111. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

BASAL ROT (Fusarium oxysporum) caused stunting of growth of young Martha Washington plants in a 50 ft. row at Vernon, B.C. (G.E. Woolliams).

WILT (Fusarium spp.). Affected specimens were received from a farm at Exeter, Ont.; the entire planting of 100 acres was reported to be unthrifty and unproductive. All plants had a degenerate root system. Isolations yielded several species of Fusarium, including a pathogen (F. oxysporum) of asparagus seedlings (C.D. McKeen, K.M. Graham).

FASCIATION (cause undetermined). A plant in a private garden at Dorn Ridge, N.B., was severely affected (D.J. MacLeod).

BEAN

GREY MOULD (Botrytis cinerea). Infection tr. in Golden Wax and Round Pod Kidney Wax in a garden in Queens Co., P.E.I. (R.R. Hurst). Grey mould caused some damage in all fields of Golden Wax and Improved Logan in the Cannan district, Kings Co., N.S., but halo blight, very heavy rains, and wind damage made it difficult to estimate the amount (K.A. Harrison).

ANTHRACNOSE (Colletotrichum lindemuthianum). Infection was tr.-sev. in the plots, O.A.C., and in gardens around Guelph, Ont. In plots at O.A.C. inoculated with 4 different isolates of the organism the standard commercial varieties were sev. infected, but new varieties received from Cornell University were relatively free of disease (J.D. Gilpatrick). Anthracnose was reported to have been sev. for 4-5 years in a garden in Algonquin Park (H.N. Racicot).

Anthracnose was not common in the Montreal district, Que., in 1950, but one $\frac{1}{2}$ acre field of Pencil Pod was nearly 100% infected at Ste. Dorothee, Laval Co. (E. Lavallee). The disease was severe in $\frac{1}{4}$ acre planting near Hull for the second successive year; no rotation was followed (K.M. Graham). Anthracnose completely destroyed 4 rows of late planting in a small garden at Kentville, N.S. (K.A. Harrison); sev. infected specimens were received from Digby (H.N. Racicot). Infection was tr.-sev. in wax beans in gardens in Queens Co., P.E.I. (R.R. Hurst) and a trace on Improved Golden Wax in a garden at Torbay, Nfld. (G.C. Morgan).

HALO BLIGHT (Pseudomonas phaseolicola). In most fields examined in the B.C. Interior infection was only sl., the severest being on Ashley Wax (75%), which was grown from seed produced in a sev. infected field in 1949 (G.E. Woolliams). Damage was sev. in several plantings at Lethbridge, Alta., but it was confined to localized areas in the Station plots (M.W. Cormack). Only tr. infections were noted at Lacombe and Edmonton (T R.D.). Infection was rather sev. on the leaves with few spots on the pods in a planting of several acres in Wentworth Co., Ont. (J.K. Richardson). Halo blight affected 10% of the plants with trace on pods in a $\frac{1}{4}$ acre planting of Masterpiece at Ottawa (V.R. Wallen). The disease affected only single hills in a planting near Hull, Que., but the damage was severe on the 5% affected (K.M. Graham).

The Cannan district, N.S., usually harvests 4000 hampers of beans. Damage from halo blight is estimated to have reduced the 1950 crop to less than 1000 hampers. The principal variety is Golden Wax and plantings of this variety in other communities were not nearly so severely affected. One grower with 4 acres sprayed with bordeaux 7-8-100 felt that the treatment had paid on the younger plants. Improved Logan seemed to be damaged less than Golden Wax (K.A. Harrison).

POD ROT (Pythium ultimum) affected a few pods where they came in contact with the ground in a garden in Saskatoon, Sask. The organism was isolated (T.C. Vanterpool).

STEM ROT (Sclerotinia sclerotiorum) caused a sl. infection in several fields in the Thompson River Valley, B.C. (G.E. Woolliams). A mod. infection developed in a garden in Saskatoon, Sask., but too late to do much damage (T.C. Vanterpool).

RUST (Uromyces appendiculatus). Infection sl. on Kentucky Wonder in a home garden in Kings Co., N.S. (K.A. Harrison), and mod. on a specimen brought to the laboratory from Queens Co., P.E.I. (R.R. Hurst).

COMMON BLIGHT (Xanthomonas phaseoli). Diseased specimens were received from North Battleford, Sask. (T.C. Vanterpool). The disease was sev. in a plot at Saskatoon, and the crop was a total loss (E.T. Reeder). A mod. infection in a planting at Carman, Man. (W.A.F. Hagborg). Infection was heavy on the leaves of 30% of the plants in a plot of Ottawa BA-1 at Ottawa, Ont., on 8 Aug., while the pods at the time showed only a trace (V.R. Wallen). A 25% infection was seen on Brittle Wax at Farnham East, Que. (E. Lavallee).

BACTERIAL BLIGHT (Xanthomonas phaseoli and Pseudomonas phaseolicola). Numerous cases were observed in Sask.; in some the infection was sl.-mod. but more commonly it was sev. with the crop a failure (R.J.L.). A disease of field beans, which we diagnosed as bacterial blight, caused so much damage to the seed in the Hensall region of Huron Co., Ont., that it was unsaleable. The most severely affected beans came from low-lying farms where the drainage was poor; upland farms bordering Lake Huron produced high-quality beans (A.A. Hildebrand).

MOSAIC (virus). A tr. infection was found in nearly all bean crops inspected in B.C. Interior (G.E. Woolliams). Half the plants were infected in a $\frac{1}{2}$ acre plot of Ottawa BA-1 at Ottawa, Ont.; numerous plants stunted and malformed with no seed set by some (V.R. Wallen). A few affected plants were found in most of the 20 bean fields examined in the Montreal area, Que.; the highest infection was 0.5% in a field at Stanbridge East. The disease seems on the increase (E. Lavallee). Mosaic affected 20% of the plants in Ace and Yellow Eye at the Station, Kentville, N.S. (K.A. Harrison).

YELLOW MOSAIC (Phaseolus virus 2). A trace in a field of Pencil Pod Black Wax at Lavington, B.C. (G.E. Woolliams). Three plants showed yellow mosaic in a garden at the Station, Fredericton, N.B.; a nearby plot of gladioli showed a faint mottling of the leaves (D.J. MacLeod).

CHLOROTIC BLOTCHING followed by delayed greening was observed on beans in the Field Husbandry plots, at the University, Saskatoon, Sask., on 16 June following high soil surface temperatures 10-14 June. Seedlings that were through the ground by 10 June were not damaged (T.C. Vanterpool).

2,4-D INJURY resulted in some damage to 3 fields near treated grain fields at Cannan, N.S. (K.A. Harrison). Injury from 2,4-D was also noticed in B.C. (W.R. Foster).

BEET

LEAF SPOT (Cercospora beticola). Infection was sl. on leaves in a plot of Detroit Dark Red at Ottawa, Ont. (V.R. Wallen); tr.-mod. on beets in gardens in Queens Co., P.E.I. (R.R. Hurst); and sl. in 2 plots and mod. in 3 out of a small number visited in Nfld. (G.C. Morgan).

DOWNY MILDEW (Peronospora schachtii) was general in plantings of stecklings of Detroit Dark Red near Victoria and at the Station, Saanichton, B.C. The fungus was sporulating freely on 6 Dec. (W. Jones, J. Scholefield).

LEAF SPOT (Phoma betae). Infection was sl. on a few steckling plants of Detroit Dark Red at the Station, Saanichton, B.C., on 6 Nov. (W. Jones); sl. on D.D.R. #16 in a small plot at Ottawa on 30 Aug. (V.R. Wallen).

SCAB (Streptomyces scabies) more or less affected most of the beets in the plots at St. Martin, Laval Co., Que. (E. Lavallee). Infection was heavy in a box of roots brought in for examination from Queens Co., P.E.I. (R.R. Hurst). Farmers claim that scab was fairly heavy in central Nfld., while infection was sl. on the e. and w. coasts; 10 plots ($\frac{1}{4}$ acre) in Conception Bay produced roots carrying fairly heavy scab (G.C. Morgan).

RUST (Uromyces betae) was fairly general on stecklings of Detroit Dark Red grown for the 1951 crop on Vancouver I., B.C.; the rust was sporulating abundantly on 6 Nov. (W. Jones).

ROOT CANKER (Boron deficiency) affected half the roots of Detroit Dark Red in a planting at the Station, Saanichton, B.C.; damage was considerable (W. Jones).

BROCCOLI

CLUB ROOT (Plasmodiophora brassicae) affected a few plants in a garden at Victoria, B.C. (W. Jones).

BRUSSELS SPROUTS

DOWNY MILDEW (Peronospora brassicae) was found on all sprouts examined from one crop grown in B.C. (W.R. Foster).

2,4-D INJURY. Two cases of injury observed in B.C. were traced to the use of improperly-cleaned knapsack sprayers (W.R. Foster).

CABBAGE

GREY MOULD (Botrytis cinerea) was causing a sev. rot of 3% of the heads in a damp storage at St. Phillips, near St. John's Nfld., in April (G.C. Morgan).

SOFT ROT (Erwinia carotovora) sev. affected 15% of the heads of Danish Ballhead in one storage at St. John's, Nfld., following a severe chilling (G.C. Morgan).

YELLOWS (Fusarium conglutinans). In late August, 85% of the plants of Danish Ballhead were affected in a 2-acre field at Wheatley, Ont. Many plants were already dead and others severely affected; the crop was virtually a total loss (C.D. McKeen).

DOWNY MILDEW (Peronospora brassicae). Tr. infections were seen on the outer leaves of Danish Ballhead in two fields at Mount Pearl, Nfld. (G.C. Morgan).

CLUB ROOT (Plasmodiophora brassicae) was general in the Lower Fraser Valley, B.C., especially in delta truck gardens; the early crop escaped, but the later plantings were sev. damaged (I.C. MacSwan). About 3% of the plants were affected in a Chinese market garden at Cloverdale (H.N.W. Toms). Club root was again general on Montreal and Jesus Islands, Que. Losses were very high in many

fields of cabbage and cauliflower; this disease is the worst problem facing the vegetable growers of the area (E. Lavallee). Near Hull, 5-10% of the plants of E.J. Wakefield and Danish Ballhead were already sev. clubbed by 11 July (K.M. Graham). Every plant was affected in a garden at the Station, Kentville, N.S. (K.A. Harrison). Sl. affected plants were brought to the laboratory from Queens Co., P.E.I. (R.R. Hurst). Club root is a very serious disease in Nfld., causing much loss in cabbage especially in the Notre Dame Bay and South Coast areas; losses in late cabbage crops up to 80% this year. No crop rotation is practised (G.C. Morgan).

BACTERIAL LEAF SPOT (Pseudomonas maculicola). Two affected heads from a shipment from the southern U.S. were received from Belleville, Ont. In one head the bacteria had penetrated to the centre of the head; in the other only the outer part was affected. The organism was isolated (D.S. MacLachlan).

WIRE STEM (Rhizoctonia solani) is prevalent on cabbage, cauliflowers and turnips in hot beds in the Montreal district, Que., and losses are heavy, although bed treatment with Arasan is used more and more with very satisfactory results (E. Lavallee). Wire stem destroyed 20% of the cabbage plants in one late seeding and 75% in another in Nfld. (G.C. Morgan).

BLACK ROT (Xanthomonas campestris) caused mod. loss in a field of cabbages at Lumsden, Sask. (K.J. Ledingham). Diseased specimens were received from Brantford, Ont. (E.H. Garrard).

FASCIATION (cause undetermined). Two plants in a garden at the Station, Fredericton, N.B., showed sev. fasciation (D.J. MacLeod).

CARROT

SOFT ROT (Erwinia carotovora) affected 10% of the roots of Chantenay in a crop on muck soil, which was quite wet, at Okanagan Mission, B.C. (G.E. Woolliams).

RHIZOCTONIA (Pellicularia filamentosa (R. solani). At harvest a few carrots sev. infected with sclerotia were found in the garden at Saskatoon, Sask., in which the perfect stage was found on potato (q.v.) in August. The sclerotia could be easily removed; penetration of the mycelium into the carrot must have been sl. (T.C. Vanterpool).

RHIZOPUS ROT (Rhizopus sp.) was observed on carrots in storage at Edmonton, Alta. (A.W. Henry).

BLACK ROT (Stemphylium radicinum (M.D. & E.) Neerg. (= Alternaria radicina M.D. & E.) caused reduction of yield in some stands set out for seed in the B.C. Interior. Losses varied from sl. to 25-30% (G.E. Woolliams). The disease was affecting 10% of the roots in a lot in storage at Berwick, N.S., on 18 Nov. (K.A. Harrison).

SCLEROTINIA ROT (S. sclerotiorum) completely destroyed the crop from a small garden at Gaspereaux, N.S., by 29 Nov. (K.A. Harrison).

BACTERIAL BLIGHT (Xanthomonas carotae) was found, as usual, on seed crops in Interior B.C., but it did not cause much damage (G.E. Woolliams).

YELLOWS (Callistephus virus 1) was present in only sl. amounts in Interior B.C. and caused little damage to seed crops (G.E. Woolliams). A few plants were found affected in a field at Taber, Alta. (M.W. Cormack) and in plantings at Edmonton (T.R. Davidson). Yellows infection was tr.-26% in commercial fields in York, Sunbury, Queens, Westmorland and Carleton Counties, N.B.; the damage was sev. in the field showing 26% (D.J. MacLeod). Traces only were recorded in Kings Co., N.S.; yellows spread very slowly in carrot fields this year (K.A. Harrison). Several fields of carrots showed signs of yellows in Nfld. As noted by Hockey (P.D.S. 29:xx) the fall dandelion is very prevalent and is affected with yellows (G.C. Morgan).

CAULIFLOWER

DOWNY MILDEW (Peronospora brassicae). About 25% of the plants were affected in a 2-acre field of Snowball at Surrey, B.C. The current symptoms were numerous dark spots with a paling of the intercostal tissues to give a pronounced mottle to the affected leaves, which finally die (I.C. MacSwan, W. Jones).

CLUB ROOT (Plasmodiophora brassicae). An affected plant received from Gibsons Landing, B.C. (I.C. MacSwan). About 25% of 1400 plants were affected in a planting in Montreal, Que.; the land was being cropped to cauliflower for the second year after an excellent crop the first (K.M. Graham). Club root was prevalent on young plants in a garden near St. John's, Nfld.; plants were sev. affected in a field at Mount Pearl (G.C. Morgan).

BACTERIAL SPOT (Pseudomonas maculicola). A single affected head was seen on the market at Ottawa, Ont., on 23 Sept.; where it was grown is unknown. Sunken black spots were present on the peduncles and pedicels (K.M. Graham).

WIRE STEM (Rhizoctonia solani) affected flats of transplants in a greenhouse in St. John's, Nfld.; loss was about 25% of the plants (G.C. Morgan).

WHIPTAIL (molybdenum deficiency). A 2-acre field was sev. affected at St. Martin, Laval Co., Que.; losses were heavy (E. Lavallee). Two plants showed severe whiptail in a private garden in Fredericton, N.B.; the soil was acid, pH 5.0 (D.J. MacLeod). Whiptail was observed affecting several varieties in a planting in Queens Co., P.E.I., on 15 Aug. Snowball and Dan America were most severely affected while Stokes and Ewing were least affected. Applications of ammonium molybdate to 24 plants at the rate of 20 lb. per acre in late August had a noticeably beneficial effect (D. Robinson).

CELERY

EARLY BLIGHT (Cercospora apii) was more prevalent than usual on celery (Salt Lake variety) in the laboratory plots, St. Catharines, Ont., and caused considerable damage. Early blight was about as heavy as late blight in these plots (J.K. Richardson). Early blight was found in only 2 fields located at St. Martin, Que.; the same two were affected last year. They are on muck land and no crop rotation is practised (E. Lavallee).

LATE BLIGHT (Septoria apii-graveolentis). A mod. infection developed on the outside rows that did not receive adequate coverage with a fungicide in a 5-acre field in B.C. (I.C. MacSwan). Sev. infection observed in a market garden at Edmonton, Alta. (L.E. Tyner). Infection was considerable on both the yellow and green varieties particularly in poorly sprayed fields in Lincoln, Wentworth and Simcoe Counties, Ont. The Bradford Marsh was very severely attacked, resulting in considerable loss at harvest (J.K. Richardson). Late blight was general in celery fields in Laval Co., Que. The disease appeared earlier than usual and its prevalence varied with the number of spray applications and the thoroughness with which the sprays were applied (E. Lavallee).

STEM CRACKING (boron deficiency), which used to be found here and there in Laval Co., Que., is no longer a problem since all growers use fertilizers containing borax (E. Lavallee).

YELLOWS (Callistephus virus 1, western strain). A commercial field in Sunbury Co., N.B., showed 2% yellows; zinnias growing near this field showed 4% of the plants affected. These two hosts are highly resistant to the common eastern strain of the virus (D.J. MacLeod).

CHINESE CABBAGE

CLUB ROOT (Plasmodiophora brassicae) affected a few plants at the Station, Saanichton, B.C., (W. Jones) and 1% of the plants in a small bed at Cloverdale (H.N.W. Toms).

CUCUMBER

LEAF SPOT (Alternaria sp.). A few plants were found affected in the test plots, U.B.C., Vancouver, and in a garden at Mission, B.C. (H.N.W. Toms). The disease was widespread in plots and gardens in Kent Co., N.S., infection being tr.-sev. (K.A. Harrison). The etiology of this disease is virtually unknown; cf. P.D.S. 28:42 (I.L.C.).

GREY MOULD (Botrytis cinerea) was sev. in several greenhouse crops in April and May at Leamington, Ont. Up to 20% of the plants were destroyed in 3 houses. Stem lesions were unnoticed by the growers until the plants wilted (C.D. McKeen).

SCAB (Cladosporium cucumerinum) was present in many cucumber crops both in the greenhouse and field at Leamington, Ont., but, as usual, it caused little damage (C.D. McKeen). A severe case was reported from Pembroke, Ont. (K.M. Graham). At St. Laurent, Montreal Island, Que., 200 cucumber beds were very severely affected, losses amounting to $4000. The beds situated at the same spot last year were also diseased (E. Lavallee). Scab caused sl.-sev. damage in Queens Co., P.E.I., depending on the field (R.R. Hurst).

BACTERIAL WILT (Erwinia tracheiphila) was, as usual, present in tr. amounts in many fields in the Harrow-Leamington area, Ont. (C.D. McKeen). Diseased specimens received from Guelph, Ont. (E.H. Garrard). The disease was sev. in a field in Frontenac Co. (D.S. MacLachlan). Tr.-mod. infections were seen about Ottawa (H.N. Racicot). With a big increase in acreage of pickling cucumbers in Kings Co., N.S., most fields showed a few vines that had died from bacterial wilt (K.A. Harrison).

POWDERY MILDEW (Erysiphe cichoracearum) developed in late June or early July in several greenhouse crops at Leamington, Ont.; sulphur dusts kept the disease under control (C.D. McKeen). The disease was present on the lower leaves of a greenhouse crop in Lincoln Co. in January; damage was sl. (G.C. Chamberlain).

WILT (Mycosphaerella citrulina) sev. infected a greenhouse crop at Leamington, Ont., destroying half the crop. Previously the disease has been found on mature or senescent plants but in 1950 comparatively young plants were attacked and rapidly destroyed. Poor control was obtained by spraying or painting the lesions with a ferbam paste, a treatment that has proved highly effective against grey mould (C.D. McKeen).

ANGULAR LEAF SPOT (Pseudomonas lachrymans). Sl. infection observed in a field at Edmonton, Alta. (L.E. Tyner). Leaf and fruit infection was sl. in plantings at Lethbridge and Taber and mod.-sev. in a field, which was irrigated by sprinkler, at Medicine Hat (M.W. Cormack).

DAMPING-OFF (Pythium ultimum) caused losses of tr.-5% in the early greenhouse crop (C.D. McKeen).

STEM ROT (Sclerotinia sclerotiorum). A tr. was observed in one greenhouse at Leamington, Ont. (C.D. McKeen). Stem rot caused sl. damage in a greenhouse at Falmouth, N.S., in April. The stem cankers were the result of infection from diseased corollas that had lodged in the leaf axils. Several clumps of apothecia were found in the greenhouse soil (J.F. Hockey, K.A. Harrison).

MOSAIC (Cucumis virus 1) affected about 10% of the plants in the Horticulture variety plots, C.E.F., Ottawa, Ont. (K.M. Graham). Mosaic affected 25-35% of the plants in about 30 beds placed in the same spot for many years at St. Jean, Que. (E. Lavallee). Two plants were found affected in a commercial field in Sunbury Co., N.B. The virus was transmitted from one plant by sap inoculation to Nicotiana tabacum, Capsicum annuum and Vicia faba. The symptoms that developed in each host were typical of Cucumis virus 1 (D.J. MacLeod). A trace of mosaic was observed in one planting in Queens Co., P.E.I. (R.R. Hurst).

FOOT ROT (cause unknown) was found in several greenhouse crops about Leamington, Ont., and a trace was found early in the season in one field at Harrow. Species of Fusarium have been isolated, but none of the isolates proved pathogenic under a wide variety of conditions (C.D. McKeen).

EGGPLANT

DAMPING-OFF (Rhizoctonia solani). This pathogen has been found to be responsible for most of both the pre- and the post-emergence damping-off in eggplant. Losses of 60% of the seedlings have been observed in stands at Harrow, Ont., in recent years. Soil treatment with Arasan has proved rather ineffective in its control in eggplant (C.D. McKeen).

WILT (Verticillium albo-atrum). The pathogen was isolated from diseased plants in the plots at the Station, Summerland, B.C. (G.E. Woolliams). Up to 20% of the plants were affected in several fields at Harrow, Ont. (C.D. McKeen). The only case observed this year was in a garden at Simcoe, Ont., where 3/4 of the plants were affected and the crop was considerably reduced (J.K. Richardson). Wilt affected about 5% of the plants in the variety plots, C.E.F., Ottawa, Ont.; the pathogen was isolated (K.M. Graham).

HOP

DOWNY MILDEW (Pseudoperonospora humuli). A slight infection was observed at Sardis, B.C., 8 Jan.; the infection was less than normal (W. Jones).

Weather conditions were favourable for the growth of hops in the spring of 1950 in the hop-growing district about Fournier, Ont. At the Hop Illustration Station there, downy mildew spikes were not numerous and disease was very effectively controlled by roguing of the diseased spikes until all vines were trained on the poles. Effective control was then maintained by the following schedule: (1) the fixed copper, C.O.C.S., (8 lb. per 100 gal. water) applied 15 June at the rate of 160 gal. per acre and 450 lb. pressure with a tractor-drawn power-take-off sprayer equipped with 4 spray guns; (2) the same applied 24 June at 500 lb. pressure, 160 gal. per acre; (3) the same plus

nicotine applied 1-3 July; (4) and (5) bordeaux 4-4-40 applied 13 and 21 July, 180 gal. per acre (on account of incomplete coverage with the 4th spray, the yards were dusted with C.O.C.S. 40 lb. per acre during the evening of 21 July or morning of 22 July); (6) bordeaux 4-4-40 applied 24 July, 150 gal. per acre; and (7) C.O.C.S. dust, 40 lb. per acre 29 July.

Most growers dust rather than spray their hops. Where applications were made at regular intervals and sufficient material was used to obtain good coverage, a satisfactory crop was harvested. Where any neglect occurred, particularly in late July, considerable losses occurred from downy mildew. High winds and rains, often over consecutive days, during this period made it difficult to maintain a protective cover. A combination of spraying and dusting gave the best control under these circumstances (A.E. Barrett).

RHIZOCTONIA (R. solani) caused considerable damage at Sardis, B.C., to young shoots, which developed from below the soil line after the plants were pruned. The growth of the plants was checked. The organism was isolated and its pathogenicity proved (W. Jones).

JERUSALEM ARTICHOKE

STEM ROT (Sclerotinia sclerotiorum) affected about 25% of the stems growing in 40 sq. ft. of a home garden at Vancouver, B.C.; about 18 in. of the stem above g ound was covered by a mycelial felt, studded with sclerotia of moderate size and with small sclerotia in the pith. Although the stems were beginning to die back naturally, healthy stems were still green and turgid (H.N.W. Toms).

KALE

CLUB ROOT (Plasmodiophora brassicae) affected a few plants in a garden in Victoria, B.C. (W. Jones).

LETTUCE

GREY MOULD (Botrytis cinerea). A few heads were badly rotted in a garden in Saskatoon, Sask. (T.C. Vanterpool). The disease severely affected about 10% of the plants in a garden in Queens Co., P.E.I. (R.R. Hurst).

DOWNY MILDEW (Bremia lactucae) was general in a seed crop at the Station, Saanichton, B.C., causing mod. damage. The fungus was sporulating 3/4 way up the stems (W. Jones).

BOTTOM ROT (Rhizoctonia solani) caused 50% of the crop to be lost in a small planting at Leamington, Ont. (C.D. McKeen).

WILT (Sclerotinia sclerotiorum) affected 20% of the plants in a seed crop at Okanagan Mission, B.C., causing their death after they blossomed (G.E. Woolliams).

YELLOWS (?Callistephus virus 1) affected 1% of the Grand Rapids plants in the Horticulture plots, C.E.F., Ottawa, Ont.; the symptoms were a blanching and stunting of the leaves and delay in the emergence of the buds (K.M. Graham). A light infection of "white heart" was present along one side of a field planted for a fall crop at Grand Pre, N.S. (K.A. Harrison).

BLACK HEART (boron deficiency). Affected plants showing microscopic symptoms of boron deficiency were received from North Sydney, N.S.; inner affected tissues free from micro-organisms (H.N. Racicot). This disorder was found severely affecting 7 plants in a garden in Queens Co., P.E.I. I believe that this is the first report of this disorder in lettuce in P.E.I. (R.R. Hurst).

TIP BURN (physiological). Many scattered reports received and samples examined in July and August in Kings Co., N.S. Several growers lost up to 60% of the crop grown too late into the summer (K.A. Harrison).

BACTERIAL ROT (unidentified bacterium) severely affected about $\frac{1}{4}$ acre of New York lettuce at Charlottetown, P.E.I., 15 Sept. The outer leaves turned brown and became dry from the margin inwards. The inner leaves showed a wet, dark, marginal rot invaded by a gram negative bacterium. Land fertile and crops rotated (D. Robinson).

MELON

LEAF SPOT (Alternaria cucumerinum) was observed in several fields near the end of the cropping season in the Harrow-Leamington area, Ont.; damage was sl. (C.D. McKeen).

POWDERY MILDEW (Erysiphe cichoracearum) appeared in several fields at Leamington, Ont. Little damage occurred in the earlier crops, but defoliation was mod. in the later-maturing ones (C.D. McKeen).

WILT (Fusarium bulbigenum var. niveum) was present in many fields in the Harrow-Leamington area, Ont., and is becoming widespread. On many farms only the resistant variety Iroquois can be grown profitably (C.D. McKeen). Although in the one field observed wilt affected about 10% of the plants in the Ancaster district, growers stated the disease was becoming quite common (J.K. Richardson).

DAMPING-OFF (Pythium irregulare). Several rows of melons and watermelons were almost wiped out in the seedling stage at Saskatoon, Sask. Isolation yielded some Fusaria but chiefly Pythium irregulare (R.J. Ledingham, T.C. Vanterpool).

WILT (Verticillium albo-atrum). The fungus was isolated from affected specimens received from Osoyoos, B.C. (G.E. Woolliams).

MOSAIC (virus). In general, infection was sl.; however, in one field at Leamington, a 50% infection was recorded. No explanation was found for this high infection (C.D. McKeen). In 2 fields of about 5 acres in the Ancaster district, 75 and 80% of the plants were infected and the crop was almost a total loss. Aphids were abundant, which may have been a contributing factor (J.K. Richardson). About 1% of the plants were affected in the Horticulture plots, C.E.F., Ottawa, Ont. (K.M. Graham).

LEAF SPOT (cause undetermined). This apparently new trouble that was so widespread in Essex Co., Ont., in 1949 (P.D.S. 29:48) was observed in parts of 2 fields in 1950. Although the spots show certain characteristics of a bacterial infection, experimental results to date have indicated that it is not of bacterial origin (C.D. McKeen).

ONION

BLACK MOULD (Aspergillus niger). A few affected Sweet Spanish onions were received from Chatham, Ont. (C.D. McKeen).

NECK ROT (Botrytis allii). Mod. infection in a garden at Ladysmith, B.C. This species has been isolated from many diseased samples (W. Jones). A decay of the outer scales of the bulbs appeared in both fall and spring planted onions in early June after prolonged and exceptional cool weather this spring. The disease was fairly general in the Vernon district (G.E. Woolliams). Up to 15% of the Sweet Spanish onions harvested by a large grower near Chatham, Ont.; became affected before or soon after they were placed in storage (C.D. McKeen). Neck rot caused in storage a loss of 15% of the sets of Kenearly grown at the Station, Kentville, N.S. The variety is one developed at the Station to mature the same season when the crop is sown in the field (K.A. Harrison). One sev. diseased lot brought to the Laboratory, Charlottetown, P.E.I. (R.R. Hurst).

BULB ROT (Fusarium sp.) caused sev. damage in one planting in the Winnipeg area, Man.; F. oxysporum f. cepae was readily isolated from the infected bulbs (E. Robertson, W.L. Gordon). A low percentage of Spanish onion bulbs were affected at harvest in one field at Kingsville, Ont., and in another at Chatham (C.D. McKeen).

DOWNY MILDEW (Peronospora destructor). Infection was sev. in a truck garden on Salt Spring Island, B.C., and mod. on a White Portugal seed crop at Saanichton (W. Jones). The disease was sev. on a bulb crop of White Portugal and in smaller amounts on other varieties in the test plots, U.B.C., Vancouver, B.C. (H.N.W. Toms). Owing to a warm dry season downy mildew was virtually absent from the B.C. Interior. It did occur in the Grand Forks district, where two pockets of infection were found in adjacent seed crops (G.E. Woolliams). Infection was mod.-sev. in 1½ acre field near Toronto, Ont. (K.M. Graham).

PINK ROOT (Pyrenochaeta terrestris) greatly reduced the yields in many fields in the Leamington marsh, Ont. There is considerable evidence to indicate that several other organisms are involved in the pink root complex in onions grown on muck soils in s.w. Ont. (C.D. McKeen).

ROOT ROT (Pythium irregulare) was found affecting a small percentage of the Spanish onion seedlings grown in flats in Essex Co., Ont. Remarkably good control was obtained by treating the seed-bed soil with Arasan prior to planting (C.D. McKeen).

SMUT (Urocystis cepulae) affected 1-3% of the onions seeded in the Leamington marsh, Ont. (C.D. McKeen).

CHEMICAL INJURY (excess boron). As a result of faulty field application in the spring, parts of a field planted to seed onions at Grand Forks, B.C., showed injury and many plants eventually died (G.E. Woolliams).

PARSNIP

GREY MOULD (Botrytis cinerea) destroyed part of one root in storage at Centreville, N.S. (K.A. Harrison).

SCLEROTINIA ROT (S. sclerotiorum) was isolated from plants growing in the greenhouse at Edmonton, Alta. (T.R. Davidson).

PEA

LEAF and POD SPOT (Ascochyta pisi). Infection was tr.-sl. in the variety plots and in several plantings at Lethbridge, Alta. (M.W. Cormack). Infection was tr.-sl. on most varieties at Lacombe. About Edmonton the disease became mod.-sev. in some plantings by harvest time (S.G. Fushtey). Infection was mod. in 2 plantings of Lincoln in the Winnipeg area, Man. (W.A.F. Hagborg).

A survey revealed infection to be tr. in 5/22 fields in s.w. Ont., tr.-sl. in a 30-acre field of Glacier at Alliston and mod.-sev. on 25% of the plants in 20-acre field of this variety at Rosemont. Infection was sev. and plants killed in artificially inoculated plots at O.A.C., Guelph; of 61 varieties

tested Scotch, O.A.C. 181, and A-100 appeared to have some resistance to 4 different isolates of A. pisi. Leaves and stems of a volunteer stand of vetch were found sev. infected at Scotland; tr. also at Selkirk, and in a roadside stand of vetch at Thurso, Que. (J.D. Gilpatrick).

A survey for leaf and pod spot were made in fields of peas in eastern Ont., principally the Ottawa Valley. Most of the crop examined was grown from foundation or registered stock. Over most of the area growing conditions were excellent except in the Renfrew district where the pea crop was a failure as a result of extremely dry conditions in the early part of the growing season. No disease was found in 18 fields comprising 16 varieties of garden peas. Of the 20 fields of field peas examined, 3 of Valley and 5 of Chancellor were free of disease while infection was 6-tr. 1-sl./12 fields of Arthur. Many fields of canning peas, largely Canner King, were examined in Prince Edward Co.; all were free of A. pisi and yields appeared the highest in years (V.R. Wallen, A.J. Skolko).

A tr. of leaf and pod spot was found in a small field of Fenland Wonder being grown for seed at Tupperville, N.S. (K.A. Harrison).

POWDERY MILDEW (Erysiphe polygoni) was present in varying amounts on practically all varieties in August in the B.C. Interior (G.E. Woolliams). Infection was mod. at Craigmyle, Alta. (A.W. Henry), and sev. in the plots at Lethbridge in late August on all except early maturing varieties (M.W. Cormack). Powdery mildew was prevalent in the O.A.C. plots and in gardens at Guelph, Ont., in August (J.D. Gilpatrick). Infection was sl. in a field of Valley in the Ottawa district (V.R. Wallen) and a tr. in a field of Fenland Wonder in Kings Co., N.S. (K.A. Harrison).

ROOT ROT and WILT (Fusarium spp.) caused sev. damage to Laxton's Progress in a home garden on Salt Spring Island, B.C. (W. Jones). A spotty infection affecting 1% of the plants was present in 5 acre field of Surprise on Westham Island (I.C. MacSwan). Root rot caused sev. damage in one planting at Lethbridge, Alta. (M.N. Grant). Of the 22 fields examined in s.w. Ont., no root rot (F. solani var. martii) was found in 4, and a few plants were diseased in most fields, but infection was 1% in 4 fields, 5% in 1, 50% in a 30-acre field of Glacier at Alliston (J.D. Gilpatrick). Tr. in small plot of Ottawa PE-8 at Ottawa (V.R. Wallen). Root rot was sev. in a garden patch of Fenland Wonder at Kentville, N.S.; plants kept dying throughout the season after they were 3 in. high; less than half a crop was harvested (K.A. Harrison).

NEMATODES (Heterodera sp.). A few elliptical depauperate areas up to 20 ft. long, were present in a 3-acre field of canning peas at Ladner, B.C. Some of the weeds in these areas were affected by root-knot (I.C. MacSwan, H.N.W. Toms). Reported as H. goettingiana Lieb. by A.D. Baker.

MYCOSPHAERELLA BLIGHT (M. pinodes). A tr. was found in a garden at Guelph, Ont. (J.D. Gilpatrick).

DOWNY MILDEW (Perenospora pisi) was general, causing sev. damage, in a home garden on Salt Spring Island, B.C. (W. Jones). Tr. found at Lethbridge, Alta. (A.W. Henry). Infection was tr. in 30 acres of Glacier and mod. in 12 of Glacier at Elmvale, Ont.; and mod. in 16 acres of Pride at Minesing (J.D. Gilpatrick). As J.D. Gilpatrick and L.V. Busch (U.S.D.A. Pl. Dis. Reporter 34(11):340-341. 15 Nov. 1950) note, heavy infections have not been reported previously in Eastern Canada (I.L.C.).

BACTERIAL BLIGHT (Pseudomonas pisi). Tr. infection in the variety plots at Lacombe, Alta. (S.G. Fushtey). Infection was sl.-mod. in a field of Glacier heavily infected with Ascochyta pisi at Alliston, Ont. (J.D. Gilpatrick).

LEAF BLOTCH (Septoria pisi). A tr. was found in a plot of Linton in the Ottawa district, Ont. (V.R. Wallen).

RUST (Uromyces fabae) was recorded as follows: single leaf in plot at Vancouver, B.C. (H.N.W. Toms); tr. in garden at Guelph, Ont. (J.D. Gilpatrick); sl. infection in 2-acre field of Arthur in the Ottawa district (V.R. Wallen); infection heavy in a late planting of Fenland Wonder in Kings Co., N.S. (K.A. Harrison).

MOSAIC (Pisum virus 1). A tr. was found in garden in Sunbury Co., N.B.; 1% of the plants were affected in a garden at the Fredericton Station. The virus was identified by standard methods (D.J. MacLeod).

PEPPER

ANTHRACNOSE (Colletotrichum sp.) affected up to 20% of the fruits that ripened late in many fields in Essex Co., Ont.; sweet and semi-hot varieties were more affected than pimento or hot types. The Colletotrichum was not determined specifically (C.D. McKeen).

SOFT ROT (Erwinia carotovora). The sl. damage caused in Essex Co., Ont., in 1950 was in striking contrast to the sev. damage in 1949 and was largely confined to fruits that ripened in July. The sl. infection this year is attributed to the cool season, which was unfavourable for the corn borer as this insect is largely responsible for transmission of the disease in s.w. Ont. (C.D. McKeen). Soft rot caused the loss of 15% of the fruits of Harris Earliest at Kentville, N.S., following slug injury to the fruits (K.A. Harrison).

DAMPING-OFF (Pythium sp. and Rhizoctonia Solani) occurred in small amounts in several greenhouses about Harrow, Ont. Treating the soil used in both the seed beds and the transplanting beds has markedly reduced losses from this disease in recent years (C.D. McKeen).

WILT (Verticillium spp.). V. albo-atrum was isolated from diseased specimens from a home garden at Lillooet, B.C. (G.E. Woolliams). Up to 5% of the plants were affected in several fields about Harrow, Ont. (C.D. McKeen).

ETCH (virus). A virus disease, apparently new to Ont., seriously affected the pepper crop in s.w. Ont. All pepper fields examined were affected, losses varying from 10% to almost 100%. Studies to date indicate the virus is a strain of the tobacco etch virus. Greenhouse experiments confirmed field observations that aphids were largely responsible for its transmission (C.D. McKeen). See Virus Diseases under Tobacco (I.L.C.). Mosaic was quite common on most varieties in plantings in the Niagara district. Several plants of the new variety V35 in a garden in Lincoln Co. showed symptoms of a ring spotting, distinct from those caused usually by mosaic (J.K. Richardson).

MILD MOSAIC (Solanum virus 2). Three plants in a garden near a plot of Green Mountain potatoes affected by rugose mosaic (Solanum viruses 1 and 2) at the Station, Fredericton, N.B., showed a mild mosaic. The virus was identified by standard methods (D.J. MacLeod).

STREAK (Solanum virus 1, S strain). Two plants were found affected in a garden at the Station, Fredericton, N.B. The virus was identified by standard methods (D.J. MacLeod).

BLOSSOM-END ROT (non-parasitic). Affected specimens were received from a market garden on Lulu Island, B.C.; the summer was dry (H.N.W. Toms). Blossom-end rot affected up to 10% of the fruit of all varieties in most fields in s. Essex Co., Ont.; most of the damage occurred in August, the hotest part of the season (C.D. McKeen).

SUN SCALD (non-parasitic) caused the loss of 5% of the fruit in a field at Sheffield Mills, N.S.; a good set of fruit was obtained, but foliage was scanty (K.A. Harrison).

POTATO

The Division of Plant Protection, Science Service, supplied the data in Tables 3 to 7 on Seed Potato Certification. All fields entered for certification were planted with Foundation or Foundation A seed.

There was a further increase in the acreage devoted to the seed potato industry in 1950, but, as the percentage of fields passing inspection was less, actually fewer acres passed than in 1949. If the figures for rejection in 1950 are compared with those of last year it will be seen that the only disease less prevalent in 1950 was bacterial ring rot. The amount of mosaic and black leg increased very materially.

Table 4. Seed Potato Certification:
Number of Fields and Acres Inspected, 1950

Province	Number of Fields		Fields Passed %	Number of Acres		Acres Passed %
	Entered	Passed		Entered	Passed	
P.E.I.	8,412	6,871	81.7	35,581	29,628	83.3
N.S.	545	480	88.1	1,119	920.1	82.2
N.B.	3,589	3,194	89.0	27,056	23,049.2	85.2
Que.	1,389	841	60.5	3,676	1,971.8	53.6
Ont.	804	660	82.1	2,575	2,113.8	82.1
Man.	133	121	91.0	607	525	86.5
Sask.	78	76	97.4	137	115.5	84.3
Alta.	290	243	83.8	1,672	1,138.7	68.1
B.C.	963	806	83.7	2,929	2,471	84.4
Total	16,203	13,292	82.0	75,352	61,933.1	82.2
Previous Yearly Totals						
1949	15,476	13,739	88.8	72,706	65,051	89.4
1948	15,635	12,504	80.0	70,561	57,392	81.3
1947	14,616	12,605	86.2	60,385	53,474	88.5
1946	14,198	11,628	81.9	66,665	55,256	82.8

Acres Entered		Acres Passed	
1950	75,352	1950	61,933
1949	72,706	1949	65,051
Increase of 2,646 or 3.6%		Decrease of 3,118 or 4.8%	

Table 5. Seed Potato Certification: Acreage Passed by Varieties, 1950

Variety	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.-Alta.	B.C.	Total
Katahdin	4831	291	17899	45	1421	5	39	24,531
Sebago	11336	58	340	1.5	61	2	5	11,803.5
Irish Cobbler	8460	137	1323	128	166	197	5	10,416
Green Mountain	4605	105	2108	1787	107.2	2	127	8,841.2
Netted Gem	18	2	85	5	13	1093	1651	2,867
Bliss Triumph	46	248	728			57		1,079
Pontiac	90		441			162	0.5	693.5
Chippewa	99	29	26		273	0.1	22	449.1
White Rose			70			7	234	311
Warba	20	8	15	0.3	17.3	65.5	118	244.1
Early Epicure						0.1	140	140.1
Sequoia	106	0.1					1	107.1
Columbia Russet						37	69	106
Canus		0.1	0.8	2.2	13	59	8	83.1
Others*	17	42	13.5	2.7	42.2	92.5	51.5	261.4
Total	29628	920.2	23049.3	1971.7	2113.7	1779.2	2471	61,933.1

*These varieties with the acreage of each were: Early Ohio 54.6, Early Rose 31, Rural Russet 28, Canso (391) 23, Carter's Early Favorite 21, Great Scot 16, Red Warba 14, Rural New Yorker (Dooley) 13, McIntyre 8.1, Garnet Chili 8, Keswick (431) 7.25, Mohawk 7, Pawnee 6.2, White Bliss 6, Burbank 4.5, Sir Walter Raleigh 4, Gold Coin 4, Up-to-date 3, Clarka #3 2, and Arran Victory 0.75.

Table 6. Seed Potato Certification: Fields Rejected on Field Inspection, 1950

Province	Leaf Roll	Mosaic	Ring Rot in field	Ring Rot on farm	Black Leg	Wilts	Adjacent Diseased Fields	For-eign Var.	Misc.	Total
P.E.I.	84	456	-	-	245	124	86	195	351	1,541
N.S.	4	19	6	11	3	2	7	7	6	65
N.B.	49	143	92	34	16	-	14	33	14	395
Que.	28	149	140	59	98	-	45	10	19	548
Ont.	41	12	14	6	27	7	9	6	22	144
Man.	-	-	8	2	-	-	-	1	1	12
Sask.	-	1	-	-	1	-	-	-	-	2
Alta.	-	-	2	5	33	-	1	1	5	47
B.C.	38	16	-	-	34	2	13	15	39	157
Total	244	796	262	117	457	135	175	268	457	2,911
Rejections as a percentage of fields:										
Entered	1.5	4.9	1.6	0.7	2.8	0.9	1.1	1.7	2.8	18.0%
Rejected	8.4	27.4	9.0	4.0	15.7	4.6	6.0	9.2	15.7	100%

Table 7. Seed Potato Certification: Average Percentages of Diseases found in Fields, 1950

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	.33	.02	.07	.39	.03	.08	.04	.30	.14
Leaf Roll	.14	.06	.13	.08	.04	.03	.04	.02	.15
Mosaic	.25	.19	.21	.37	.01	.08	.16	.01	.09
Fields passed: (final inspection)									
Black Leg	.02	.01	.04	.10	.01	.03	.01	.03	.04
Leaf Roll	.01	.03	.04	.02	.02	—	.01	-	.02
Mosaic	.01	.03	.05	.04	.01	.02	.01	-	.02

The variety picture also shows many changes. Sebago has become the most widely grown variety in P.E.I. with the result that the certified acreage of Sebego was only second to Katahdin, the most popular variety in N.B., whereas Irish Cobbler and Green Mountain have now dropped to the third and fourth places respectively. Katahdin appears to yield better than Green Mountain and to produce a crop equal to the latter variety in quality in the warmer sections of the eastern United States and possibly in southwestern Ont. This variety thus enjoys a firmer export market than other varieties. Sebago is very popular with the restaurant trade and manufacturers of potato chips. Moreover it appears to be less susceptible to late blight, an important advantage in P.E.I.; on the other hand it is susceptible to wilt and storage dry rot. Although no precise figures are available on how far Katahdin and Sebago have replaced the high-quality varieties Green Mountain and Irish Cobbler in the table stock trade in eastern Canada, the replacement must be considerable to the detriment of quality. Many other old varieties besides the leaders are also declining in importance to be replaced by new varieties. Of the latter mention should be made of two new seedling varieties produced at the Station, Fredericton, N.B., under the co-operative potato breeding project of Science Service and Experimental Farms Service. These varieties named Canso (#391) and Keswick (#431) are resistant to late blight, the former being particularly promising.

EARLY BLIGHT (Alternaria solani) infection was 100-sl. 20-mod. 3-sev./997 fields inspected in B.C., particularly in fields in the Grand Forks and Cariboo districts (H.S. MacLeod). The disease was general on the new varieties Keswick and Canso, the former being much more susceptible than our standard varieties. It was also quite common in gardens in Vancouver Island where growing conditions were dry (W. Jones). Early blight developed late in the growing season and infection was tr.-mod. throughout central and n. Alta. Early varieties were most sev. infected (T.R. Davidson, J.W. Marritt). The pathogen was isolated from plants showing severe top burning and other atypical symptoms from a field near Coutts (M.W. Cormack). Early blight appeared in most districts in Sask. and caused partial to complete defoliation in a few fields of early potatoes that had escaped the mid-August frosts (A. Charlebois). Infection was a tr. on early varieties in the Winkler area, Man., and mod. in fields in the Rainy River and Thumber Bay districts, Ont. (D.J. Petty). From 16 isolations made from affected tubers received from Minnedosa, Man., 27 February, 13 colonies of A. solani were obtained; according to A.A. Dilworth, Agr. Representative, the tubers appeared normal when dug, "but during the winter they have been turning black and losing their moisture" (H.N. Racicot).

Early blight was found in many fields in the London district, Ont., but it caused little damage (F.J. Hudson). The disease also caused little damage in district 2, except in a field in Durham Co., where the injury was mod. (W.L.S. Kemp). Late blight was even less prevalent than usual in district 3. However in a trial plot, which was not sprayed with a fungicide, Keswick was almost completely destroyed by September (H.W. Whiteside). In e. Ont., early blight was observed in 24/74 fields examined, but in none was it severe (O.W. Lachaine). Although the disease may not have been of importance in commercial

plantings in e. Ont., diseased specimens were received by 27 July and those arriving about mid-Aug. were mod.-sev. infected (H.N. Racicot). A mod. infection was noted in most fields in n. Que.; elsewhere it occurred in negligible amounts except in isolated cases where infection was sev. by 15 Aug. (B. Baribeau). Early blight was present in most parts of N.B., but infection was sl. in nearly all fields. Tuber rot was observed in a few bins during the winter and spring shipping season, but the loss was negligible (C.H. Godwin). Early blight was very sev. in certain fields of Early Rose, Irish Cobbler and Canso in Kings and Colchester counties, N.S. The disease appeared early following dry weather in the early summer; many fields showed every leaf infected and then died down early (K.A. Harrison). Although early blight was possibly present in more fields in N.S. in 1950 than in 1949, sev. infections were noted in only a few. The most severe infections reported were in Keswick and Canso, particularly in the former (R.C. Layton). Infection was generally light in P.E.I. and damage was negligible (S.G. Peppin). A trace of rot was present in one 1949 lot in storage on 2 Feb. (R.R. Hurst). Early blight was found in 20 fields in Avalon Peninsula, Nfld. It was late in developing and was less prevalent than last year. In several bins last winter a rot attributed to A. solani infected about 5% of the tubers (G.C. Morgan).

LEAF SPOT (Botrytis cinerea) was common in many fields in N.B.; it developed under humid conditions when the withered flowers adhered to the leaf surfaces (J.L. Howatt).

BLACK DOT (Colletotrichum atramentarium) was found affecting Irish Cobbler potatoes in a garden at Bon Accord, Alta.; seed was obtained from N.B. (A.W. Henry). The fungus was very conspicuous on vines at harvest in a garden at Saskatoon, Sask., but the damage was considered nil (T.C. Vanterpool). Tr. to 25% of the stalks were affected in a field of Irish Cobbler in Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL RING ROT (Corynebacterium sepedonicum). B.C. continues virtually free of ring rot. Traces were found in 9 farms in the Lower Fraser Valley. Only table stock was grown on these farms. On 3 farms the same Katahdin seed was used, the original seed being secured from P.E.I. and planted on one of the farms in 1949. As the 1950 crop was the second to be grown from this seed lot, it is impossible to be certain of the source of infection despite the fact that no ring rot was detected in fields from other seed lots on one or other of the three farms. The source of infection in the other infected fields was also obscure although in two the disease appeared in Katahdin seed from P.E.I. grown for the first time in B.C. in 1950. Potato crops in 4 other farms were placed under detention because machinery had been used from affected farms. The crops under detention are being disposed of in paper bags to special markets and their sale is expected to be completed by 31 January 1951 (I.C. MacSwan, W.R. Foster). Ring rot was found in tubers from a crop of Sequoia entered for certification at Ladysmith in February. The original seed was grown in P.E.I. in 1949 (W. Jones).

As a result of the Provincial survey conducted with the assistance of Science Service, Dominion Department of Agriculture, bacterial ring rot was found

on 130 farms (1515 acres) out of 1229 farms (12,124 acres) in Alta. The percentage of farms infected was only slightly less than in the previous year, viz. 10.5% in 1950 compared to 11.2% in 1949. This figure is still high compared to the average low of 6.6% for 1946-48. The increase of the past 2 years is attributed to the presence of many new growers particularly in the Lethbridge area; very few are acquainted with the disease and the control regulations in force. The high price ($3.00 or more per bu.) for seed potatoes in the spring led many growers to obtain inferior seed. In fact, a large quantity of commercial potatoes was shipped in from other provinces and used for seed. All diseased stock are now moving under the control of the Provincial Department and about a quarter has been disposed of. Outlets are difficult to find and part of the affected stock may have to be fed to livestock.

In following up some ring rot cases this year the source of infected seed could be traced unmistakeably to the use of old sacks. Up to the present no attempt has been made to control their movement, but growers have been warned of the danger of using sacks of unknown origin.

In continuation of last year's policy the Department has purchased a supply of Foundation A seed, for sale to growers who must secure new seed to replace their own affected stocks. Growers who have had ring rot for 3 consecutive years are being asked to reduce their acreage or stop growing potatoes entirely for a year or two. Also all potatoes brought into Alta. are now subject to inspection for ring rot. It is hoped this tightening of the regulations will materially reduce ring rot in 1951 (W. Lobay). A trace was found in 2 fields entered for certification in Alta.; 5 others were rejected because of its presence in other fields on the same farm (J.W. Marritt).

Bacterial ring rot was not found in any fields entered for certification in Sask. Despite the short season, the disease was found in bins of table-stock Canus at Lumsden (A. Charlebois). Specimens showing the disease were received from 10 widely separated points in Sask. (R.J. Ledingham). A tr. was found in Man. in a seed stock from Minnesota comprising 7 fields; the disease also occurred in one field of Man. seed (D.J. Petty). A single plant was found affected in one field inspected in s.w. Ont. (F.J. Hudson). In district 2, 9 cases were found, 2 in the field and 7 in other potatoes on the same farm. One of the 2 cases in the field was attributed to infected seed, and the other from custom-used implements (W.L.S. Kemp). Ring rot was found in 8 inspected fields in district 3, with additional cases noted at harvest and on bin inspection. A clean up campaign was organized in n. Simcoe Co. by our staff and the provincial department of agriculture. All farms of seed growers were visited and the disinfection was supervised of all potato machinery before planting and of all potato storages and harvesting equipment before harvesting. A special circular was sent all growers in the district with instructions for other disinfections especially if machinery were to be used co-operatively (H.W. Whiteside). Ring rot was found in the field on 6 seed growers' farms and on one other on bin inspection in s. Ont. (O.W. Lachaine). During the eighth annual survey for bacterial ring rot in Ont., about 2500 farms were visited and ring rot was found on 362 (14%). This figure is considerable less than last year when 590 (26%) of the 2250 farms inspected were affected. Of this year's positive reports 65% were from farms on which ring rot had not been previously reported (D.S. MacLachlan).

Bacterial ring rot was definitely less prevalent in Que. in 1950 than in recent years and the percentage of plants infected was low in the affected fields. This improvement resulted from the use of better seed for planting. However, 140 (10%) of the fields entered for certification were rejected for ring rot. The disease is more prevalent in w. Que. than in e. Que. The use of second-hand bags is believed to be an important factor in introducing the disease into new localities.

The Teton variety was tested in trials supervised by the Seed Potato Certification staff for the second year in Temiscouata, Kamouraska and Chicoutimi counties and at the Station, Ste. Anne de la Pocatiere. The seed was provided by N.M. Parks, Division of Horticulture, C.E.F., Ottawa and Carter's Seed Co., Washburn, Me. The Teton was planted only on farms where ring rot had been present for the past 5-6 years; with Green Mountain in a nearby field on each farm. On the 16 farms in the test, a total acreage of 5.6 acres of Teton yielded 1232 bu. or an average of 220 bu. per acre. Inspection at digging time revealed less than 1% of stem-end discoloration and pear-shaped tubers, the same amount of common scab, and no ring rot, late blight, or black leg except on one farm where black leg was present and 5 tubers affected by ring rot. The Green Mountains in the neighbouring row were severely affected by ring rot. Under our climatic conditions, Teton is equal to Green Mountain and highly acceptable to the growers.

Its high resistance to ring rot and also its resistance to potato virus 2 would make the variety very valuable to many growers who are sustaining serious losses from this bacterial disease (B. Baribeau).

Bacterial ring rot was the chief cause of rejection of fields inspected in N.B., as 126 fields (1900 acres) or 7% of the acreage was rejected. This figure represents a decrease from last year although the number of new growers was considerable (C.H. Godwin). The bacterial ring rot survey in N.S. was confined to checking farms where ring rot was found last year and adjacent farms and to a third inspection of as many of the certified seed fields as possible. The disease was reported on 7 farms, on four of which certified seed was being grown. Our own inspection revealed 17 cases, 6 in the fields entered for certification and 11 in other fields on the same farm (R.C. Layton). Bacterial ring rot was not found in the current crop in P.E.I.; however, 3 cases in addition to the 8 reported last year were found in the 1949 crop; Sebago was affected in one and Katahdin in two (S.G. Peppin, R.R. Hurst). Bacterial ring rot is suspected to occur in Nfld., but its presence has yet to be verified (G.C. Morgan).

BLACK LEG (Erwinia phytophthora) was found in 196 (19.7%) of the fields inspected in B.C. and caused the rejection of 34 fields (88.6 acres). The disease seems to have increased in importance in recent years although there was little change this year over last; the growing season was slightly drier than normal in most districts (H.S. MacLeod). Black leg, the principal cause of rejections in Alta., was found in 92 (31.7%) of the fields inspected and 33 were rejected. The disease was rather prevalent in s. Alta., particularly in the Brooks area (J.W. Marritt). Black leg was seen in 4% of the fields inspected in Sask. and caused one to be rejected. A mod. infection occurred in 2 table stock fields at Lumsden; the growers claimed that Foundation A seed was planted (A. Charlebois). In one field in the Kinley area over 31% of the plants were affected by black leg (R.J. Ledingham). The disease was seen in 12% of the fields inspected in Man.

and 20% in n.w. Ont.; no fields were rejected (D.J. Petty). Specimens were received from a field at Virden, Man. where many of the plants were wilting and dying (H.N. Racicot).

Black leg was present in many fields of early potatoes in the Leamington area, Ont.; losses were tr. to 2-3% (C.D. McKeen). Two fields were rejected on account of black leg in s.w. Ont.; an occasional plant was affected in other fields inspected (F.J. Hudson). Black leg caused the rejection of 7 fields in district 3; the seed planted was mostly from the Maritimes (W.L.S. Kemp). Black leg was late in developing but was more prevalent than usual in district 3, 12 fields being rejected for this reason. The weather conditions were ideal for its development. In one field where several consecutive plants in the row were affected the seed corn maggot was found working in the stems (H.W. Whiteside). Black leg caused the rejection of 4 fields in e. Ont.; the highest infection observed was 7% (O.W. Lachaine). Black leg was general in Que. and was found in 613 (44.1%) of the fields inspected causing 98 fields (418 acres) to be rejected, this being the worst outbreak ever experienced. The highest infections recorded were 7% in a field entered for certification and 16% in a table stock field. Most growers do not treat. Black leg was more noticeable than usual in the tubers at digging time and bin inspection (B. Baribeau). Black leg was fairly general in N.B. and was more prevalent than last year. It caused the rejection of 16 fields (84 acres). Conditions favourable to the disease were a late spring frost, which caused in a few cases chilling of cut seed, and cool moist conditions, which prevailed during the growing season (C.H. Godwin). A trace was found in Canso in a commercial planting in York Co. (D.J. MacLeod). Black leg was found in 57 (1.0%) of the fields inspected in N.S. and 3 fields were rejected. Sebago was more frequently affected than any other variety (R.C. Layton). Black leg showed a big increase in P.E.I. over 1949; 245 fields (2.9%) were rejected in 1950 compared with 60 (0.7%) in 1949 (S.G. Peppin). Despite a dry planting season, black leg was very general in P.E.I. Up to 25% of the plants were found affected. In a general survey average infection was Sebago 7%, Katahdin 2%, Irish Cobbler 1.5%, and Green Mountain 0.5% (D. Robinson, R.R. Hurst). Black leg was present in half of the 30 fields visited in the Avalon Peninsula, Nfld., and a 20% loss occurred in a few fields. The disease was more prevalent than last year. Most farmers do not treat (G.C. Morgan).

WILT (Fusarium oxysporum) was found in 92 (9.2%) of the fields inspected in B.C. and caused the rejection of 2. The disease was much less prevalent than last year; the highest incidence was in the Okanagan, followed closely by the Cariboo (H.S. MacLeod). Wilt was somewhat more prevalent than last year in Alta., particularly in the south. It was found in 34 (11.7%) of the fields inspected (J.W. Marritt). Wilt was present in 18% of the fields inspected in Man. and 14% in n.w. Ont. (D.J. Petty). Very little wilt was seen in fields inspected in s.w. Ont. (F.J. Hudson). Two fields were rejected on account of wilt in district 2; very little stem-end browning has been found during bin inspections (W.L.S. Kemp). Wilt appeared to be more prevalent than usual in district 3; 5 fields were rejected (H.W. Whiteside). One field was rejected in e. Ont. (O.W. Lachaine). Wilt was less prevalent in Que. than usual, small amounts being present in a few fields mostly of Irish Cobbler and Green Mountain (B. Baribeau). A few cases were reported in N.B. (C.H. Godwin). A trace was

reported in a field of Green Mountain in Queens Co., P.E.I. (R.R. Hurst).

DRY ROT (Fusarium spp.) was more prevalent in s. Alta. than usual and was a problem in some districts particularly in stock grown on light soils about Rosemary and Vauxhall (H.W. Marritt). Storage rots of various types were prevalent in one large storage cellar at Lethbridge; F. caeruleum was the predominant isolate (M.W. Cormack). More fully matured crops with less mechanical bruising during harvesting and improved storage has lessened the loss caused by dry rot in district 2, Ont. Preventive measures are constantly being stressed (W.L.S. Kemp). Bruising caused about the usual amount of dry rot in district 3. However 3 specimens showing unusual dry rot symptoms were sent to Ottawa for examination. In the opinion of H.N. Racicot these specimens had been injured by fertilizer. It is believed that much of so-called bruising where a white or grey lesion extends into the tuber is caused by chemicals (See Fertilizer Burn) (H.W. Whiteside). In Que., storage rot has not been the problem it was in 1949; losses in 1950 are about 5% (B. Baribeau). Dry rot was again reported in odd lots from most parts of N.B., although it was less prevalent than in 1949. A loss of 15% was recorded in one bin of Katahdin in York Co. (C.H. Godwin). Storage rot is about as prevalent in P.E.I. in 1950 as in 1949; losses are mostly in Sebago and averaged about 1% of the crop. In table stock losses as high as 5% have been recorded (S.G. Peppin, R.R. Hurst). Storage rot was prevalent in potatoes stored at St. John's, Nfld. last winter; in one warehouse 20% of the tubers were affected (G.C. Morgan).

LENTICEL NECROSIS (Fusarium sp.) caused sl.-sev. damage in a number of seedling varieties at Fredericton, N.B. (J.L. Howatt).

RHIZOCTONIA (Pellicularia filamentosa (Rhizoctonia solani) infection was 531-sl. 220-mod. 18-sev./997 fields inspected in B.C.; it was about as prevalent as last year, but with a larger portion of the tubers showing a mod. development of sclerotia (H.S. MacLeod). Infection was mod. in 46 (15.9%) of the fields inspected in Alta. The tops were injured by an early frost and in consequence tubers harvested late bore sclerotia (J.W. Marritt). A sev. infection observed in a garden at Edmonton, Alta. (A.W. Henry). Infection was sl. in most fields to mod.-sev. in a few in Sask. The development of sclerotia on the tubers was heavier than usual in many lots of early potatoes (A. Charlebois). The cool moist weather prevailing in Sask. this past summer apparently favoured rhizoctonia; the disease was widespread and probably caused considerable loss (R.J. Ledingham). The development of the perfect stage was pronounced on 4-5% of the hills in a private garden at Saskatoon. The moist cool weather of mid summer probably favoured basidial development. Heavy development of sclerotia on the tubers was not correlated with basal stem lesions on the plants (T.C. Vanterpool). Most fields in Man. and n.w. Ont. were lightly infected (D.J. Petty). Only light infections were observed on the plants and tubers in s.w. Ont. (F.J. Hudson). Although rhizoctonia was less prevalent in district 2 than formerly, a portion of the tubers had to be graded out in a few crops, notably in York Co. (W.L.S. Kemp). Rhizoctonia was more prevalent than usual in district 3, particularly in Temiskaming and Cochrane areas; the

summer was cool and moist (H.W. Whiteside). Rhizoctonia was observed in 5/74 fields inspected in e. Ont. (O.W. Lachaine). Infection was mod. in the fields inspected in Que. and development of sclerotia was sl.-mod. in most lots of tubers; it was more prevalent than in 1949 (B. Baribeau). Rhizoctonia severely infected a Fredericton seedling tested at Ste. Clothilde; basidiospores were forming in profusion on the grey weft of mycelium on the stem above the ground line on 18 July (K.M. Graham). Rhizoctonia was fairly general in fields throughout N.B., but infection was sl. or sometimes mod.; a sl. development of sclerotia occurred in a few lots with negligible loss (C.H. Godwin). Infection was sl. to mod. in a few fields in N.S. where potatoes have been planted for several successive years on the same ground. Scurf development was also sl. (R.C. Layton). Rhizoctonia infection was very light in P.E.I. and damage was negligible (S.G. Peppin). Rhizoctonia was present in 30 (60%) of the fields visited in Nfld., infection being 15-sl. 8-mod. 7-sev. On the tubers sclerotium development was sl.-mod. (G.C. Morgan).

LATE BLIGHT (Phytophthora infestans) was reported in only 19 (1.9%) of the fields inspected in B.C. and in only one was the infection sev. Late blight was first reported on the Lower Mainland on 19 July over a month later than in recent years. The dry season was unfavourable for blight development. Late blight was sev. in unsprayed home gardens on Lulu Island. Where the haulms were removed early little tuber rot developed; where they were not removed, up to 50% of tubers were destroyed after a short storage period (I.C. MacSwan). Late blight appeared in Man. on 16 Aug. Spread was slow until after 1 Sept. when it was reported almost simultaneously from several points. It caused little damage except in an area just north of Winnipeg where damage to plants was severe. Considerable rotting of stored tubers was reported later from the area (J.E. Machacek).

Late blight was first observed in n.w. Ont. at Fort Frances on 24 July and was sev. in the district by late Aug. Mod. infections were noted in the Thunder Bay district (D.J. Petty). Late blight was found in many fields inspected in August in s.w. Ont., but most fields were carefully sprayed and very little tuber rot was observed on bin inspection (F.J. Hudson). A few tubers were found affected in 6 fields at Leamington in mid-July. Later the disease was prevalent in almost every field in s.w. Ont. (C.D. McKeen). Some shipments made by the S.W. Ont. New Potato Growers' Marketing Board in early August were found with tubers affected by late blight (one case 100%) when the crop reached towns in e. Ont. The presence of the fungus was verified (H.N. Racicot, K.M. Graham). Late blight caused little or no damage to the tops in fields regularly sprayed or dusted in district 2. Damage to the tops caused the rejection of 5 fields and a few blighted tubers were left in the field in roughly 20% of those passed (W.L.S. Kemp). Late blight was observed in the Niagara Peninsula from August onwards on most varieties regardless of the spray schedule. The tops were entirely killed in a field of Katahdin by mid-September and 10% of tubers were already infected (J.K. Richardson). Late blight was first observed about 10 Aug. in district 3 and it spread rapidly. Growers that followed an adequate spray schedule produced crops that suffered little from the disease (H.W. Whiteside). Late blight was sl.-mod. in 13 fields, sev. in one out of 74 inspected in e. Ont. (O.W. Lachaine).

Late blight was first observed in Que. on 28 July on tomatoes near Hull and on potatoes in Lotbiniere Co. and it appeared in most parts of Que. in the next three weeks. The disease was of little importance on the foliage in most parts of Que. except about Montreal and in the Eastern Townships and at St. Charles de Caplan, Bonaventure Co. At St. Charles, 37 seedlings were sev. defoliated out of 64 tested. A severe frost killed the tops in the Lake St. John and Lower St. Lawrence districts before much damage occurred; 0.5% of the tubers developed rot. About Montreal and in the Eastern Townships some fields were not harvested, 6 fields showed 100% tuber infection, 14, 50%, with average of 8-9% for 124 fields inspected (B. Baribeau).

Damage on tubers was most noticeable in regions where disease was severe on the foliage, particularly on heavy soils. It appeared that tubers well covered with soil did not show much disease despite sev. foliage infection. Well-sprayed fields showed traces of blight on the tubers, whereas in some unsprayed fields a 50% tuber loss resulted (H. Genereux).

Conditions were ideal for late blight development in N.B. It was first observed on 17 July and was present everywhere by mid-August. Late blight was found in nearly 75% of the fields inspected, infection being sl.-mod. in most fields and sev. in a few. Heavy rains in late August favoured the development of tuber rot, which caused some trouble during the fall shipping season although the loss was generally sl. (C.H. Godwin). Late blight was first found in N.S. in Kings and Cumberland counties on 20 July. Infection was unusually widespread and was mod.-sev. by 20 Aug. Little trouble from tuber rot occurred in fields of commercial growers as they continued spraying to the end of the season and killed the tops before harvesting. A 2% loss was about the highest. However along the south shore and in Yarmouth and Digby counties losses well over 50% were seen and as high as 75% were reported (R.C. Layton). A general epidemic developed after mid-August in P.E.I. when a period of heavy rains and very high humidity occurred. Average loss from tuber rot was estimated at 10% of the crop (L.C. Callbeck). Late blight was particularly sev. in Irish Cobbler (S.G. Peppin). Late blight was less prevalent in Nfld. than in 1949, the weather being very dry on the east coast. The disease did develop in widely scattered areas in the Avalon Peninsula, but heavy loss (75%) was seen in but one field of Green Mountain. Tuber loss was mod. in several stored lots of 1949 crop (G.C. Morgan).

LEAK (Pythium ultimum) was found affecting tubers in 3 lots at Lethbridge, Alta. (M.W. Cormack). The disease is still present in district 3, Ont., but it was less serious than in previous years. In general tubers are more mature at harvest time than formerly as a result of the increased use of vine killers (H.W. Whiteside). Leak was found affecting tubers sent in for examination from 2 Ont. points. Isolations were made from one sample (H.N. Racicot). Leak affected about half the tubers in a bushel lot of Sebago still in storage 1 June at Charlottetown. The organism was isolated and determined from a culture (D. Robinson, D.S. MacLachlan).

STEM ROT (Sclerotinia sclerotiorum). A few plants were found affected in plots at Comox, B.C. (W. Jones). Four plants were affected in a field of Green Mountain in Matane county, Que. (B. Baribeau).

SILVER SCURF (Spondylocladium atrovirens). A few infected tubers were found in storage at Lethbridge, Alta. (R. Stogryn, M.W. Cormack). This trouble was present in district 3, Ont., especially on tubers stored for some time in jute bags (H.W. Whiteside). Silver scurf was present in small amounts in a few lots of Warba, President, and Irish Cobbler sent in for identification in Que. (B. Baribeau). A tr. was observed on Irish Cobbler 4 Dec. 1949 and on Sebago 30 Oct. 1950 in Queens Co., P.E.I. In the latter case the tissues underlying the lesions were noticeably darkened (R.R. Hurst).

POWDERY SCAB (Spongospora subterranea) lightly infected a few tubers in a 3-acre field of Netted Gem table stock at Cloverdale, B.C. (I.C. MacSwan). The disease was noted in a few bins in Que. (B. Baribeau). In N.S., a 3% infection was observed on one lot of Bliss Triumph seed to date. In one field of table stock in Digby Co. 50% of the tubers were affected (R.C. Layton).

COMMON SCAB (Streptomyces scabies) has been decreasing in prevalence in B.C. each year since the flood of 1948. No fields were rejected for scab, but grading out of scabby tubers will cause some loss in several lots especially in the Cariboo district (H.S. MacLeod). Scab was mod.-sev. on smooth-skinned varieties being grown for seed in n. Alta. Scab was more prevalent than usual on Netted Gem, especially in the Lacombe district; the pustules are small and very shallow on this variety (J.W. Marritt). Only trace infections were observed in the variety plots at Beaverlodge, Edmonton, and Lacombe (T.R.D.). Scab was severe on some crops on bush soils in Sask., but in general the disease was much less prevalent than usual (A. Charlebois). Only light infections were observed in a few areas in Man. and n.w. Ont. (D.J. Petty).

No severe scab was observed in s.w. Ont. and only a few lots were mod. infected (F.J. Hudson). Scab was prevalent in many fields of early potatoes in the Harrow-Leamington district. An increase has been noted in the last 3 years; several crops were mod. infected (C.D. McKeen). Although scab damage was less than in 1949 in district 2, 50% of the tubers were affected in crops grown on sandy soils in Durham and Ontario counties. A 20-acre field of Ontario table stock was very clean compared to the badly scabbed crops of Katahdin formerly produced on this farm. No appreciable amount of scab developed on crops of Yampa, a scab-resistant variety being grown for table stock in s. Dufferin Co. (W.L.S. Kemp). The incidence of scab varied considerably in district 3, but was less prevalent than usual in Alliston area. Several crops of Ontario were almost free of scab and Keswick, Canso, and Sebago appear to have some resistance (H.W. Whiteside).

Scab was more prevalent than usual in the Lower St. Lawrence district, Que., affecting most lots. Some lots were quite sev. infected and will be difficult to grade. Infection was much lighter elsewhere in the province (B. Baribeau). Scab was present in scattered lots in N.B.; usually infection was sl.-mod., but in a few bins it was sev. (C.H. Godwin). Scab infection was

very slight this year in N.S. A single severe case was reported in one lot of Irish Cobbler in Antigonish Co.; infection has been severe on this farm for several years (R.C. Layton). Scab infection in P.E.I. was tr.-sev. on Irish Cobbler and Green Mountain, tr. on Houma and Katahdin and nil on Sebago. The average infection was 3% of the tubers (R.R. Hurst). Scab was less prevalent in 1950 in Nfld. than 1949 except in the Burin Peninsula. Fairly heavy infections were observed on Irish Cobbler, Warba, Arran Victory, and Kerr's Pink (G.C. Morgan).

WART (Synchytrium endobioticum). Losses from wart were not as heavy in Nfld. in 1950 as in 1949 because of the extremely dry season. Out of 100 fields visited in the Conception Bay area 84 were infected with wart and losses were 10-50% in the affected fields and averaged about 25%. In fact, wart appears to be much more prevalent, especially on the East Coast, than was formerly realized, although the Conception Bay area is one of the very worst. Arran Victory, probably the most popular variety in Nfld., is highly susceptible under Nfld. conditions as are Green Mountain, Irish Cobbler, Bliss Triumph, Early Rose, Arran Banner, Warba and Great Scot. In trials conducted at 3 places in the Conception Bay area, Keswick was immune to wart, Katahdin, Sebago (mauve flower), and Canso were highly resistant and Sebago (white blossom) showed some resistance. On the other hand Green Mountain (4 sources of seed), Irish Cobbler (4 sources), Arran Victory, Warba, Bliss Triumph, and Early Rose were highly susceptible and Chippewa, Garnet Chili, and Sequoia were only slightly less affected (G.C. Morgan).

WILT (Verticillium albo-atrum) affected 10% of the Katahdin plants in a plot on low-lying muck soil near Okanagan Lake, Summerland, B.C. The pathogen was isolated (G.E. Woolliams). A few plants diagnosed as having Verticillium wilt were found in fields of Green Mountain, Keswick, Irish Cobbler, Teton, and Warba in different districts of Que. Infection was sl., but the disease seems to be increasing (B. Baribeau). Wilt was reported in 45 (8%) of the fields inspected in N.S. and 2 were rejected. A sample was taken from each affected field for identification by the Laboratory at Kentville (R.C. Layton). Wilt caused the rejection of 124 (1.5%) of the fields inspected in P.E.I. in 1950 compared to 20 (0.2%) in 1949 (S.G. Peppin).

AUCUBA MOSAIC (virus). A unit of 3 plants showing a marked aucuba mosaic was found in a seedling planted in Temiscouata Co., Que. (B. Baribeau).

FOLIAR NECROSIS (virus). Two seedlings were found showing foliar necrosis in a test plot in York Co., N.B. The virus was identified as the D strain of Solanum virus 1 (D.J. MacLeod).

BUNCH or PURPLE TOP (virus) was present in small amounts in 21 (7.2%) of the fields inspected in Alta. (J.W. Marritt). Infection was 0.5-1.0% in 16% of the fields inspected in Man. and 0.5-3.0% in 22% of the fields in n.w. Ont. In addition 3 fields were observed in the Fort Francis area with infection up to 6% (D.J. Petty). Purple top was not seen in the London district (F.J. Hudson) and affected only the occasional plant in district 2 (W.L.S. Kemp).

The disease was less prevalent than last year in district 3; a small percentage of plants were affected (H.W. Whiteside). Purple top was found affecting 5% of the plants of Green Mountain 17 July at Collins Bay. Top symptoms were typical of purple top; the stem and roots were blackened as in black leg, but the tissues were sterile. It is believed that the infection was transmitted to the plants through the tubers (D.S. MacLachlan). Purple top was fairly general in fields of Katahdin in N.B., but infection was less than last year (C.H. Godwin).

Late leaf roll was found in the test plots in York Co. and in commercial fields of York, Carleton and Sunbury counties, N.B., in the varieties Irish Cobbler, Bliss Triumph, White Rose, Canso, Keswick, Sebago, Pontiac, Chippewa, and Kennebec. Infection ranged from a trace to 22%. Late leaf roll is the early primary symptom of the bunch-top virus (Cf. P.D.S. 29:64-65), which is visible while the virus is still confined to the top section of the plant. The bunch-top virus was identified in a representative number of plants.

The bunch or purple top disease (the secondary symptoms of the virus) was observed in commercial fields of Green Mountain, Katahdin, Kennebec, Irish Cobbler, Bliss Triumph, White Rose, Keswick, Canso, Pontiac, and Sebago in Carleton, York, and Sunbury counties. Infection ranged from a trace to 6%. Bunch top was also severe on 12% of the plants in a field of Keswick at Roseneath, P.E.I. The virus caused 0.1% misses in a field of Canso at Dorn Ridge. The virus was identified in a representative number of plants in each variety. The bunch top virus is either an aberrant strain of the aster yellows virus or an entirely different virus (Solanum virus 17).

Haywire, or the aggregate symptoms produced in plants from virus-infected sets, was found in commercial fields of Green Mountain and Katahdin in York Co., infection ranging from a trace to 2.5%. A trace of haywire was found in test plots at the laboratory, Fredericton, in Sebago, Kennebec, Canso, Keswick, Irish Cobbler, and Bliss Triumph. A trace-3% infection was also observed in 6 new potato seedlings under test. The bunch top virus was identified in a representative number of plants in each case (D.J. MacLeod).

Purple top was reported in 27 (5.0%) of the fields inspected in N.S., infection being tr.-2%. It was found chiefly in Katahdin, Sebago, and also in Keswick and Canso (R.C. Layton). Bunch top was about as prevalent as last year, some fields of Sebago showing 50% of the plants infected (S.G. Peppin). Purple top was noted in one field of Sebago on the Avalon Peninsula, Nfld.; it affected 5% of the tubers (G.C. Morgan).

LEAF ROLL (virus) was found in 244 (24.5%) of the fields inspected in B.C. and caused the rejection of 38. The disease was observed in fewer fields, but a greater number were rejected. It was particularly prevalent in the Okanagan this year, but few fields were affected in the Grand Forks area (H.S. MacLeod). Leaf roll was recorded in 41 (14.1%) of the fields inspected in Alta. and none were rejected. The disease was less prevalent than last year and there was no evidence of current season spread; even less leaf roll should appear in certified stocks next year (J.W. Marritt). Sl.-sev. infection was noted in garden plots at Edmonton. A trace was also found at Beaverlodge and

Lacombe (T.R.D.). Leaf roll was present in 21% of the fields inspected in Sask., but none were rejected (A. Charlebois). Infection was tr.-0.1% in 4% of the fields inspected in Man. but one field of Irish Cobbler from P.E.I. seed showed 1%. One field was infected (0.2%) in n.w. Ont. (D.J. Petty).

Leaf roll was found in several fields in s.w. Ont. and caused the rejection of 3 (F.J. Hudson). Leaf roll caused the rejection of 30 fields in district 2, compared with 35 fields rejected for other causes. Several growers of Chippewa and Warba were able to maintain their stocks only as long as tuber-indexing of foundation stock was continued at Guelph. When the service was discontinued the disease content of their crops rapidly increased and they were rejected (W.L.S. Kemp). Leaf roll caused the rejection of 11 fields mostly of Warba and Chippewa in district 3. Attempts are being made to revive tuber indexing especially for Warba. Stocks of both these varieties produced in Cochrane district are still free of leaf roll (H.W. Whiteside). Leaf roll caused 3 fields to be rejected in e. Ont. (O.W. Lachaine). Leaf roll was present in 489 (35.2%) of the fields inspected in Que. and 28 fields were rejected, compared with 5 in 1949 and 12 in 1948. The disease was much more prevalent in w. Que. than in the n.e. part (B. Baribeau). Leaf roll caused 49 fields to be rejected in N.B., an increase over last year. Although the percentage of affected plants was usually low, 9.3% were infected in one field (C.H. Godwin). Leaf roll was found in 220 (40%) of the fields inspected in N.S. and 4 were rejected (R.C. Layton). Leaf roll caused the rejection of 84 fields in P.E.I. compared with 15 in 1949 (S.G. Peppin). In a survey of 25 table stock fields in P.E.I. infection ranged tr.-4% in Irish Cobbler, tr.-7% in Green Mountain and tr.-9% in Sebago (R.R. Hurst). Leaf roll was found in 20 fields in Nfld., but infection was not over 5% (G.C. Morgan).

In a planting of Physalis angulata and P. floridana in the Laboratory disease garden, Fredericton, N.B., 2 plants of P. angulata and one of P. floridana showed typical symptoms of potato leaf roll. Also 2 plants of Datina stramonium were found affected. The presence of the virus was confirmed by standard methods (D.J. McLeod).

LEAF ROLL (Solanum viruses 14 and 17). Six plants of Keswick and 2 plants of Canso were found in commercial fields in York Co., N.B., showing typical secondary symptoms of leaf roll. It was demonstrated experimentally that the bunch top virus (Solanum virus 17) was present and the leaf roll virus (Solanum virus 14) was absent. The similarity the early secondary symptoms of the bunch top virus and the secondary symptoms of leaf roll virus in certain potato varieties causes some confusion in differentiating these two diseases under field conditions (D.J. MacLeod).

LEAF STREAK (Solanum virus 1, N strain) was found in 3 varieties in commercial fields in York Co., N.B., as follows: Katahdin, 4 plants; Keswick, 6; Canso 3. The disease was also found in 2 plants of Teton in a laboratory test plot. The virus was identified in each case by standard methods (D.J. MacLeod). A trace was found in 2 seedlings grown in Temiscouata and Lake St. John districts (B. Baribeau).

SIMPLE MOSAIC (Solanum virus 1, L strain) caused by a medium strain of Solanum virus 1 was in evidence in potato fields in York, Sunbury, Albert, Carleton and Victoria Counties, N.B. Infection was tr.-95%. The simple mottling associated with this medium strain was enhanced by the cool humid weather which continued for a period of 20-30 days in July and August. This mottling disappeared when weather conditions returned to normal. This simple mosaic was observed in the varieties Green Mountain, Irish Cobbler, Bliss Triumph, Pontiac, Katahdin, Warba, Chippewa, Netted Gem, Sebago, White Rose, and Canus (D.J. MacLeod).

MILD MOSAIC (Solanum virus 3) was observed in commercial fields in York, Carleton, Sunbury, and Victoria counties, N.B., in Green Mountain, Irish Cobbler, White Rose, and Bliss Triumph. Infection was tr.-30%. The top percentage was in a large planting of about 300 acres of Bliss Triumph. The cool humid conditions during August enhanced symptom expression of this virus, which under normal conditions shows only a very slight mottling in certain Bliss Triumph stocks. This lot of Bliss Triumph was rejected for certification on account of the mild mosaic (D.J. MacLeod).

MILD MOSAIC (Solanum virus 1, S strain) was in evidence in potato fields in York, Carleton, Victoria counties, N.B. Infection was tr.-3.5% in Katahdin, Chippewa, Canso, Keswick, and Sebago, the 2 highest infections being in Katahdin (3.5% and 2%) (D.J. MacLeod).

RUGOSE MOSAIC (Solanum virus 2). A 1.5% infection was recorded in a field of Pontiac in Carleton Co., N.B. (D.J. MacLeod).

CRINKLE MOSAIC (Solanum viruses 1, 2, and 3) was in evidence in table stock fields in York, Sunbury, Carleton and Albert Counties, N.B. Infections from tr. to 4% were recorded in Green Mountain, Bliss Triumph, and White Rose (D.J. MacLeod).

MOSAIC (virus) was found in 157 (15.7%) of the fields inspected in B.C. and it caused 16 fields to be rejected. Although fewer fields were infected, a greater number were rejected than last year (H.S. MacLeod). Only a mild mosaic was found in a tr. to small percentages in 17 (5.9%) of the fields inspected in Alta. (J.W. Marritt). Mosaic was found in a large percentage of the fields inspected in Sask., but it caused the rejection of only one field (A. Charlebois).

The late, wet spring delayed the planting of potatoes in Man. by nearly a month. Favourable weather during the summer allowed subsequently good growth, resulting in yields that were slightly above normal. Latent mosaic (simple mosaic) caused light mottling of the foliage throughout s. Man. and in some fields all plants were affected. The appearance of this mottling led to some confusion as it was difficult to distinguish from mild mosaic. The prevalence of the mottling caused some concern among growers of seed potatoes (J.E. Machacek). The cool weather in Man. caused potato virus X to be noticeable this year. Infection mostly of mild mosaic was tr.-0.5% in 18% of the fields inspected in Man. and tr.-0.3% in 20% of the fields in n.w. Ont. (D.J. Petty). A small percentage of diseased plants occurred in a few fields in s.w. Ont. (F.J. Hudson). The cool moist growing conditions in district 3 were ideal for

the detection of mosaic; 10 fields were rejected. Some of these fields were grown from stocks that had satisfactorily met the certification standards for many years and the crop showed no appreciable reduction in yields (H.W. Whiteside). Two fields were rejected for mosaic in e. Ont. (O.W. Lachaine). Mosaic was again much more prevalent in Que. than it had been for the past 5-6 years. It was found in 740 (53.3%) of the fields inspected and caused the rejection of 149. The increase is attributed to the dry, warm weather which favoured the aphid population in the late growing season in 1949. Mosaic, like leaf roll, was more prevalent in w. Que. than in the n.e. district (B. Baribeau).

Mosaic was noticeably more prevalent in N.B. than last year and caused the rejection of 143 (9.8%) of the fields inspected. A few large acreages of Bliss Triumph and several fields of Green Mountain had to be rejected. Smaller percentages were found in a few fields of Katahdin as well (C.H. Godwin). Mosaic was reported in 209 (38%) of the fields inspected in N.S. and caused 19 to be rejected. Mosaic has definitely increased in the last few years. It is suspected this increase may be due to the increasing use of the planter, if only indirectly, as it is harder to rogue mild mosaic from fields where tubers are not planted by tuber units than in those where tuber-unit planting is practised (R.C. Layton). Mosaic was far more prevalent in 1950 than in 1949 in P.E.I. for 456 (5.4%) of the fields were rejected for mosaic this year compared to 242 (2.9%) last year (S.G. Peppin). In 25 fields of table stock examined in P.E.I., mosaic infection was tr.-40% in Green Mountain, tr.-10% in Irish Cobbler and tr.-7% in Sebago (R.R. Hurst). Mild mosaic was seen in 75% of the fields examined in Nfld., infection being up to 90% (in Northern Beauty), average 25%. Traces of rugose mosaic were observed in 5 fields of Green Mountain (G.C. Morgan).

SPINDLE TUBER (Solanum virus 12) was only observed in table stock of Green Mountain, Irish Cobbler and Katahdin in Que. (B. Baribeau). A trace was reported in 3 lots in N.B. (C.H. Godwin). Spindle tuber was found in Green Mountain (2% infection) and Katahdin (0.5%) in the propogation plots at the Station, Fredericton, N.B. (D.J. MacLeod). One suspected case of spindle tuber was found in N.S.; infection 0.1% (R.C. Layton). There was a decided increase of spindle tuber in P.E.I., 57 fields being rejected in 1950 compared to 21 in 1949 (S.G. Peppin). Traces were found in 5 out of 10 fields of Irish Cobbler in the Avalon Peninsula, Nfld., and in 1 field of Sebago (G.C. Morgan).

TOP and TUBER NECROSIS (Solanum virus 4 or B virus). A severe necrotic disease (acronecrotic type), which eventually destroyed the tops of 2 plants, was found in Canso in a test plot at the laboratory, Fredericton, N.B. The tubers on these plants showed a severe necrosis of the surface and the flesh. The virus was identified as Solanum virus 4 (B virus). The Canso reacts in this violent manner to this virus because it is highly hypersensitive to it (D.J. MacLeod).

MILD FOLIAR NECROSIS (virus undetermined). Plants of Green Mountain and Irish Cobbler were found in the Laboratory plots, Fredericton, N.B., showing infection by leaf roll or bunch top and also displaying a superficial foliar necrosis. When scions of such plants were grafted on tomato (Bonny Best) an interveinal necrosis, a downward rolling of the leaves and a general dwarfing of the plants developed. This virus was transmitted also by Myzus persicae to tomato and Physalis angulata in which it produced a downward rolling of the leaflets and an interveinal foliar necrosis confined largely to the top leaves (D.J. MacLeod).

STREAK and ROLL (virus undetermined), described in P.D.S. 23:67, was found on Irish Cobbler, Katahdin, Chippewa, and Sebago in a test plot on a farm in York Co., N.B. Infection was 2-100%. Irish Cobbler appears to be exceedingly susceptible to this virus disease whereas Green Mountain and Bliss Triumph are apparently resistant (D.J. MacLeod).

WITCHES' BROOM (Solanum virus 15) was found in 174 (17.5%) of the fields inspected in B.C., an increase over 1949, and it caused 3 to be rejected. As in former years, the disease was more prevalent in the Cariboo district than elsewhere (H.S. MacLeod). The disease was found in 23 (7.9%) of the fields in Alta. (J.W. Marritt). A few infected plants were observed in plantings near Edmonton (T.R. Davidson). A few isolated cases were found in district 3, Ont. (H.W. Whiteside). Witches' broom, affecting 15% of the plants, was recorded in a field of Irish Cobbler in P.E.I. The virus was identified by standard methods (D.J. MacLeod).

YELLOW DWARF (virus) affected the odd plant in about 10% of the crops inspected in district 2, Ont. (W.L.S. Kemp). The disease was found only once in a field of Irish Cobbler at Burwash (H.W. Whiteside).

BLACK HEART (non-parasitic). Affected tubers were received from Megantic, Que. (B. Baribeau). Trace was observed in Sebago in storage in Queens Co., P.E.I. (R.R. Hurst).

ENLARGED LENTICELS affected about 7% of the tubers in a lot of a few seedlings planted in wet soil in Que. and 5% of a Green Mountain crop in one storage (B. Baribeau).

FERTILIZER BURN. Tubers submitted from Charlton, Ont., showed large, necrotic, shrunken areas with the periderm stretched over them. The cell walls were more or less completely dissolved away leaving the cells or starch grains free. The underlying tissues were white to dark grey in colour and almost sterile (H.N. Racicot). Fertilizer burn was observed in one field on light sandy soil in Lake St. John Co., Que., where the fertilizer was applied as a top dressing when the plants were 6-8 in. high. The stem was injured at ground level (B. Baribeau). Much damage was caused to potato crops in fields in the Avalon Peninsula, Nfld.; about half the crop was affected in 2 fields. The damage was no doubt the result of the common practice of placing the seed directly on top of the fertilizer in the rows. Since the past season was exceptionally dry, the fertilizer was slow in dissolving (G.C. Morgan).

FROST INJURY. Net necrosis, caused by frost killing the plants, was observed in slight amounts in the Cariboo and Okanagan districts, B.C. (H.S. MacLeod). Freezing temperatures occurred on several nights between 16-23 August, causing rather severe damage to potato fields in Sask. (A. Charlebois). An early frost in Durham and Ontario counties, Ont., froze tubers near the surface. Since most of these had been badly sunburned the added loss was not great (W.L.S. Kemp). Frost injured several fields in n. Que. and the tubers showed frost necrosis and typical breakdown at harvest (B. Baribeau). Several fields of Arran Victory were injured by frost in St. John's East, Nfld., and the tubers showed typical breakdown at harvest (G.C. Morgan).

GIANT HILL was reported in 236 (23.7%) of the fields inspected in B.C. and none were rejected (H.S. MacLeod). The trouble, in small amounts, was found in 23 (7.7%) of the fields inspected in Alta. (J.W. Marritt). Isolated cases of giant hill were observed in the southern part of district 3, Ont., but it appears to be increasing in prevalence in the North Bay section and northwards. Nearly 5% of the hills were affected in fields of Green Mountain at North Bay (H.W. Whiteside). Giant hill was more prevalent in Que. than in 1949; it was reported in many fields of Green Mountain (B. Baribeau).

HEAT and DROUGHT INJURY. Some net necrosis due to heat and drought caused by the extremely dry summer season, occurred in B.C., but it was not prevalent or severe (H.S. MacLeod). Some wilting and discoloration of potatoes were found in fields in Conception Bay, Nfld. (G.C. Morgan).

INTERNAL BROWN SPOT (non-parasitic) was common in a crop of Great Scot at Gordon Head, B.C. (W.R. Foster).

LIGHTNING INJURY. Three cases were investigated in Kings Co., N.S., of supposed late blight outbreaks in August; they proved to be lightning injury (K.A. Harrison).

LOW TEMPERATURE and FROST INJURY. Several samples, usually from car lots of potatoes, were received showing injury from exposure to low temperatures. Most of these potatoes originated in N.B. (H.N. Racicot).

MAGNESIUM DEFICIENCY severely affected 2% of the plants in a field of Irish Cobbler on sandy soil at Covehead, P.E.I. (R.R. Hurst).

NET NECROSIS. Except for a few lots of Green Mountain less than 0.5% of the tubers produced in Que. showed net necrosis (B. Baribeau). Small percentages were reported in a few bins in the Green Mountain growing areas in Victoria and Madawaska counties, N.B. (C.H. Godwin).

NO TOPS and SECONDARY TUBER FORMATION. A slight amount of this trouble was found in a field of Canso in Lake St. John Co. and in a Green Mountain field in Temiscouata Co., Que. (B. Baribeau).

SEED-PIECE DECAY. On account of the unusual dry weather experienced in late May and June seed-piece decay was severe in P.E.I. Many fields had to be replanted, some being replanted the second time or sown to grain (R.R. Hurst).

STEM-END DISCOLORATION. Some vascular darkening was observed in tubers in district 3, Ont., where tops were killed by vine killers. Seed growers have used calcium cyanamide and apparently avoided this trouble (H.W. Whiteside). A few cases of stem-end discoloration were observed in Green Mountain, Canso, Katahdin, and Teton in Que. (B. Baribeau).

SUN BURN. About 10% of the tubers are graded out annually in district 2, Ont., from Katahdin crops on account of sun burn. This variety produces its tubers on long stolons with tubers being formed on the top or side of the hills. We constantly advocate deeper planting and early and improved moulding of the soil up over the row to combat the trouble (W.L.S. Kemp).

RADISH

CLUB ROOT (Plasmodiophora brassicae) affected 30% of the plants in a planting at St. Leonard, Jacques-Cartier Co., Que. (E. Lavallee). An occasional plant was infected in a garden in Queens Co., P.E.I. (R.R. Hurst).

RHUBARB

CROWN GALL (Agrobacterium tumefaciens). A single plant found infected in a home garden at Summerland, B.C. (G.E. Woolliams). An occasional plant was found affected in a planting of Macdonald in Kings Co., N.S. (J.F. Hockey). In another planting a single plant of Early Surprise was severely affected while the rest were healthy (K.A. Harrison).

RED LEAF (cause unknown). In the plantings at the Station, Lacombe, Alta., the plants of Coulter, Ruby, Ruby Select, and Valentine have been wiped out. Although the plants of Canada Red, Macdonald, Early Sunrise, New Zealand, and Plum Hutt appeared clean when inspected, plants of these varieties have been lost in the past. Macdonald is perhaps the most resistant (T.R. Davidson).

SPINACH

MOSAIC (Cucumis virus 1) affected all the plants of Long Standing Bloomsdale in the plots, Division of Horticulture, C.E.F., Ottawa, Ont., and caused severe damage (K.M. Graham).

SQUASH

BACTERIAL WILT (Erwinia tracheiphila). Several Hubbard plants were dying from wilt in a garden at Gaspereaux, N.S. (K.A. Harrison).

MOSAIC (virus) affected 20% of the plants in one variety in the plots, Division of Horticulture, C.E.F., Ottawa, Ont. The symptoms were vein-banding, yellow and interveinal mottle, followed by necrosis. Cucumber mosaic was present in the area and cucumber beetles were noted feeding (K.M. Graham).

SWEET CORN

RUST (Puccinia sorghi). A trace was seen on most leaves in a planting at Altona, Man. (B. Peturson). Rust was more severe on sweet corn in 1950 in the Niagara Peninsula, Ont., than I have ever seen it. The leaves in many plantings were literally covered with pustules, but loss from the disease was not apparent (J.K. Richardson).

SMUT (Ustilago maydis) was reported at Sedgewick, Alta. (A.W. Henry). Specimens were received from 2 plantings at Medicine Hat (M.W. Cormack). Specimens were collected in 3 fields in Jacques-Cartier and Laval counties, Que.; it is a number of years since any enquiry has been received concerning smut (E. Lavallee). A single sample was received from Annapolis Co., N.S. (K.A. Harrison).

TOBACCO

The diseases of tobacco were summarized in a special report by R.H. Stover.

Seedbed Diseases

BLUE MOULD (Peronospora tabacina). Since the last general outbreak of 1947, blue mould has declined in importance as a seedbed disease. Again in 1950, most infections were limited and occurred after the planting season. Scattered infections were reported in both the Old and New Belts, but the disease was not general and very little injury resulted. Blue mould was first reported on 11 May, in the Langton district of Norfolk County. There was no evidence of a spore shower; overwintering was indicated. (See Sci. Agr. 31, 1951. In press).

YELLOW PATCH (excessive nutrients) and DAMPING-OFF (Rhizoctonia and Pythium spp.) were no more prevalent in the Old Belt than usual. COLD INJURY, expressed in the form of bud chlorosis and mild leaf distortion, was widespread in the Old Belt during the latter half of May in both cotton and glass-covered seedbeds. CREOSOTE FUMES from treated greenhouse timbers caused the destruction of seedlings in an entire seedbed at Leamington. In general, there were few seedbed failures in 1950, and the supply of seedlings was ample.

Field Diseases

BLUE MOULD (Peronospora tabacina). The fungus caused spotting on the lower leaves of tobacco in most areas of the New Belt during July. Scattered field infections were also observed in the Old Belt. In most cases no serious injury resulted.

BROWN ROOT ROT (a root-rot complex in which nematodes are a primary etiological agent) was not prevalent in the burley tobacco areas, and only mild infection was observed on susceptible tobacco varieties following corn in most of the brown root-rot experimental plots at Harrow.

A survey of the New Belt is planned to ascertain the importance of brown root rot in flue-cured varieties. Because of the widespread occurrence of black root rot in the flue-cured areas, and the similarity of the above ground symptoms of both black and brown root rots the latter disease may often be obscured. From field survey evidence, it appears that black root rot is the most serious disease in the New Belt, and that in most areas brown root rot is of minor importance. However, brown root-rot experimental plots on the flue-cured soils of Norfolk County would contribute considerably to our knowledge of the disease in that area.

BLACK ROOT ROT (Thielaviopsis basicola) was the most serious disease affecting tobacco in 1950. Its severity was correlated with the general use of susceptible flue-cured varieties and a cool, wet growing season (See U.S.D.A. Pl. Dis. Reporter, 34(12):387-391. 15 Dec. 1950). Most of the injury occurred in the New Belt, although the relatively small dark tobacco area in Kent County was severely affected. Where the variety Delcrest, which is resistant to black root rot, was grown in the New Belt very little injury was caused. This reduced injury can be attributed in part to the less virulent nature of strains of T. basicola in the New Belt, a situation that may change with time. (See Can. J. Research C. 28(16):726-738. 1950). Black root rot contributed to reduced yields, delayed maturity, and lowered quality of flue-cured tobacco in 1950.

VIRUS DISEASES have been epidemic in the Old Belt since 1947. In that year there occurred in Ontario the first infestation of aphids on tobacco. Since then virus disease epidemics have been associated with the wide-spread occurrence on tobacco of the peach aphid, Myzus persicae. To ascertain the viruses involved in these epidemics, a large collection of representative specimens was made in 1950 and these were transferred to differential hosts

in the greenhouse for analysis. A brief preliminary report on some of the virus diseases found in the Old Belt of Ontario is presented here. The list includes the following in order of their relative abundance:-

(1) Tobacco etch (Nicotiana virus 7) at least three field strains. (2) Tobacco mosaic (Nicotiana virus 1) at least five field strains. (3) Cucumber mosaic (Cucumis virus 1) several strains. (4) Tobacco streak (Nicotiana virus 8). (5) Tobacco ring spot (Nicotianaia virus 12). (6) Potato virus Y. (Solanum virus 2).

Although the tobacco etch virus has not been previously reported in Canada, results of this year's survey indicate that it is now the most prevalent virus on tobacco in the Old Belt. It is found in all fields in the Leamington-Harrow district and in 60-70% of the fields in other districts of the Old Belt. The general occurrence of the etch virus in this district can be attributed to its transmission by the peach aphid; that the virus is transmitted by the peach aphid has been demonstrated in greenhouse experiments. It appears also that viruses other than etch are transmitted by insects. These viruses (cucumber mosaic, ring spot, streak, and potato virus Y) are not noticeable to any extent until the tobacco plants are approaching the early flower bud stage. They appear at this time often in the absence of any mechanical operations. The mid-summer increase in the insect population in and around tobacco fields, including leaf hoppers and scattered colonies of aphids, usually accompanies the rapid and widespread appearance of these viruses. This evidence indicates that insects are the main vectors of viruses in tobacco previous to the mechanical operations of topping and suckering. The high incidence of tobacco mosaic in most fields after the topping stage can be attributed to these mechanical operations. Cases of overwintering of tobacco mosaic and field infections resulting from seed-bed sources are easily recognized early in the season.

The symptoms of the tobacco etch virus will be described in detail in another publication and will be mentioned only briefly here. Pronounced vein clearing, with or without necrosis, on the lower and middle leaves is usually the first symptom of infection in the field. This virus alone causes very little stunting and leaf distortion. However, after the topping stage, chlorosis, "burning", and various patterns of mottling and necrosis are evident in the upper and middle leaves of the plant. The injury is most severe on burley varieties. On flue-cured and dark varieties, the symptoms consist mainly of a mottle and necrosis is less severe than in burley; chlorosis and "burning" are usually absent. There are several strains of this virus that cause very mild mottles and only slight leaf necrosis. The most severe outbreaks of etch occur in the vegetable growing districts of Essex County.

Tobacco mosaic and certain other viruses are often associated with the etch virus. The indications are that injury is more severe where two or more viruses are present together than when they occur singly. The tobacco mosaic virus is present to some extent in nearly all fields by the end of the season. Several strains of tobacco mosaic have been collected in the field, including two strains that give a necrotic response, often with systemic necrosis, on

varieties carrying the n' gene (Green Briar, flue-cured varieties, Greenwood, Halley's Special, etc.). Strains that cause "burning" of the upper leaves of cigarette burley varieties have also been identified.

Tobacco streak is usually the first virus to be observed throughout the Old Belt district. As high as 8% infection was observed in some fields in Dover Township, Kent Co., in 1950. The reservoir of inoculum appears to be some of the forage legumes grown in and around the tobacco fields. Streak is rarely found in the New Belt.

The cucumber virus, although common, is not as prevalent as the etch or tobacco mosaic viruses. The ringspot virus can be found in most districts of the Old Belt, but its incidence is usually less than .01% in any field. The potato Y virus has only been recently identified in a collection from tobacco. The mild veinbanding symptom expression on certain tobacco varieties in the greenhouse indicates that it may be easily overlooked in the field. However, further work needs to be done with this virus including its possible iteraction with the other viruses.

Control of virus diseases in Ontario depends on the control of insects feeding on tobacco, and elimination of the overwintering hosts. in regard to overwintering, a survey needs to be made of the perennial hosts of the viruses in Ontario, their abundance, virus content, and location.

Tobacco Decays

During the curing season for burley tobacco, wet weather favoured the development of organisms causing barn burn ("sweat" or pole burn). These organisms (moulds and bacteria) attack the yellowing leaves when conditions are such that the air in the curing barn remains saturated with moisture and evaporation from the leaf surface is hindered. Numerous crops were reduced three to five grades in quality because of barn burn. Also, this decay resulted in a much higher percentage of trash or nondescript tobacco than usual. Because of the severity of injury this year, information regarding the cause, nature, and prevention of barn burn should be made available to the burley growers.

Other Observations

MOSAIC (virus). Rate of infection was heavier than usual in the Joliette area of Que. (F. Godbout).

TOMATO

EARLY BLIGHT (Alternaria solani) was sev. on Early Chatham (both foliage and fruit) and sl. on Stokesdale growing in adjacent rows at Metchosin, B.C. (W. Jones). Infection was in general more severe than usual in both early and late tomato crops in Essex Co., Ont. Extensive defoliation occurred in many of the canning crops (C.D. McKeen). Early blight caused a rot in about 20% of

the fruits of a fall greenhouse crop in Montreal, Que., 2-3 days after picking; the disease was also observed on the leaves (L. Cinq-Mars). Early blight was seen in tomato fields in Laval Co., but infection was not severe (E. Lavallee). Moderate infections were also observed in the Hull district (H.N. Racicot). Early blight was unusually severe in tomato plots in Kings Co., N.S., on land in tomatoes in 1948 and 1949, with most of foliage destroyed by 19 September. Two rows grown on land not previously used for this crop remained almost free until mid-September (K.A. Harrison). A tr.-mod. infection was seen in gardens at Charlottetown, P.E.I. (R.R. Hurst). Traces of early blight were observed in Nfld. (G.C. Morgan).

GREY MOULD (Botrytis cinerea) is always present when the foliage remains heavy during September. This year there was hardly a plant in the plots at Kentville, N.S., that did not have at least one fruit infected by the end of the month (K.A. Harrison).

LEAF MOULD (Cladosporium fulvum). D.L. Bailey (Can. J. Res. C, 28:535-565. 1950) reports that he has identified 7 races of Cladosporium fulvum in s.w. Ont., of which 5 apparently arose, probably through mutation, during the period of study. Stimulus for mutation seems to be somehow related to colonization of an incompatible host. Mutants in culture have unchanged or reduced pathogenicity and usually have reduced ability to produce spores. In mixed cultures of races 1 and 5 or 1 and 7, both components survived several transfers in vitro or on the host. No perfect stage has been induced (D.B.O.S.).

A severe infection of leaf mould developed on Washington State and Vetomold in a greenhouse at Haney, B.C., when the temperature was increased and ventilation reduced in an attempt to reduce injury from Verticillium wilt (I.C. MacSwan). Leaf mould was found on a fall greenhouse crop at Summerland (G.E. Woolliams). Although only a few greenhouse crops were examined in Essex Co., Ont., the disease was nowhere serious. The variety Improved Bay State was resistant where it was grown (C.D. McKeen). A trace was seen in a garden in Charlottetown, P.E.I. (R.R. Hurst).

ANTHRACNOSE (Colletotrichum phomoides) continues to be one of the most important diseases, particularly in the canning crop, throughout Ont. Individual growers have suffered severe losses when picked tomatoes were held for even short periods before processing now that grading at the factory determines the price to the grower (J.K. Richardson). During the last 3-4 years anthracnose has been increasingly severe on both early and late tomato crops in Essex Co., Ont. In 1950 a high percentage of the fruit ripening after 1 Sept. were severely infected in many fields of canning tomatoes (C.D. McKeen). Anthracnose caused mod.-sev. damage to Bounty tomatoes in the plots, Division of Horticulture, C.E.F., Ottawa (K.M. Graham). A mod. infection occurred on over-ripe fruit of Stokedale in the plots, Kentville, N.S., on ground bearing tomatoes for the third successive year (K.A. Harrison). A light infection was observed in a crop in Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL CANKER (Corynebacterium michiganense). Damage was sl.-sev. in several fields at Medicine Hat, Alta. In one sprinkler-irrigated field over 50% of the fruits developed a secondary soft rot. (M.W. Cormack). Diseased specimens were received from Leslie, Sask. (T.C. Vanterpool). Bacterial canker severely damaged half a dozen early tomato crops in the Kingsville-Leamington district, Ont. (C.D. McKeen). During the past summer, a severe epidemic of bacterial canker occurred at Ste. Anne de la Pocatiere, Que., and neighboring towns. The disease was first observed in late July and progressed rapidly during August. Most of the plants in the area are distributed as seedlings by one grower. It is suspected that the organism was introduced on the seed (C. Perrault). Bacterial canker was first observed in a $\frac{1}{2}$ acre field at Waterville, N.S., on 20 July and caused later almost complete loss of crop. Of the varieties grown, Bounty was most severely affected (K.A. Harrison).

FUSARIUM WILT (F. lycopersici). Damage was spotty in several fields at Medicine Hat, Alta., and in the variety plots at Taber (M.W. Cormack). No wilt was found in the tomato crops in Essex Co., Ont., in 1950 except what occurred in the plot of infested soil at the Laboratory at Harrow (C.D. McKeen). Wilt affected 80% of the plants in a field at Ste. Dorothee, Que.; loss was severe (E. Lavallee). A mod. infection was reported in a greenhouse crop at North Sydney, N.S. Isolations yielded the organism and its pathogenicity was proved (K.M. Graham).

PHOMA ROT (P. destructiva) caused mod. damage to fruits close to the soil in a planting at Sidney, B.C. The weather was dry, but the dew was heavy at night. Spots bearing pycnidia also occurred on the leaves (W. Jones). A sl. infection was recorded in a garden in Vancouver (N.S. Wright).

LATE BLIGHT (Phytophthora infestans) was common in gardens after heavy rains in late September in North Saanich, B.C. (W. Jones). The pathogen was isolated from diseased fruits from the Winnipeg-Selkirk district, Man. (H.N. Racicot). Late blight was found affecting both the early and late field crops of tomatoes as well as the fall greenhouse crop in Essex Co., Ont. Near Kingsville a field of early tomatoes was found heavily infected on 5 July. The grower stated that the disease was affecting the plants before they were set in the field. The blight was present in the greenhouse crop in the fall of 1949 and apparently had overwintered in the greenhouse to attack the young plants in the early spring. Sporadic outbreaks of late blight appeared in the county during August and then the disease became widespread in canning tomato fields in early September. During the fall months late blight invaded a high percentage of the greenhouses and caused severe losses in many cases (C.D. McKeen). Not a crop of tomatoes was seen free from late blight in Lincoln and Wentworth counties and many growers lost a large proportion of their crop. All above-ground parts of the plant were affected (J.K. Richardson). Diseased fruits and stems were received from places in the Ottawa valley. (H.N. Racicot).

Late blight was severe on tomato fruits in the Eastern Townships, on Jesus Island, about Joliette, and in the Baie des Chaleurs regions, Que., causing an average loss of 25% of the crop. In trials conducted at St. Charles de Caplan, Bonaventure Co., and at Lennoxville, the percentage of affected fruits varied widely depending on the variety. Precipition was exceptionally high in the Eastern Townships and was above normal in the other districts mentioned (H. Genereux). Specimens were received from Fredericton, N.B. (H.N. Racicot). Late blight infected about 50% of the fruits in the untreated plots at the Station, Kentville, N.S., by 20 Sept. The disease was fully controlled by many farmers through their spray program (K.A. Harrison). Late blight was in general severe on tomatoes in P.E.I. late in the season and damage was heavy in some plantings (R.R. Hurst).

BUCK-EYE ROT (Phytophthora parasitica) developed in a low-lying field at Vernon, B.C. It started in a small patch of plants and then spread out in a circle. This is the first time the disease has been observed in the field in the Okanagan. The weather of April and May was exceptionally cool (G.C. Woolliams).

DAMPING-OFF (?Rhizoctonia solani) caused severe damage to plants of Bonny Best in late May in a greenhouse in Queens Co., P.E.I. (R.R. Hurst). Mod. losses were observed in 3 out of 5 greenhouses that produce tomatoes in Nfld. (G.C. Morgan).

LEAF SPOT (Septoria lycopersici) caused much defoliation in many crops of early tomatoes in Essex Co., Ont. (C.D. McKeen). Leaf spot was more prevalent than usual in Lincoln Co. It was observed in several seed beds and caused severe defoliation in a number of fields (J.K. Richardson). Tr.-sl. infection was observed at Hull and Perkins, Que. (K.M. Graham). Two plants of a new seedling were found infected in the trial plots at Kentville, N.S. (K.A. Harrison). Leaf spot caused sl. defoliation in early tomato crops in the Conception Bay area, Nfld. (G.C. Morgan).

WILT (Verticillium albo-atrum) affected 10-15% of the plants in a greenhouse at Haney, B.C. The grower increased the temperature of the house to 70-72°F. at night and 90-100°F. in the day. After 10 days the plants seemed to recover and grow normally but leaf mould (q.v.) developed rapidly (I.C. MacSwan). A late cold spring favoured wilt development in greenhouses at the Coast. Best control appears to be achieved by the buried tile method of stem sterilization of the soil (W.R. Foster). Wilt was found affecting up to 100% of the plants in the field in many localities in the Okanagan and Thompson Valleys. Amount of damage was not determined (G.E. Woolliams). Wilt was affecting 10% of the tomatoes and 75% of the eggplants in a field at Iberville, Que., on 10 August. Soil was heavily infested because it has been cropped to the same crops year after year (L. Cinq-Mars). Specimens sent in for identification were received from greenhouse growers in Kings, Hants, Pictou, and Cumberland counties, N.S. (J.F. Hockey).

BACTERIAL SPOT (Xanthomonas vesicatoria). Specimens were received from Picton, Ont. (E.H. Garrard).

BUNCH or PURPLE TOP (Solanum virus 17) was found affecting 5 plants in a plot at the Station, Fredericton, N.B. (D.J. MacLeod).

LEAF ROLL (Solanum virus 14). A few plants were found infected with what appeared to be leaf roll in a planting of Bonny Best in Queens Co., P.E.I. (R.R. Hurst).

MOSAIC (virus) affected 1-15% of the plants of Vetomold, 10% of Washington State, 5% of Potentate and Dominant in a greenhouse at Haney, B.C. Symptoms varied considerably with the variety (I.C. MacSwan). Mosaic was common in early and late tomato crops in Essex Co., Ont. Mosaic also affected many fall greenhouse crops at an early stage. Many growers in the Leamington district have been making the mistake of starting plants for the fall crop outdoors beside the greenhouse. Much less disease has been noted where the plants are started indoors and kept free of insects (C.D. McKeen). Mosaic seemed to be more prevalent this past summer in the fields observed in the Niagara peninsula than in most seasons. Severe infections were noted in several plantings particularly in staked crops. "Shoestring" plants were more numerous than usual (J.K. Richardson). Tobacco mosaic affected 50% of the plants in the Horticulture greenhouse, Ottawa, on 17 July, whereas less than 1% were affected in the field at Smithfield (D.S. MacLachlan). Mosaic severely affected 3 fields at Ste. Dorothee and one at St. Martin, Que. (E. Lavallee). Although many tomato fields were visited in N.S. this summer, the worst outbreak of mosaic observed was in a field of Early Harkness where 25% of the plants were affected by tobacco mosaic (K.A. Harrison). Traces were observed on Earliana and Break o'Day in a planting in Queens Co., P.E.I. (R.R. Hurst). A few plants were affected in a greenhouse at St. John's, Nfld. (G.C. Morgan).

STREAK (virus) affected 5% of the plants of Washington State at Haney, B.C. (I.C. MacSwan). About 100 plants were found affected in each of two commercial greenhouses at Summerland (G.E. Woolliams). Typical symptoms of double streak were observed in a greenhouse at Medicine Hat, Alta. (M.W. Cormack). A single plant affected by double streak was noted in a planting at Brighton, Ont. (K.M. Graham). Three diseased plants were received from Kings Co., N.S.; the fruit symptoms were typical of single virus streak (K.A. Harrison).

YELLOWS (Beta virus 1). A slight infection occurred in only a few fields mostly in the s. Okanagan valley, B.C., chiefly in Earliana and Clark's Early (G.E. Woolliams).

BLOSSOM-END ROT (non-parasitic) caused moderate damage to Burpee and Clinton hybrids at the Station, Saanichton, B.C. (W. Jones). The trouble was common in s.w. Ont. in canning tomatoes that ripened in early August, but it was less severe than usual (C.D. McKeen). Blossom-end rot caused mod. damage to tomatoes about Ste. Anne de la Pocatiere, Que., particularly in the Laboratory plots in early September (L.J. Coulombe). Blossom-end rot was less severe in N.S. than in 1949. However, one truss on each plant was severely affected in the plots

at the Kentville Station (K.A. Harrison). The trouble caused a marked reduction of the crop in P.E.I. in 1950 (R.R. Hurst). Blossom-end rot was more common in the Conception Bay area, Nfld., this year than in 1949, probably as a result of the hot summer weather (G.C. Morgan).

BLOTCHY RIPENING (non-parasitic). The immature fruit of the first truss were quite disfigured in a planting of the hybrid, Stokesdale x Chatham, at Waterville, N.S., as the brown vascular bundles showed through the flesh. As the fruit ripened they were not so noticeable and the affected fruit were marketed. The plants were very vigorous and were planted on a low piece of ground. Following a rain the plants had "wet feet" for a few days. It is suspected that this condition favoured the development of the trouble, which is well described by J.D. Atkinson et al. in Tomato diseases and pests in New Zealand and their control. Inf. Series 2, Dept. Sci. & Ind. Res. Wellington, N.Z. 1949 (K.A. Harrison). A tr. to 15% of the fruit were affected in several gardens in Queens Co., P.E.I. (R.R. Hurst).

2,4-D INJURY is becoming increasingly common in B.C. from drifting spray, and use of improperly washed sprayers. Injury from applying too concentrated solutions of hormones also occurs (W.R. Foster). A number of cases of injury were observed in Kings Co., N.S. In several cases it was impossible to find a nearby field where 2,4-D had been used. Apparently wind currents had carried the spray at least a ½ mile (K.A. Harrison).

PHOSPHORUS DEFICIENCY. A case was observed in a small stand of 15 plants on a high calcium soil in Queens Co., P.E.I. No confirmatory tissue tests were made (R.R. Hurst).

SKIN CRACKING was quite evident in tomatoes on the Avalon Peninsula, Nfld., after a dry July and August followed by heavy rains in late August and again in early October (G.C. Morgan).

TURNIP

SOFT ROT (Erwinia carotovora) caused the total loss of a Laurentian swede turnip crop at St. Alban, Que. The rot appears to follow severe brown heart. Experiments have shown that the amount of soft rot is proportional to the severity of the brown heart. Nothing is left of the root except the cortex, which cracks open when the root is lifted and freed of soil (R.O. Lachance). Soft rot caused sl. damage to a crop of white turnips at New Minas, N.S. (C.L. Lockhart). A very slight infection was seen in a field of Laurentian in Kings Co., P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe polygoni). A sl. infection was reported at Craigmyle, Alta. (A.W. Henry). A heavy infection was observed in several fields late in the season in P.E.I. (R.R. Hurst).

DOWNY MILDEW (Peronospora brassicae) was general on the foliage in a field crop of swede turnips at Courtenay, B.C. (W. Jones). The disease was quite prevalent and caused defoliation in several seed crops of Ditmar in Digby Co., N.S. (K.A. Harrison).

BLACK LEG (Phoma lingam). A trace infection was seen in a field of Ditmar in Queens Co., P.E.I. (R.R. Hurst).

CLUB ROOT (Plasmodiophora brassicae) was heavy on spring maturing turnips in Chinese market gardens on muck soil near Vancouver, B.C. (H.N.W. Toms). Club root was reported to be severe in a field of rutabaga at Riviere Bois Clair, Que. (H.N. Racicot). A light infection was noticed scattered through a field of Ditmar at Barton, N.S. It was found later at the Kentville Station (K.A. Harrison). Club root was recorded in all 3 counties in P.E.I.; damage was sl. to very sev. (R.R. Hurst). A mod. infection was found on Erysimum cheiranthoides and a very light one on Capsella bursa-pastoris. In the latter case club root was heavy on swede turnip (J.E. Campbell). Club root is quite prevalent on turnip in certain sections of Nfld., but causes less injury than to cabbage. Farmers growing Wilhelmsburger swede turnip have little or no loss from club root, but many of the subsistence farmers who purchase seed of Danish or Dutch origin have suffered heavy losses.

STORAGE ROT (Rhizoctonia solani). In one small lot of Ditmar grown and stored in Digby Co., N.S., 30% of the roots yielded pure cultures of R. solani. In other lots of affected roots, a large number of organisms were isolated, but R. solani was the commonest isolate (K.A. Harrison).

STORAGE ROT (Sclerotinia sclerotiorum). About 2% of 10,000 stecklings were rotted in one storage in Digby Co., N.S. (K.A. Harrison).

BLACK ROT (Xanthomonas campestris). A diseased specimen was received from B.C. from W.R. Foster (J. Sibalis). A few affected roots were observed in one storage in Queens Co., P.E.I. (R.R. Hurst).

MOSAIC (virus) has spread considerably in Ont. since it was first encountered in the Walkerton district in 1946 (P.D.S. 26:63). It is now found in Waterloo and Oxford. Turnips infected early in the season are stunted and measure 2-3 in. in diameter compared to the 5-6 in. of normal turnips. The Laurentian variety, the principal variety grown, is more susceptible than Purple King (G.H. Berkeley).

BROWN HEART (boron deficiency) caused the total loss of a planting of Laurentian at St. Alban, Portneuf Co., Que. The symptoms were as severe as those observed in sand cultures with 0.10-0.25 p.p.m. of boron (R.O. Lachance). Only 20 bu. of sound roots were harvested from a field at Melvem Square, N.S. Most growers do not plant without using boron; occasionally one still takes a chance (K.A. Harrison). Traces were found in a few fields in Queens Co., P.E.I., and no severely affected fields came to our attention (R.R. Hurst). Brown heart caused sl.-mod. damage in many fields in Trinity Bay and Conception Bay, Nfld.; the season was very dry (G.C. Morgan).

ROOT BURN (heat and drought) was fairly prevalent in P.E.I. Heat and lack of moisture did not permit sufficiently rapid growth of the roots (R.R. Hurst).

2,4-D INJURY caused severe distortion of about 75% of the roots in a field of Ditmar at Charlottetown, P.E.I. The surrounding grain fields had been sprayed with 2,4-D (D. Robinson).

VEGETABLE MARROW

MOSAIC (Cucumis virus 1). About 3% of the plants of Long White Bush in the Horticulture plots, C.E.F., Ottawa, Ont., were affected. The symptoms were typical of cucumber mosaic. The seed was produced at the Station, L'Assomption, Que., and the disease appeared to be seed-borne (H.N. Racicot).

WATERMELON

ANTHRACNOSE (Colletotrichum lagenarium) was severe in most plantings in the Harrow-Leamington area, Ont., and much fruit infection was noted late in the season. The disease was first noticed in plots at the Harrow Laboratory late in June (C.D. McKeen).