noticeable in the plots receiving no boron treatment at the Kentville Station, N.S. Soft rot was reported to have caused the loss of 50% of the crop in fields in Cape Breton (K.A. Harrison). Soft rot destroyed 29% of the roots growing in a very rich, excessively manured soil in a field near Charlottetown, P.E.I. The organism gained entrance through growth cracks (G.W. Ayers). It also followed black leg and destroyed 3% of the roots in a bin in March in Queens county.

LEAF SPOT (Cercosporella albomaculans). Specimens of the disease were brought in by Mr. Whiteside from Victoria Harbour, Ont. (F.S. Thatcher). A slight infection was observed at the Cap Rouge Station, Que. (C. Perrault)

VEGETABLE MARROW

WILT. Odd plants affected by wilt were found at Brandon, Man. Fusarium spp. were isolated. (W.L. Gordon)

WATERMELON

WILT (Fusarium spp.). Several varieties of watermelon were severely wilted at the Lethbridge Station, Alta.

FRUIT ROT (Pythium sp. and Fusarium Scirpi) was rather common at Morden, Man., due to previous hail damage. A Pythium was isolated which was capable of producing a rapid decay on inoculation. Fusarium Scirpi was also isolated, but it produced a slower decay. (W.L. Gordon)

LEAF SPOT (Cladosporium cucumerinum). A 5-acre field of watermelons in Lincoln county, Ont., was so severely affected by leaf spot that the vines were entirely withered and killed on August 25. The crop will be a total loss. (J.K. Richardson)

SCLEROTIAL ROT (Sclerotinia sclerotiorum) destroyed a single fruit in a garden at Kentville, N.S. (J.A. Boyle)