# III. DISEASES OF VEGETABLE AND FIELD CROPS

## ASPARAGUS

SEEDLING BLIGHT (Fusarium oxysporum) was observed for the first time in Canada in the Niagara Peninsula, Ont., in 1945, when it destroyed two plantings and greatly weakened most of the plants in a third. It was not seen again until the spring of 1949, when three fresh outbreaks occurred in the Peninsula. The disease appears to be most severe on land previously occupied by mature asparagus even up to 10 years after the plants were destroyed and the land used for other crops. Symptoms of the disease are most evident in seedling plants, 2-6 weeks old. Affected plants are stunted, yellowed or wilted. Wilting seems associated with complete collapse of sections of the primary root. The causal organism, F. oxysporum, has been isolated consistently from soils, from mature plantations, and from land cropped previously to asparagus. The pathogen appears to be favoured by cool soil temperatures (K.M. Graham).

YELLOWS (virus). Two plants severely affected by what appeared to be yellows were observed at Lacombe, Alta. (D.J. McLeod).

## BEAN

GREY MOULD (Botrytis cinerea) was common on the pods of Blue Lake pole bean and Pencil Pod Wax at Milner and Saanichton, B.C., in September (W. Jones). It caused tr.-sl. infection as localized leaf lesions from fallen petals and rot of pods at the flower end on bush beans in the Lower Fraser Valley and about Vancouver (H.N.W. Toms). About 4% of the plants were severely damaged in a crowded planting of Bountiful in Queens Co., P.E.I. (R.R. Hurst).

ANTHRACNOSE (Colletotrichum Lindemuthianum). Light infection in plots at Lacombe, Alta. (T.R.D.). Not as prevalent in Ont. as in 1948; infection tr.-mod. in vegetable gardens about Guelph and tr. in 11 varieties in the O.A.C. plots, but severe in plots artificially inoculated (J.D. MacLachlan, J.D. Gilpatrick). Infection trace in 2 of 27 fields examined in the Port Hope area (A.J. Skolko, M.D. Sutton). Observed in a few fields in the Montreal district, Que., but damage very slight even in fields sown with infected seed, due to dry conditions this year (E. Lavallee). Trace infection in a garden plot of Black Seeded Pencil Pod at Kentville, N.S. (K.A. Harrison). Every pod of Improved Golden Wax severely injured in a garden in Queens Co., P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe Polygoni). Trace on Vermont Cranberry in the plots, O.A.C., Guelph, Ont. (J.D. MacLachlan).

STEM CANKER (Pellicularia filamentosa (Rhizoctonia Solani). A severe infection in a field of Michelite was seen 24 June in Kent Co., Ont. (A.A. Hildebrand).

HALO BLIGHT (Pseudomonas phaseolicola) appeared 16 June on Landreth's strain of Stringless Green Pod and considerable spread occurred in the next 2 weeks in the seed testing plots, Point Grey, B.C. (H.N.W. Toms). In most fields in which the disease was found in the B.C. Interior, less than 1% of the plants was affected, but in one field of several acres blight developed on 90% of the plants following irrigation by sprinkling (G.E. Woolliams). Infection was tr. at Beaverlodge, Alta., sl. at Edmonton and sl.-mod. at Lacombe (T.R.D.); sl.-sev. in 3 fields of canning beans at Taber and plots at Lethbridge, and absent or tr. in most varieties of field beans (M.W. Cormack). Trace on Supergreen in the plots, O.A.C., Guelph, Ont., on 25 July (J.D. MacLachlan). Trace on Stringless Green pod in a planting in Queens Co., P.E.I. (R.R. Hurst).

SCLEROTINIA ROT (S. Sclerotiorum). Commonly found in both seed and canning crops of bush and pole beans at Vernon, Kelowna, Salmon Arm and Armstrong, B.C.; most serious in pole beans where 90% of the plants were sometimes affected (G.E. Woolliams).

RUST (Uromyces appendiculatus). Light general infection of Blue Lake pole bean in home garden at Chilliwack, B.C. (R.E. Fitzpatrick). Rust was found in a field of Kentucky Wonder pole beans being grown for seed at Winfield. The plants were allowed to spread over the ground and were irrigated by sprinkling. Infection was mainly on the leaves, but some pods were also affected. Rust has not previously been reported from the Okanagan (G.E. Woolliams). Infection tr.-mod. in the plots, O.A.C., Guelph, Ont., in August and September (J.D. MacLachlan). A trace was recorded in Queens Co., P.E.I. (R.R. Hurst).

COMMON BLIGHT (Xanthomonas phaseoli). Trace infection in 3 fields out of 27 examined in the Port Hope area, Ont. (A.J. Skolko, M.D. Sutton). Caused slight damage in gardens about Guelph; pathogen isolated from samples from Freeman and Brantford (J.D. MacLachlan, E.H. Garrard). The disease affected 15% of the pods in a field of Clipper, 20% in one of Corvette and 2% in an acre plot of Pacer in Carleton Co. (V.R. Wallen). Traces only found in a few fields in Laval Co., Que. (E. Lavallee) and in Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL BLIGHT (Xanthomonas phaseoli and Pseudomonas phaseolicola). Numerous cases were observed in Sask.; the disease caused considerable damage (H.W.M.).

CURLY TOP (virus) was fairly widespread in the southern part of the B.C. Interior; infection varied from a trace to 25% depending on the variety and location (G.E. Woolliams).

MOSAIC (virus) infected over 75% of the plants in some 40 acres of Blue Lake, hybrid 65, at Bradner, B.C., but appeared to cause no loss in yield. The seed was imported from California by the canners. Infection was about 30% in 3 acres of a different strain at Langley (R.E. Fitzpatrick, I.C. MacSwan). Less than 1% of the crops being grown for seed in the B.C. Interior were affected by mosaic (Phaseolus virus 1) (G.E. Woolliams).

Mosaic infection in the 27 fields inspected in the Port Hope area, Ont., ranged from less than 1% to 75% and averaged 11% (A.J. Skolko, M.D. Sutton); in the Horticultural plots, O.A.C., Guelph, it was nil on Rival and Logan, tr. in Commodore Improved, and sl.-sev. in 11 other varieties (J.D. MacLachlan); it ranged from 5% in Round Pod Kidney Wax to 60% in Stringless Green Pod in 4 varieties examined in Carleton Co. (V.R. Wallen). Mosaic (Phaseolus virus 1) affected 6 plants of White Marrowfat in a farm garden in York Co., N.B. (D.J. MacLeod). A few plants of Round Pod Kidney Wax were affected in a garden in Queens Co., P.E.I. (R.R. Hurst).

YELLOW MOSAIC (Phaseolus virus 2) was found in a number of fields of beans being grown for seed in the B.C. Interior; infection ranged tr.-10% (G.E. Woolliams). A trace was found in Kentucky Wonder in a garden in Fredericton, N.B. The source of the virus was a planting of gladioli 12 feet from the beans. The gladioli showed a faint mottling of the leaves (D.J. MacLeod).

CHEMICAL INJURY (2,4,5-T) was suffered by bush beans in a home garden at Steveston, B.C., from drifting of spray applied to the side of a public highway. Growth ceased, stems became twisted and flowers failed to produce pods (N.S. Wright).

## BEET

LEAF SPOT (Cercospora beticola). General on seed crop of Flat Egyptian at the Farm, Agassiz, B.C.; damage mod. on a few plants (W. Jones). Infection mod. on Detroit Dark Red in a garden in Queens Co., P.E.I. (R.R. Hurst).

DOWNY MILDEW (Peronospora Schachtii). Only a trace found in the Grand Forks district, B.C., on Detroit Dark Red #16 in Oct. (G.E. Woolliams).

SCAB (Streptomyces scabies). Affected specimens received from a gardener at Nanaimo, B.C. (W.R. Foster). Trace on Detroit Dark Red and Crimson Globe in a garden in Queens Co., P.E.I. (R.R. Hurst).

RUST (Uromyces Betae). Infection general and damage moderate to foliage of Detroit Dark Red seed plants at the Station, Saanichton, B.C. on 15 Nov. (W. Jones).

BROWN HEART (boron deficiency). Specimens brought to the Laboratory from only one planting in Queens Co., P.E.I. (R.R. Hurst).

## BROAD BEAN

MOSAIC (virus) affected 2 plants in 100 ft. row of broad beans in a garden in Queens Co., P.E.I. (R.R. Hurst).

## CABBAGE

BLACK LEAF SPOT (Alternaria brassicicola). A trace on seed plants of Danish Ballhead in the University plots, Vancouver, B.C. (H.N.W. Toms).

GREY MOULD ROT (Botrytis cinerea) severely affected 2% of the heads in a rather damp storage in Queens Co., P.E.I., in March 1949 (R.R. Hurst).

SOFT ROT (Erwinia carotovora) severely affected 5% of the heads of Danish Ballhead in one storage in Queens Co., P.E.I.; the heads had been severely chilled (R.R. Hurst).

DOWNY MILDEW (Peronospora Brassicae). Trace infection on leaves of a Danish Ballhead seed crop in the University plots, Vancouver, B.C. (H.N.W. Toms). Heavy infection on the outer leaves of a 4-acre planting of the same variety on Lulu Island (I.C. MacSwan).

CLUB ROOT (Plasmodiophora Brassicae) affected a few young plants in a truck garden at Royal Oak, B.C. (W. Jones). The club-root situation on cabbage and cauliflower was about the same as last year in the Fraser River Valley (I.C. MacSwan). Infection was general on cabbage and cauliflower on Jesus Island, Que.; due to the drought, diseased plants wilted more and losses were greater than usual (E. Lavallee). A light infection was observed in Queens Co., and the disease was reported from O'Leary, Prince Co., P.E.I. (R.R. Hurst).

WIRE STEM (Rhizoctonia Solani). One grower in Leamington, Ont., brought to the Laboratory several flats of young plants in which 50% of the seedlings were destroyed; losses up to 10% are common in commercial greenhouses in the area (C.D. McKeen). Wire stem was prevalent again in beds and greenhouses in Laval Co., Que. When it was present, most plants were affected and losses heavy. Arasan, applied at the rate of 1.5 gm. per sq. ft. well mixed into the soil, again gave very satisfactory results (E. Lavallee).

FASCIATION (cause unknown). One plant affected in a home garden at Comox, B.C. (I.C. MacSwan).

OEDEMA (non-parasitic). A few plants affected in a garden in Queens Co., P.E.I. (R.R. Hurst).

## CARROT

BLACK ROT (Alternaria radicina) caused damage to stored roots and to stecklings planted in the field for seed in the B.C. Interior; it caused severe reductions in stand in some fields and almost no damage in others (G.E. Woolliams).

SOFT ROT (Erwinia carotovora) caused some damage to over-wintered roots in the interior of B.C. (G.E. Woolliams). About 5% of the Chantenay plants were affected in a ½-acre seed crop in Carleton Co., Ont. (V.R. Wallen).

ROOT KNOT (Heterodera marioni). One ½-acre field found affected at St. Martin, Laval Co., Que. (E. Lavallée).

RHIZOCTONIA (Pellicularia filamentosa (R. Solani) affected about 5% of the roots in a garden near Guelph, Ont., but damage was slight; potatoes in the same garden were also affected (J.D. MacLachlan).

VIOLET ROOT ROT (Rhizoctonia Crocorum). An affected root received from Outlook, Sask., showed a superficial film of mycelium and young sclerotia; the correspondent reported that many carrots from his garden showed the thin purplish web characteristic of the disease. (R.J. Ledingham). The disease was first recorded in carrot in Alta. (P.D.S. 17:37-38), but there is a bottled specimen in the Herbarium collected at Fenton, Sask., 27 Sept. 1916, det. H.T. Gussow (I.L.C.).

Affected roots were brought in by inspectors of the Fruit Branch, Toronto, from the Thedford Marsh, Lambton Co., Ont. According to their reports the disease is present in every field throughout the marsh. Some 1-5% of the carrots are affected in patches of a few square feet to 1/4 acre. Violet root rot appears to have been present for some time, but never previously has it caused any alarm. Affected carrots are regularly ploughed down (J.D. MacLachlan). A visit was made to the marsh when harvesting was well advanced. Violet root rot was found in two areas on the properties of four growers. At the southwest end of the marsh carrots and potatoes were affected on one property and carrots on an adjacent holding. Both growers stated that the disease had been noted on carrots each year for the past six years, when the land was again brought under cultivation after being idle. The other location was at the north-east corner of the bog. The disease occurred in a low, apparently poorly drained strip in an area not previously cultivated. The disease is therefore indigenous. In this strip 5-10% of the carrots were affected. No other crops were found diseased (K.M. Graham). First report from Ont. (I.L.C.).

SCLEROTINIA ROT (S. sclerotiorum). Trace infection observed at Edmonton, Alta. (T.R.D.).

BACTERIAL BLIGHT (Xanthomonas carotae) slightly infected seed crops in B.C. Interior (G.E. Woolliams).

DWARF (undetermined virus) was again found in fields in York, Sunbury, and Queens Counties, N.B.; infection ranged from a trace to 5% (D.J. MacLeod).

YELLOWS (Callistephus virus 1) was found only to a slight extent on root crops in the B.C. Interior (G.E. Woolliams). Moderate infection in the plots at Edmonton, Alta. (T.R.D.) and at Yorkton, Sask. (H.W.M.).

About 5% of the plants were affected in a ½ acre seed crop of Chantenay in Carleton Co., Ont. (V.R. Wallen). Yellows was general on carrots in York, Sunbury, Carleton and Queens Counties, N.B.; infection was tr.-47% and averaged 7% (D.J. MacLeod). Yellows affected 20% of the plants in an early-planted field by 1 Sept. Most late-planted fields showed less than 10% by 15 Oct. (J.F. Hockey). The disease was widespread in P.E.I. in 1949; in a planting of Nantes Half Long, 75% of the plants were affected (R.R. Hurst).

CHEMICAL INJURY (2,4,5-T) was present on carrots in a private garden as a result of winddrift from spraying the road allowance at Steveston, Lulu Island, B.C.; protuberences appeared on the main tap root and laterals and plants ceased to grow (N.S. Wright).

## CAULIFLOWER

SOFT ROT (Erwinia carotovora). Light infection of the curds in 2 seed crops at White Rock and Elk Lake, B.C. (W. Jones). Affected 10% of the plants in the University plots, Vancouver (H.N.W. Toms).

DOWNY MILDEW (Peronospora Brassicae). Light infection on seed plants of Snowball at the Station, Saanichton, B.C. Oospores were prevalent in a few of the affected seed pods (W. Jones).

CLUB ROOT (Plasmodiophora Brassicae) was common on young plants in a truck garden at West Saanich, B.C. (W. Jones). A few affected plants were seen in the University testing plots, Vancouver and at White Rock (H.N.W. Toms). A large patch severely affected and plants dying in a field in Wentworth Co., Ont., on 25 July; soil is acid in the district (J.D. MacLachlan). Trace infection seen in a planting in Queens Co., P.E.I. (R.R. Hurst).

WIRE STEM (Rhizoctonia Solani) was present in flats of transplants in many greenhouses at Leamington, Ont.; losses varied, but amounted to 15% in some (C.D. McKeen).

SCLEROTINIA WILT (S. sclerotiorum). A few plants killed in a seed crop at Elk Lake, B.C. (W. Jones).

BROWNING (boron deficiency) affected an occasional head in a planting in Queens Co., P.E.I. (R.R. Hurst).

WHIPTAIL (physiological). A mod.-severely affected planting was observed near Victoria, B.C. An application of sodium molybdate the 4th week in May, over 2 months after setting out of the plants, was too late to be of value for the seed crop, but it had a favourable effect in checking and overcoming the trouble (W.R. Foster). According to J.C. Walker (U.S.D.A. Farmers' Bull. 1439, revised 1948), whiptail is a malnutrional disorder occurring chiefly in the U.S. along the Atlantic seaboard on highly acid soils. It has been reported previously in Canada not only in N.B. and N.S., but also in Ont. and Que. (P.D.S. 18, 19, 21, and 28).

Molybdenum deficient soils have been known for some time in New Zealand and Australia. Recently R.B. Walker (Science 108:473-475. 29 Oct. 1948) has demonstrated that molybdenum deficiency occurs in certain serpentine barren soils in California. Soils deficient in molybdenum have not yet been recognized in Canada, but molybdenum unlike most elements is less available in acid than in alkaline soils. That whiptail was due to molybdenum deficiency was first suggested by E.B. Davies (Nature 156:393. 29 Sept. 1945) and confirmed by K.J. Mitchell (N.Z. Jour. Sci. & Tech. 27, sec. H:287-293. 1945) in New Zealand and E.J. Waring et al. (Jour. Aust. Inst. Agric. Sci. 13:187-188. 1947) in Australia. Good control was obtained with ammonium molybdate, 20 lb. per acre, applied in bands along the planting row one week before setting out well-grown seedlings. One ton of bone and blood manure per acre greatly reduced the disease (I.L.C.).

## CELERY

EARLY BLIGHT (Cercospora Apii) was found in a small planting near Harrow, Ont., in late May; sprays containing fixed copper were applied soon after the disease appeared and damage was slight (C.D. McKeen). Two fields were found moderately affected at St. Martin, Laval Co., Que. (E. Lavallee).

LATE BLIGHT (Septoria Apii-graveolentis) was rather heavy on the outer, older leaves in the test plots, University, Vancouver, B.C. (H.N.W. Toms). Although late blight was present in most celery fields in the Montreal district, Que., it caused much less damage than usual due to the dry conditions (E. Lavallee). Only a trace of late blight was observed in Queens Co., P.E.I., this year (R.R. Hurst).

YELLOWS (Callistephus virus 1, western strain). About 6% of the plants were severely affected in a field in Sunbury Co., N.B. (Celery and zinnia are highly resistant to the eastern strain of the virus) (D.J. MacLeod).

STEM CRACKING (boron deficiency). A sample of celery received from Holland Landing, Ont., showed cracking at the top of the stalks. The condition developed late in the season after a period of very rapid growth. No organism was isolated from the lesions (C.D. McKeen).

## CHIVES

RUST (Puccinia Porri). Specimens showing both uredinia and telia of this rust were collected by Dr. H.T. Güssow in his garden at Victoria, B.C., on 6 Oct. and sent to Ottawa (I.L. Conners, J.A. Parmelee).

## CUCUMBER

GREY MOULD (Botrytis cinerea) appeared in several greenhouses in April-May in Essex Co., Ont., and caused up to 10% loss in some crops. Periodic spraying with Fermate prevents outbreaks and rapidly developing lesions have been arrested by painting affected areas with a thick slurry of Fermate (C.D. McKeen).

SCAB (Cladosporium cucumerinum) was present, as usual, in many cucumber crops, both in greenhouse and field, in Essex Co., Ont.; the damage was slight (C.D. McKeen). One lot of 200 beds was severely affected at St. Laurent, Jacques Cartier Co., Que.; 75% of the crop was destroyed, a loss of $4000-$5000. Beds had been set on the same spot for many years and no fungicide was applied until the disease became severe (E. Lavallee). Scab was found after harvest at Ste. Anne de la Pocatiere when cucumber seed was being collected from ripe fruit (A. Payette). Scab was general on cucumbers about Charlottetown, P.E.I., and moderate losses were reported by growers. Infection occurred on the fruits at all stages of development (D.B. Robinson).

BACTERIAL WILT (Erwinia tracheiphila). Traces were observed in several field crops in Essex Co., Ont., and it destroyed 3% of the plants in one greenhouse at Leamington (C.D. McKeen). Diseased specimens were received from Wallaceburg, Watford, Weston, and Clarkson (J.D. MacLachlan). A few cases of bacterial wilt were observed in the Montreal district, Que., but the disease is probably quite widespread (E. Lavallee). Light infection seen on several varieties in the test plots at Ste. Anne de la Pocatiere, (R.O. Lachance).

POWDERY MILDEW (Erysiphe Cichoracearum) developed in a few fields in Essex Co., Ont., near the end of the harvesting period. It also appeared late in the spring in many greenhouse crops. The disease is always prevalent in greenhouse cucumbers grown in the late fall and makes the growing of this crop hazardous (C.D. McKeen).

WILT (Fusarium sp.). Several plants were killed in a garden at Lethbridge, Alta.; isolations yielded a Fusarium resembling F. oxysporum (M.W. Cormack).

FOOT ROT (?Fusarium). As in the past few years, foot rot was found in many greenhouse crops in the Leamington district, Ont. Lesions appear on the underground internode. Species of Fusarium have always been isolated, but none of those tested have proved pathogenic (C.D. McKeen).

WILT (Mycosphaerella citrulina). Traces found in 4 greenhouses at Leamington, Ont. The disease usually develops near the end of the harvesting season; fruit bodies of the fungus always appear on the stem near a node (C.D. McKeen).

DOWNY MILDEW (Pseudoperonospora cubensis) was observed in south-western Ont. attacking greenhouse and field crops in late September. The

disease threatened to destroy the fall greenhouse crop, but it slowly disappeared after heating of houses began. Little damage resulted in either field or greenhouse (C.D. McKeen).

ANGULAR LEAF SPOT (Pseudomonas lachrymans) was seen in 2 greenhouse crops at Leamington, Ont. Little damage was done as the disease developed at the end of the cropping period (C.D. McKeen).

DAMPING OFF (Pythium ultimum). Up to 7% of some greenhouse stands were destroyed in commercial houses by damping-off in Essex Co., Ont. Plants set in the greenhouse have been destroyed up to 10 days after transplanting. Pythium ultimum was isolated from several affected plants and proved highly pathogenic to cucumbers up to at least 6 days after transplanting if the inoculum was applied near the hypocotyl (C.D. McKeen). Damping-off (P. sp.) destroyed 50% of the plants in a field in Queens Co., P.E.I., and other fields less severely affected were reported (D. Robinson).

STEM ROT (Sclerotinia sclerotiorum) affected about 3% of the plants in 2 greenhouses at Leamington, Ont.; the soil had not been previously steamed (C.D. McKeen).

WILT (?Verticillium sp.) was found affecting several varieties of cucumbers in the trial plots at the Station, Summerland, B.C. (G.E. Woolliams).

MOSAIC (virus) killed about 2% of the plants of English Telegraph in a greenhouse at Leamington, Ont. (C.D. McKeen). A few affected plants were noticed in a field at St. Martin, Laval Co., Que. (E. Lavallee).

STEM SPLITTING and FOLIAGE WILT (?chemical injury). Splitting of stems and wilting of the foliage was prevalent in southern Ont., wherever the winter greenhouse crop was grown on soil that had been treated with Dowfume G, a relatively new soil fumigant used for the control of root knot. It appeared that some component of the pesticide remained in the soil for a sufficient period to affect adversely the growth of the cucumber plants (C.D. McKeen).

## EGGPLANT

WILT (Verticillium Dahliae) affected some plants in the trial plots at Summerland, B.C. (G.E. Woolliams).

## GARLIC

BULB ROT (Fusarium sp.). Specimen received from Windsor, Ont. (J.D. MacLachlan).

## GINSENG

ROOT ROT (Ramularia sp.) caused considerable damage to a commercial planting of Panax quinquefolium at Aldergrove, B.C. The symptoms were similar to those described by A.A. Hildebrand (Can. Jour. Res. 12:82-114. 1935) (W. Jones).

ROOT KNOT (Heterodera marioni). Infection was localized in part of one bed at Aldergrove, B.C.; damage nil (H.N.W. Toms).

## KALE

CLUB ROOT (Plasmodiophora Brassicae). Infection light in a field crop at Victoria, B.C. (W. Jones) and a trace in a home garden at White Rock (H.N.W. Toms).

## LETTUCE

DOWNY MILDEW (Bremia Lactucae) caused moderate damage to 2 seed crops, New York 515 at Saanichton and No. 12 at Agassiz, B.C. (W. Jones), and in a low-lying field near Keating (W.R. Foster). All plants of New York 515 were slightly damaged in a garden at Guelph, Ont. (J.D. MacLachlan).

GREY MOULD (Botrytis cinerea) caused considerable damage in a commercial planting at Victoria, B.C. (W. Jones). A few heads severely affected in a greenhouse in Queens Co., P.E.I. (R.R. Hurst).

Specimens sent to the Laboratory from Kelowna, B.C., were thought to be affected by BACTERIAL ROSETTE (Pseudomonas rhizoctonia (Thomas) Burkh.) and possibly by BACTERIAL WILT (Xanthomonas vitians (Brown) Starr & Weiss) (G.E. Woolliams). These disease have not previously been reported in Canada.

DROP (Sclerotinia sclerotiorum). Trace observed in several fields of the early spring crop in the Leamington area, Ont. (C.D. McKeen).

LEAF SPOT (Septoria Lactucae). Mod. infection present in a fall crop in a greenhouse at Leamington, Ont.; oldest leaves of every plant destroyed (C.D. McKeen, J.A. Parmelee).

BASAL ROT (cause unknown) destroyed 25% of the plants in a 2-acre field at Winnipeg, Man. The disease apparently began at the crown and spread to the bases of the leaves, which turned brown and decayed. Isolations gave no clue to the cause (W.L. Gordon).

## MELON

LEAF SPOT (Alternaria cucumerina). Moderate infection observed in several fields in the Harrow and Leamington melon-growing areas in Ont. (C.D. McKeen).

SCAB (Cladosporium cucumerinum). Scattered infection observed in 4 fields at Kingsville, Ont.; scab appeared late in the season and losses were light (C.D. McKeen).

POWDERY MILDEW (Erysiphe Cichoracearum) was found in a few fields in late August in the Leamington and Harrow areas, Ont. Damage was very slight as harvesting was virtually completed before the disease developed (C.D. McKeen).

WILT (Fusarium bulbigenum var. niveum) was present in many fields in the southern part of Essex Co., Ont.; losses varied from a trace to 70% of the crop. The muskmelon variety Iroquois has remained to date completely resistant and is being widely grown where it is no longer possible to grow susceptible varieties. The disease is spreading rapidly in the area (C.D. McKeen). Wilt affected over 50% of the plants on land used 3 successive years for melons at Langham, Sask.; Fusarium spp. isolated from the plants (T.C. Vanterpool).

WILT (?Verticillium sp.) affected about 10% of the plants in a commercial field at Osoyoos, B.C. (G.E. Woolliams).

MOSAIC (virus) affected a small percentage of the plants in many fields in southern Essex Co., Ont.; however, its incidence was much less than in 1948 (C.D. McKeen).

LEAF SPOT (cause unknown), apparently new, was observed in almost every field in southern Essex Co., Ont. The spots varied in size from pin points up to over 1/8 in. in diameter. The centre became necrotic and was surrounded by a bright yellow halo when the leaf was viewed by transmitted light. The lesions had the appearance of grease spots when the lower surface of the leaf was viewed by reflected light. All isolations yielded sulphur-yellow bacterial colonies on potato dextrose agar. Preliminary pathogenicity tests were not conclusive, but the tests will be repeated (C.D. McKeen).

## ONION

PURPLE BLOTCH (Alternaria Porri) appeared in fields of onions in Essex Co., Ont., as the crop was nearing maturity; damage was probably slight (C.D. McKeen).

NECK ROT (Botrytis Allii) as usual caused damage to stored bulbs in the B.C. Interior; damage varied from 10 to 25% depending on the quality of the onions at harvest and the storage conditions (G.E. Woolliams). Storage losses as high as 40% were reported for Spanish and cooking type of

onions in 1948-49 season in southwestern Ont. Neck rot was affecting a few of the Spanish onions in the field at Harrow in August (C.D. McKeen). The disease was severe on 10% of the plants in a garden in Queens Co., P.E.I., on 3 Oct. It occurs frequently on imported onions (R.R. Hurst).

BULB ROT (Fusarium oxysporum f. Cepae). Moderate infection reported in a planting at Souris, Man.; isolations made from the specimens received yielded F. oxysporum f. Cepae (W.L. Gordon).

DOWNY MILDEW (Peronospora destructor) slightly affected a few seed plants of Portugal at the Station, Saanichton, B.C. (W. Jones). In an acre field of Yellow Globe Danvers #55 at Kelowna the fungus was sporulating on one dwarfed plant and probably affected 5-6 other off-type plants present but had failed to sporulate on them. Downy mildew was prevalent on the same farm in 1948, when the bulbs for this crop were grown. Although downy mildew was epidemic in 1948, conditions were apparently not favourable for the systemic infection of the bulbs. Owing to the dry season the disease caused no damage in 1949 in the B. C. Interior (G.E. Woolliams).

PINK ROT (Pyrenochaeta terrestris) was prevalent in onions grown on muck soils in Essex and Kent Counties, Ont. In some severely affected fields in the Leamington marsh only a 20% crop was harvested. Pink root was also found in abundance on upland soils where Spanish onions are being grown. Fusarium spp. and nematodes were always found associated with P. terrestris in affected onion roots (C.D. McKeen).

ROOT ROT (Pythium irregulare Buism.) was found in flats of Spanish onion seedlings grown in greenhouses in southwestern Ont. prior to transplanting. The disease is known locally as Yellow Patch; the symptoms are yellowing and wilting of the above-ground parts and rotting of the roots. Losses up to 50% of the seedlings have been observed. A fuller account is appearing in Sci. Agric. (C.D. McKeen). P. irregulare was described originally from Holland in 1927 in pea roots, a lupin plant, and cucumber seeds. It is reported on several plants, including red pine seedlings, in the U.S. (I.L.C.).

SMUT (Urocystis Cepulae), affecting 1-2% of the bulbs, was found in several fields in the Leamington marsh, Ont. (C.D. McKeen).

YELLOW DWARF (virus) affected about 50% of a planted crop in a 4-acre field of Yellow Ebenezer in the eastern section of the Grand Forks district, B.C. Until this year the disease was confined to this section, which is restricted to the production of Yellow Ebenezer. A trace has now been found in the section where Mountain Danvers onion seed is produced. The disease apparently is becoming established and will seriously affect the production of onion seed in the area (G.E. Woolliams).

YELLOWS (virus). About 3% of the plants showed severe yellows in a plot at the Station, Fredericton, N.B.; 3 plants were stunted, weak, and died early in August (D.J. MacLeod).

## PARSLEY

LEAF SPOT (Septoria Petroselini). Trace infection in Champion Moss Curled in the University plots, Vancouver, B.C. (H.N.W. Toms).

## PARSNIP

SCLEROTINIA ROT (S. Sclerotiorum). Two affected roots brought to the Laboratory from a storage in Queens Co., P.E.I., on 18 Feb. (R.R. Hurst).

SCAB (Streptomyces scabies). One slightly affected specimen brought to the Laboratory, Charlottetown, P.E.I. (R.R. Hurst).

YELLOWS (Callistephus virus 1) severely affected a single plant in a 100 ft. row in a garden in Queens Co., P.E.I. (R.R. Hurst).

## PEA

LEAF and POD SPOT (Ascochyta Pisi). Trace infection probably due to A. Pisi was found in a seed crop of Perfection peas at Mara, B.C. (G.E. Woolliams). Infection 5-tr. 5-sl. 1-mod./30 fields of seed peas inspected in southern Alta., tr.-sev. in plots at Beaverlodge, Lacombe, and Edmonton (S.G. Fushtey); and sl.-mod. in several fields near Lethbridge (M.W. Cormack). A trace was present in gardens about Guelph, Ont., and in the O.A.C. plots on 15 Aug.; peas harvested prior to this date were free of disease. Heavy infection obtained by artificial inoculation in a disease nursery at O.A.C. (J.D. Gilpatrick). Of 9 fields inspected in Renfrew Co., a trace was found in one. Also a few infected plants were seen in two fields of Arthur in Carleton Co. (A.J. Skolko, V.R. Wallen). Infection tr.-sl. in garden plantings of peas in Queens Co., P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe Polygoni). Infection tr.-sev. in gardens at Beaverlodge, Lacombe, and Edmonton, Alta. (S.G. Fushtey), and mod.-sev. in the variety plots and several gardens at Lethbridge; also reported from Brooks (M.W. Cormack). Infection mod. in 2 fields at Portage la Prairie, Man. (W.A.F. Hagborg). The disease first appeared in late August and all plots not harvested by late September were infected. Damage generally slight, but in certain heavily infected plots some pods were distorted and empty (J.D. Gilpatrick). A trace infection was noted in Queens Co., P.E.I. (R.R. Hurst).

ROOT ROT and WILT (Fusarium spp.). Light infection in most gardens at Saskatoon, Sask. (H.W.M.). A 30-acre field near Brantford, Ont., inspected 26 May, showed more than 90% of the plants affected by root rot. Burning of the stems below the ground line was observed and attributed to fertilizer injury. It is believed that the burning predisposed the plants to attack. Damage was sev. on Thomas Laxton,

and Early Harvest; mod. on Pride, and Perfection; and light on Alaska. Fusarium sp. was the predominant isolate and proved pathogenic to peas. Diseased specimens were received from Listowel, Meaford, Atwood, and Sunbridge (J.D. MacLachlan, J.D. Gilpatrick). Wilt infection tr. in 6 of 9 fields of Chancellor and Valley peas examined in Renfrew Co. and tr.-50% of the plants, av. 6.5%, in 13 garden varieties in the plots, Division of Horticulture, C.E.F., Ottawa (A.J. Skolko, V.R. Wallen). Moderate infection in one field of Arthur peas at Ste. Anne de la Pocatiere, Que.; damage slight (R.O. Lachance).

MYCOSPHAERELLA BLIGHT (M. pinodes). Infection tr.-sl. in seven fields of field peas about Portage la Prairie, Man. Infection in garden peas, due possibly in part to other Ascochyta spp., tr.-mod. in different plantings at Portage la Prairie, mod. at Miami, tr. at Hadashville and Stonewall (W.A.F. Hagborg).

DOWNY MILDEW (Peronospora Pisi). Light infection on Stratagem at the Station, Saanichton, B.C. (W. Jones).

BACTERIAL BLIGHT (Pseudomonas pisi). A summary of the information available on the occurrence of bacterial blight of peas in Canada appears timely because it is one of the diseases that, it is hoped, may be controlled by means of the Health Approval scheme for pea and bean seed. Bacterial blight of peas was described in the United States in 1916 and was first reported in Canada in 1924, when it was found at St. Vital, Man. It has since been reported in Que., Ont., Sask. and Alta. By the end of 1948, 37 occurrences, of which 7 were classes as severe, had been recorded.

The severity of the disease has varied widely. In some instances the crop has been abandoned in Man. and Ont., due apparently to severe outbreaks. In other instances, the disease occurred abundantly on the stems and pods, substantially reducing the crop through reduction of the number and size of the seeds. In still other instances, the disease gained little headway and had little effect on the yield. To what extent damage was due to the use of diseased seed was still unknown.

In 1949 severe seedling damage from bacterial blight, followed by unfavourable weather conditions, resulted in heavy losses in the canning pea crop in the eastern portion of the Red River Valley, Man. A canning firm had supplied two kinds of seed: (1) grown under contract in Man. and (2) imported from the western United States. As seedling infection and severe crop loss were confined to fields grown from seed produced in Man., it appeared that the losses were due to infection carried by the Manitoba seed.

Bacterial blight has been found in field (soup) peas in Man. whenever surveys of pea crops have been made in recent years. The damage has varied in different seasons. Along with the Ascochyta diseases, primarily Mycosphaerella blight, it has contributed to the progressive deterioration in the health of seed of field peas that appears to have occurred in the past decade (Proc. Ann. Conf. Man. Agronomists 1948:21. 1948) (W.A.F. Hagborg).

Infection tr.-sl. in the plots at Lethbridge, Alta. (M.W. Cormack); 4-tr.-13-sl. 7-mod./30 fields of seed peas examined in southern Alta. and tr.

in variety plots at Lacombe (S.G. Fushtey). Infection tr.-sl. in two fields of field peas at Portage la Prairie, Man.; heavy with severe damage in garden peas at La Rochelle, mod. at Morris, and mod.-sev. in 2 plantings at Portage la Prairie (W.A.F. Hagborg). Infection tr. in 18-acre field at Cookstown, Ont. (J.D. Gilpatrick).

SEEDLING BLIGHT (Pythium sp.). A field of Wisconsin Early Sweet at Barnwell, Alta., was ploughed up in the spring because of severe rotting of the seed and seedlings. Pythium sp. isolated from the material proved highly pathogenic in greenhouse inoculation tests (M.W. Cormack).

ROOT ROT (Rhizoctonia Solani, Fusarium sp. etc.). Infection was 14-tr. 8-sl. 1-mod. 1-sev./30 fields of seed peas in southern Alta.; tr.-sev. in garden peas at Beaverlodge and Lacombe (S.G. Fushtey); and 10-sl. 5-mod. 1-sev./26 irrigated commercial fields examined in southern Alta. R. Solani predominated among the isolates, but other fungi were apparently involved in some cases (M.W. Cormack).

LEAF SPOT (Septoria Pisi). Infection tr.-50%,av. 5.6%, in 3 out of 9 fields examined in Renfrew Co., Ont., and tr. in 6 out of 13 varieties in the plots, Division of Horticulture, C.E.F., Ottawa (A.J. Skolko, V.R. Wallen).

RUST (Uromyces Fabae). Infection sl. in garden at Metchosin, B.C. (W. Jones); tr. in gardens at Meadows and Stonewall, Man. (W.A.F. Hagborg); tr. in a garden near Guelph, Ont., in an early planting of Little Marvel, but in a later planting (30 July), all plants were slightly affected (J.D. MacLachlan); tr. in 2 of 13 varieties in the plots at C.E.F., Ottawa (V.R. Wallen); and tr. in a garden in Queens Co., P.E.I. (R.R. Hurst).

MOSAIC (virus). Tr. in a garden at Beaverlodge, Alta. (T.R.D.); a few plants in a garden at Guelph, Ont. (J.D. MacLachlan); tr. of mosaic (Pisum virus 1) in a farm garden in York Co., N.B. (D.J. MacLeod).

STREAK (virus). A trace was seen in 2 of 5 fields of Canners King in Prince Edward Co., Ont., and 1% of affected plants in a field of Arthur at C.E.F., Ottawa (A.J. Skolko, V.R. Wallen).

## PEPPER

EARLY BLIGHT (Alternaria Solani) developed in several transplanting beds at Harrow, Ont. Affected plants remained stunted after they were set in the field, and suffered moderate defoliation during July and August. Later, when the weather was cooler, they appeared to outgrow the disease (C.D. McKeen).

GREY MOULD (Botrytis cinerea). A trace present in one outdoor bed at Harrow, Ont.; the growing points of the young plants were destroyed (C.D. McKeen).

ANTHRACNOSE (Colletotrichum phomoides). One ripe fruit stored with tomatoes from the same garden at Kentville, N.S., developed typical lesions (K.A. Harrison).

SOFT ROT (Erwinia carotovora) destroyed 75% of the sweet pepper fruits in one 5-acre field at Harrow, Ont., and smaller amounts in other fields. The development of the disease depends largely upon the activities of the corn borer (C.D. McKeen).

LATE BLIGHT. In last year's report (P.D.S. 28:48) Phytophthora infestans was reported on pepper fruits in B.C. Dr. Charles Chupp writes: "I am wondering whether you definitely determined the species. My notes indicate that nowhere has P. infestans been definitely reported on pepper plants. There have been a number of possible cases, but I believe in each instance the fungus proved to be P. Capsici, which causes very similar symptoms". Unfortunately no isolations were made and the identity of the fungus present remains in doubt (I.L. Conners).

DAMPING OFF (Pythium spp. and Rhizoctonia Solani) occurred in small amounts in several greenhouses in the Harrow area, Ont. As in 1948, the loss did not exceed 5% of seedlings. The disease has been controlled by the use of Arasan in the soil of the seed beds. Damping-off in the transplanting beds was also reduced much below the level observed formerly, by mixing Arasan with the soil of these beds (C.D. McKeen).

SCLEROTINIA ROT (S. sclerotiorum) was found in several fields in the Vernon area, B.C.; 10-25% of the plants were killed (G.E. Woolliams).

WILT (Verticillium Dahliae) developed in 60% of the plants in a ½-acre field at Harrow, Ont., midway through the growing season; many plants died before any fruits were harvested and the rest, badly stunted, produced a poor crop (C.D. McKeen).

BACTERIAL SPOT (Xanthomonas vesicatoria). Infection was a trace on leaves and fruit in 2 fields at Harrow, Ont. (C.D. McKeen).

MOSAIC (virus) stunted 5% of the plants of Best Early in a planting in Lincoln Co., Ont. (G.C. Chamberlain).

STREAK (Solanum virus 1, N strain). Four plants showed severe streak in a field at Maugerville, N.B. The virus was identified (D.J. MacLeod).

BLOSSOM END ROT (non-parasitic) affected 3-10% of the fruits in most fields in southern Essex Co., Ont. (C.D. McKeen). Blossom-end rot was general this year at St. Martin and Ste. Dorothee, Laval Co., Que.; about 20% of the fruit was affected (E. Lavallee).

## POTATO

The Plant Protection Division, Science Service, supplied the data in Tables 4 to 7 on Seed Potato Certification. All fields entered for certification are planted with Foundation or Foundation A seed.

Table 4. Seed Potato Certification: Number of Fields and Acres Inspected, 1949

| Province | Number of Fields | | Fields Passed | Number of Acres | | Acres Passed |
|---|---|---|---|---|---|---|
| | Entered | Passed | % | Entered | Passed | % |
| P.E.I. | 8,474 | 7,721 | 91.1 | 37,167 | 34,519 | 92.9 |
| N.S. | 573 | 526 | 91.8 | 1,105 | 983 | 89.0 |
| N.B. | 3,156 | 2,932 | 92.9 | 24,589 | 21,960 | 89.3 |
| Que. | 1,157 | 782 | 67.6 | 2,837 | 1,728 | 60.9 |
| Ont. | 813 | 687 | 84.5 | 2,531 | 2,157 | 85.2 |
| Man. | 108 | 94 | 87.0 | 384 | 322 | 83.9 |
| Sask. | 89 | 81 | 91.0 | 204 | 180 | 88.2 |
| Alta. | 182 | 148 | 81.3 | 1,005 | 804 | 80.0 |
| B.C. | 924 | 768 | 83.1 | 2,884 | 2,398 | 83.1 |
| Total | 15,476 | 13,739 | 88.8 | 72,706 | 65,051 | 89.5 |

Previous Yearly Totals

| | | | | | | |
|---|---|---|---|---|---|---|
| 1948 | 15,635 | 12,504 | 80.0 | 70,561 | 57,392 | 81.3 |
| 1947 | 14,616 | 12,606 | 86.2 | 60,385 | 53,474 | 88.5 |
| 1946 | 14,198 | 11,628 | 81.9 | 66,665 | 55,256 | 82.8 |
| 1945 | 11,267 | 9,501 | 84.3 | 50,646 | 40,866 | 80.7 |

| Acres Entered | | Acres Passed | |
|---|---|---|---|
| 1948 | 70,561 | 1948 | 57,392 |
| 1949 | 72,706 | 1949 | 65,051 |
| Increase of 2,145 or 3.0% | | Increase of 7,659 or 13.3% | |

Table 5. Seed Potato Certification: Acreage Passed by Varieties, 1949

| Variety | P.E.I. | N.S. | N.B. | Que. | Ont. | Man.-Alta. | B.C. | Total |
|---|---|---|---|---|---|---|---|---|
| Katahdin | 6,102 | 448 | 16,434 | 3 | 1,472 | 12 | 36 | 24,507 |
| Green Mountain | 9,230 | 96 | 3,306 | 1,633 | 61 | 18 | 131 | 14,475 |
| Irish Cobbler | 9,544 | 168 | 776 | 92 | 210 | 95 | 4 | 10,889 |
| Sebago | 9,296 | 98 | 398 | | 93 | | 4 | 9,889 |
| Netted Gem | 7 | | 10 | | 2 | 936 | 1,494 | 2,449 |
| Bliss Triumph | 20 | 107 | 684 | | | 34 | | 845 |
| White Rose | | | 88 | | | 1 | 393 | 482 |
| Chippewa | 116 | 8 | 22 | | 283 | | 34 | 463 |
| Pontiac | 103 | | 234 | | | 89 | | 426 |
| Warba | 27 | 18 | 8 | | 4 | 15 | 105 | 177 |
| Columbia Russet | | | | | | 23 | 62 | 85 |
| Early Epicure | | | | | | | 83 | 83 |
| Sequoia | 71 | 11 | | | | | | 82 |
| Canus | | 1 | | | 4 | 44 | | 49 |
| Others x | 3 | 28 | | | 28 | 39 | 52 | 150 |
| Total | 34,519 | 983 | 21,960 | 1,728 | 2,157 | 1,306 | 2,398 | 65,051 |

xThese varieties with acreage of each were: Early Ohio 34; Rural New Yorker (Dooley) 28; Early Rose 22; Great Scot 22; Garnet Chile 7; Up-to-Date 5; Pawnee, Carter's Early Favorite, Wee MacGregor and Sir Walter Raleigh 4; Gold Coin, Arran Victory and Mohawk 3; Clarks #3, and McIntyre 2; Champion, Burbank, and Menominee 1.

Table 6. Seed Potato Certification: Fields Rejected on Field Inspection, 1949

| Province | Leaf Roll | Mosaic | Ring Rot in field | Ring Rot on farm | Black Leg | Wilts | Adjacent Diseased Fields | Foreign Var. | Misc.x | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| P.E.I. | 15 | 242 | - | - | 60 | 20 | 41 | 193 | 182 | 753 |
| N.S. | 5 | 8 | 4 | 3 | 3 | 6 | 9 | 7 | 2 | 47 |
| N.B. | 3 | 21 | 146 | 18 | 7 | - | 1 | 24 | 4 | 224 |
| Que. | 5 | 25 | 211 | 40 | 28 | - | 32 | 9 | 25 | 375 |
| Ont. | 28 | 2 | 44 | 3 | 2 | 6 | 2 | - | 39 | 126 |
| Man. | 3 | - | 3 | 3 | - | 3 | - | 1 | 1 | 14 |
| Sask. | - | 1 | - | - | 1 | 1 | - | - | 5 | 8 |
| Alta. | 1 | - | 2 | 2 | 15 | - | 1 | - | 13 | 34 |
| B.C. | 28 | 5 | - | - | 28 | 9 | 11 | 6 | 69 | 156 |
| Total | 88 | 304 | 410 | 69 | 144 | 45 | 97 | 240 | 340 | 1737 |
| Rejections as a percentage of fields: | | | | | | | | | | |
| Entered | 0.6 | 2.0 | 2.6 | 0.4 | 0.9 | 0.3 | 0.6 | 1.6 | 2.2 | 11.2% |
| Rejected | 5.1 | 17.5 | 23.6 | 4.0 | 8.3 | 2.6 | 5.6 | 13.8 | 19.5 | 100% |

x 235 fields rejected for causes other than disease.

Table 7. Seed Potato Certification: Average Percentages of Diseases found in Fields, 1949

| 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 | .12 | .09 | .04 | .10 | - | .01 | .07 | .23 | .13 |
| Leaf Roll | .11 | .08 | .06 | .04 | .08 | .21 | .09 | .08 | .19 |
| Mosaic | .24 | .15 | .12 | .11 | .06 | - | .19 | .02 | .10 |
| Fields passed: (final inspection) | | | | | | | | | |
| Black Leg | .05 | .05 | .03 | .05 | - | .01 | - | .02 | .05 |
| Leaf Roll | .05 | .06 | .05 | .04 | .03 | - | .03 | .03 | .05 |
| Mosaic | .07 | .10 | .10 | .04 | .01 | - | .05 | - | .02 |

There was a further substantial increase in the acreage devoted to seed potato growing in 1949, and the percentage of the acreage passing inspection was the highest in the past five years. The improvement was due to the substantially fewer rejections for mosaic, leaf roll, and black leg, in P.E.I. On the other hand, rejections on account of ring rot increased, particularly in N.B. Among the varieties grown, Katahdin has maintained the lead that it established over Green Mountain and Irish Cobbler last year, and Sebago, the second most popular variety in P.E.I., is well up in fourth place.

From an examination of the data given on Seed Potato Certification over a period of years it is evident that mosaic and leaf roll have declined in importance as causes for rejection in potatoes being grown for certification. Ten years ago these two diseases accounted for half the fields rejected and in some years they caused the rejection of a quarter of the fields entered for certification. Then a drive was made to secure stocks unusually free from virus infection by selecting those of the greatest purity to form a special class of seed and by the introduction of tuber indexing and the tuber unit method of planting. The rejections for mosaic fell at once, although the prevalence of leaf roll fluctuated widely from year to year. Since 1947, however, the rejections for leaf roll have been dropping and in 1949 they were only 5.1% of the total. Although it has not been demonstrated experimentally that reduction of leaf roll is due to the control of aphids by DDT, J.B. Adams and R.A. Kelley, in a paper to appear shortly in Am. Potato Journal, remark "This is not to suggest that the use of DDT over a great portion of the potato growing area has not limited leaf roll spread to a considerable degree. It has been possible during 1948 and 1949 to raise Foundation grade seed potatoes at the Woodstock research station by a combination of isolation, good seed, weekly DDT-spraying and early top-killing and harvest". It is significant that leaf roll is also less prevalent in table-stock fields, especially in areas where DDT has been used extensively.

affected increased significantly from 6.7% in 1948 to 11.2% in 1949. Most of the increase was in the Lethbridge district, where many newcomers to the area, allegedly ignorant of the regulations, purchased seed without regard to its freedom from ring rot. On the other hand little change occurred at Edmonton and only one field was diseased at Calgary proper. The improvement at Calgary is attributed to the establishment of "approved seed houses", where certified seed potatoes may be purchased. Although it admittedly affected the picture but little, it may be mentioned that one lot of certified seed from Man. was apparently contaminated for a trace of ring rot developed in 3 of the fields where this seed was planted.

By regulating imports to check contamination from this source, by stricter enforcement of regulations governing the issuance of planting certificates and disposition of infected stocks, and by providing disease-free seed at cost, the Department hopes to curb the further spread of ring rot (W. Lobay). One of the rejections for ring rot in Alta. (Table 6) was a field planted with imported seed (J.W. Marritt).

On several occasions severe losses from ring rot have occurred in the Pike Lake area, Sask. This year in a 5-acre block of Canus, believed to be free from the disease in 1947, the grower estimated a 50% loss at digging. Two other fields in the area were also severely damaged. Other growers who have experienced trouble in the past are now ring-rot conscious and have produced crops apparently free of disease for the past 4-5 years (R.J. Ledingham). Although ring rot was not found in any field entered for certification, diseased tubers were received from Moose Jaw and Sturgis (A. Charlebois). A trace of the disease was present in 3 fields on one farm in Man. (D.J. Petty).

Ring rot was found in 4 table stock fields in Middlesex Co., Ont. (F.J. Hudson). The disease caused the rejection of 18 fields (57 acres), about half of all the rejections, in district 2. The infection was noticeably heavier than usual in the affected fields (M.L.S. Kemp). In district 3, 33 fields were rejected on account of ring rot in the field or on the same farm. The disease was found in Irish Cobbler and Katahdin only and most cases were in the Lafontaine district in northern Simcoe Co. The disease appears to have originated through the use of old bags and to have been spread by the exchange of potato machinery. Disinfection of storage bins and machinery of all seed potato growers in the area is being carried out in co-operation with provincial men (H.W. Whiteside). Ring rot was found on 8 seed growers' farms and on one at bin inspection in eastern Ont. (O.W. Lachaine).

In the 7th annual survey for bacterial ring rot conducted by the Ont. Department of Agriculture some 2250 farms were visited by the inspectors. Of these farms 590 or 26% were affected by ring rot, a considerable increase over 1948 when 3125 farms were inspected and 250 (8%) were infected. Of the infected farms, 73% were new cases and 8% had been free of ring rot for 3 or more years. In general the level of infection was quite low in the affected fields (D.S. MacLachlan).

Bacterial ring rot was again the chief cause of rejection in Que., being present in 211 (18.2%) of the fields inspected. It was most prevalent in Temiscouata Co. and the Chicoutimi and Lake St. John districts. Ring rot was found in many lots on the table stock market and in some cases they had to be regraded with a loss of 5-8%. A 60 lb. sample of Teton was distributed to 8 growers in Temiscouata Co. to test its varietal resistance

EARLY BLIGHT (Alternaria Solani) was found in 268 (29%) of the fields inspected in B.C., being especially widespread in the Grand Forks area; it was not quite so prevalent as last year (H.S. MacLeod). Early blight was rather late developing in northern and central Alta. A light infection was found in 44 (24%) of the fields inspected and at Beaverlodge. Infection was severe on Warba at Lacombe, where heavy infections have been noted for several years, and Edmonton with smaller amounts on other varieties (J.W. Marritt, T.R. Davidson). Early blight almost completely defoliated a field of Early Ohio at Briarlea, Sask., and infection was sev. in Warba at Norquay and mod.-sev. in other fields in eastern Sask. (A. Charlebois). Infection was negligible in Man., sl. in Rainy River District, Ont., mod. in a few fields and sev. in one (of Chippewa in the Upsala area) in the Thunder Bay District (D.J. Potty). Early blight was found in many fields in south-western Ont., but it caused no severe damage (F.J. Hudson). Light infections were seen in a few fields of early potatoes in southern Essex Co. (C.D. McKeen). It caused slight damage here and there in district 2 as a result of premature ripening of the crop (W.L.S. Kemp). Early blight caused complete destruction of two seedlings, F.4425 and F.4427, under test at Mindemoya, Manitoulin I.; the disease was not prevalent in district 3, where most fields were adequately protected (H.W. Whiteside). Infection was heavy by 30 Aug. in Carleton Co., in a field of Green Mountain, which had received several sprays of a fixed copper; a dry summer was followed by a 2-week period of rainy weather (D.S. MacLachlan). Early blight appeared on 15 Aug. in eastern Ont. and generally was not severe (O.W. Lachaine). Infection was 330-sl. 28-mod. 1-sev./1157 fields inspected in Que.; a light infection was noted in most fields in the northern sections of the province; elsewhere it was more prevalent on account of the dry weather (B. Baribeau). Early blight was distinctly prevalent in N.B., affecting 75% of the fields inspected. Already some tuber rot has been observed during early bin inspection (C.H. Godwin). Early blight was first reported on 25 July in Kings Co., N.S. Within the next month it was observed throughout N.S., but infection was severe this year in very few fields, mostly in Kings Co. No Alternaria rot has yet been observed (R.C. Layton). It occurred in negligible amounts in P.E.I. (S.G. Poppin).

BLACK DOT (Colletotrichum atramentarium) was general on dead tops of Green Mountain, Irish Cobbler, and Katahdin on 12 Oct. in Queens Co., P.E.I.; damage was nil (R.R. Hurst).

BACTERIAL RING ROT (Corynebacterium sepedonicum) was not found in any crop inspected for seed certification in B.C. (H.S. MacLeod). During field inspections at digging time covering 200 acres, one affected tuber was found in one field in the same district in the Fraser River Valley, where a trace was found last year. A trace of ring rot was also found in a carload of Irish Cobbler of the 1948 crop shipped from Kamloops; source of infection appeared to be certified seed produced in P.E.I. in 1947. Ring rot in trace amounts was detected in only one of the 217 carloads imported into B.C. (W.R. Foster).

During the Provincial survey conducted with the assistance of the Dominion Laboratory at Edmonton, ring rot was found on 118 farms (1178 acres of potatoes) out of 1052 farms (8654 acres). The percentage of farms

on farms where the disease has been very persistent. No ring rot was found upon careful inspection of the plants in the field and of the tubers at digging time. The seed is being multiplied for further trial (B. Baribeau). A total of 164 fields (over 2000 acres) were rejected in N.B. on account of ring rot in the field or on the same farm. Infection was very light, only a plant or two being present at the time of inspection (C.H. Godwin).

A provincial survey was carried out on table stock in the potato-growing areas in Cumberland Co., N.S. Ring rot was found on 12 farms in fields and garden plots (5¼ acres). On at least 4 farms spread was traced to the use of the same planter. In one field of certified Irish Cobbler infection was high (10%) and was attributed to storing potatoes in contaminated bags over winter. Ring rot was also found on one farm in Colchester Co. in 30 acres of Foundation A and 16 acres of Certified seed of Katahdin. Infection was very light. The seed for planting is generally treated in second-hand bags. Formerly only formaldehyde was used, but for the last two years the seed was treated with Semesan Bel. All farms in Kings Co. where ring rot was discovered last year were reinspected; no case of ring rot was found (R.C. Layton).

Eight cases of ring rot were found after field inspection in Kings Co., P.E.I. These cases were all in Katahdin, traceable to a single seed source (S.G. Peppin). A further case was found in Queens Co. in December (R.R. Hurst).

BACTERIAL SPOT (Erwinia carotovora) was found on washed tubers held for 2 weeks in paper bags at Centerville, N.S., in early January 1949. As a result of considerable field frost the tubers soon after harvesting broke down badly in storage with some heating. To salvage the sound tubers, the potatoes were shovelled from the bins and put through a potato washer, partially dried in an air blast, and bagged for later shipment. Bacteria were consistently isolated from the spots. Cultures of the bacteria were used to inoculate sound tubers; these tubers and some of those previously affected were held in moist chambers kept in a cellar at 60°F. The inoculated tubers did not become affected and the disease progressed no further in those already lesioned. The symptoms were very similar to those illustrated in Fig. G. pl. 5, in U.S.D.A. Misc. Publ. 98 for bacterial soft rot in lenticels of northern grown late potatoes. It therefore appears that under very abnormal conditions, E. carotovora may cause a disease of potatoes in N.S. (K.A. Harrison).

BLACK LEG (Erwinia phytophthora) was found in 197 (21.3%) of the fields inspected in B.C. and caused the rejection of 28 fields or 157 acres, the largest acreage rejected for any disease. For the third year, it has increased in severity. Although the season was fairly moist, conditions in general were favourable for plant growth. Most growers do not treat their seed (H.S. MacLeod). The disease was prevalent in low-lying areas in the lower Fraser River Valley during the early part of the season (N.S. Wright). Black leg was found in 42 (23%) of the fields inspected in Alta. and caused the rejection of 15 fields, mostly in the Peers-Edson district. Elsewhere it was less prevalent than last year (J.W. Marritt). One field was rejected on account of black leg and a trace occurred in 6 others in Sask. (A. Charlebois).

Black leg was present in 4% of the fields inspected in Man.; in northwestern Ont. 35% were affected and one field was rejected, infection being 3% (D.J. Petty). Black leg was present in 2 of the fields inspected in southwestern Ont. and one field in Norfolk Co. was rejected (F.J. Hudson). Black leg was recorded in only 2 fields in district 2. It appears in some years in fields planted with stock from the Maritimes, particularly Sebago (W.L.S. Kemp). Black leg was again little in evidence in district 3 (H.W. Whiteside). Black leg was in 28 (2.4%) of the fields inspected in Que., 18 of which were in the Chicoutimi and Lake St. John districts. On some farms the fields had to be replanted due to flooding and in other fields misses were as high as 20% (B. Baribeau). Black leg was general in N.B., but only 7 fields were rejected on account of the disease. The highest infection observed was 9% (C.H. Godwin). Black leg was reported in 69 (12%) of the fields inspected in N.S. and caused 3 fields to be rejected. The highest infection was 6%, in Sebago. Although no severe infections were reported in table stock, a number of growers have reported its greater prevalence in Sebago (R.C. Layton). Black leg was definitely less prevalent in P.E.I. in 1949 than in recent years in spite of a considerable increase in the acreage of Sebago, which, as previously reported, is very susceptible. The improvement is attributed to improved planting methods such as tuber unit planting. In 1949, 60 fields were rejected for black leg as against 225 in 1948 (S.G. Peppin). Black leg ranged from trace to 1% in 15 table stock fields inspected in Queens and Prince Counties (R.R. Hurst).

WILT (Fusarium oxysporum) was found in 169 (18.3%) of the fields inspected in B.C. and caused 3 to be rejected. The disease has again increased to the 1947 level (H.S. MacLeod). Wilt affected 28 (31%) of the fields inspected in Sask., but it caused only one to be rejected (A. Charlebois). Wilt was present in 29% of the fields inspected and caused 3 to be rejected in Man.; 10% of the plants were affected in one field in the Winnipeg area. The disease affected 35% of the fields in northwestern Ont. (D.J. Petty). Wilt caused the rejection of 2 fields of Irish Cobbler in Norfolk Co.; small amounts were present in a few other fields in southwestern Ont. (F.J. Hudson). Only 2 fields were rejected for wilt in district 2 (W.L.S. Kemp). Wilt was reported to be general in district 3, but upon examination of specimens, much of the injury was diagnosed as heat necrosis and fertilizer burning (H.W. Whiteside). One field was rejected on account of wilt in eastern Ont. (O.W. Lachaine). A light infection was observed in many fields on sandy loam in Que., particularly in the Lower St. Lawrence district; it caused some reduction in yield (B. Baribeau). Wilt was not as prevalent as in previous years in N.B., as less imported seed was planted. The few cases reported were mostly in Irish Cobbler (C.H. Godwin).

WILT (Fusarium and Verticillium) was found in 13 (7%) of the fields inspected, all located in southern Alta. and under irrigation (J.W. Marritt).

DRY ROT (Fusarium spp.) was rather prevalent in a sample of certified Warba seed grown at Armstrong and on sale at Victoria in April (W. Jones). Storage rot has not been the problem it was in 1948 in northern and central Alta.; some rot developed, however, in the Brooks and Vauxhall districts (J.W. Marritt). Storage rot, which caused some loss in the fall of 1948 in Sask., continued to be troublesome throughout the winter (T.C. Vanterpool). Some dry rot was reported in the southern part of district 3, Ont. (H.W. Whiteside). Storage rot was widespread in Que., but the average infection was low. The highest infection recorded was 11% (B. Baribeau). Storage rot was unusually prevalent in N.B. in the 1948-49 crop; the average infection was estimated to be 6% of the tubers (C.H. Godwin). Storage rot (F. sambucinum f. 6) slightly affected the 1948 crop in P.E.I. whereas the 1946 and 1947 crops became seriously affected (G.W. Ayers). Losses in the 1949 crop have not exceeded 1% and the damage is largely confined to Sebago, which is very susceptible (S.G. Peppin).

LENTICEL NECROSIS (Fusarium sp.). Isolations from 15 spots from a large number of small necrotic spots on a large Katahdin tuber from Lafontaine, Ont. yielded the same Fusarium from 9. Similarly spotted tubers have been seen in the Botany plots for 2-3 years (H.N. Racicot).

SKIN SPOT (Oospora pustulans) was severe on a single Chippewa tuber received from Englehart, Ont. (H.N. Racicot).

RHIZOCTONIA (Pellicularia filamentosa (R. Solani) was present in 763 (83%) of the fields inspected in B.C.; the infection being 428-sl. 293-mod. 42-sev. Infection on the tubers was generally sl.-mod. (H.S. MacLeod). Infection was mod. in 18 (10%) of the fields inspected with slight amounts in a few other fields in Alta. A severe frost on 12 Sept. destroyed top growth earlier than usual and tubers dug after 1 Oct. bore some solerotia (J.W. Marritt). Infection was mod. in several fields of Warba and light in most others in Sask. (A. Charlebois). A single plant received by mail from Ile a la Crosse was severely affected at the base of the stem and the half dozen tubers enclosed were covered with solerotia (H.N. Racicot). Rhizoctonia caused no appreciable loss in Man. and northwestern Ont. (D.J. Petty). Infection light in southwestern Ont. (F.J. Hudson). About 25% of the crops were affected by rhizoctonia in district 2; infection averaged about 5-7% and reached 20-25% on the more severely affected fields, mostly located on the lighter soils in York, Ontario and Durham Counties (W.L.S. Kemp). Solerotia were more prevalent on the tubers in district 3 than usual; cool wet weather prevailed during September (H.W. Whiteside). Infection was light in Que. Solerotia were found on tubers in a few bins mostly located in the Montreal district and the Eastern Townships (B. Baribeau). Plant infection was sl.-mod. in N.B. this season with light solerotium development on most lots of tubers (C.H. Godwin). Rhizoctonia was much less prevalent than usual in N.S. Field infection was sl.-mod. in a few fields where potatoes have been planted on the same ground for a number of years. In one field 30% of the plants were affected, 20% severely, by rhizoctonia (L.C. Layton). Rhizoctonia was negligible in P.E.I. (S.G. Peppin).

LATE BLIGHT (Phytophthora infestans) was reported in 60 (6.5%) of the fields inspected in B.C., a marked decline from its prevalence in 1948 (H.S. MacLeod). Late blight appeared late in the season in a few fields about Courtenay and North Saanich and affected tubers were received from Kelowna; dry weather slowed up its development (W. Jones). The disease was of no importance where the crop was protected by a fungicide (N.S. Wright). A trace was seen in one field at Wawota, Sask., and affected tubers were received from a grower in the same district (A. Charlebois, H.N. Racicot). Late blight was not reported in Man. (J.E. Machacek). Late blight was light to heavy on the foliage in the Rainy River and part of the Thunder Bay districts in northwestern Ont., although it caused little tuber rot (D.J. Petty).

Continuously hot, dry weather during the summer held late blight in check and consequently it was of little economic importance in Ont. in 1949. A few reports were received from north of Georgian Bay and Lake Huron 15 Aug.-1 Sept., but no serious losses occurred except in unsprayed fields in the Cochrane area, where the season was exceptionally wet. Late blight did develop in widely scattered areas in southern Ont. in October, when weather conditions became favourable for the disease. Tuber infection was favoured by the late growing season and lack of killing frosts (J.D. MacLachlan, H.W. Whiteside). Late blight affected 90% of the tubers in 4-acre field of Green Mountain and 20% of the tubers in an adjacent field of Katahdin at Leamington. Infected tubers also received from Blenheim (C.D. McKeen). In eastern Ont., the first report of late blight was not received until 8 Oct. The season was abnormally hot and dry until late August when it turned first wet and cold and finally wet with temperatures favourable for late blight spread (H.N. Racicot).

Late blight was exceptionally light in Que. in 1949. It appeared late almost simultaneously throughout the province and spread very slowly except in the Lake St. John district where conditions were more favourable for its spread. The disease was held in check by the low relative humidity prevailing over most of the province and severe frosts in September in the eastern part reduced foliage infection. A few tubers were found affected in northern and eastern regions at harvest. Teton growing side by side with Green Mountain proved just as susceptible to late blight as the latter variety (B. Baribeau, H. Genereux). Late blight rot was showing on 20% of tubers when the crop was harvested 20 Oct. at the Station, Ste. Clothilde, following very heavy rain in the preceding 3 weeks (D.S. MacLachlan).

Weather during the growing season was hot and dry in N.B. Although late blight was observed in August, infection remained very light. Very little tuber rot developed and most of it was confined to plants receiving too little spray, particularly those at the end of the rows (C.H. Godwin).

Late blight appeared first in N.S. in the Scotts Bay district, Kings Co., on 2 Aug. Although little late blight was in evidence elsewhere up to 1 Sept., it later became general in districts where little or no spraying is done. On 15 Nov. in Cumberland Co. 1/2 the crop in 2 bins of Irish Cobbler were affected by rot (R.C. Layton). Late blight was rather late in making its appearance in P.E.I. and caused defoliation

in only isolated cases in late August. Tuber rot was more or less general in many fields at harvest time and the final loss was placed at 10-12% of the crop. Green Mountain, Irish Cobbler and Katahdin were the worst affected whereas Sebago was definitely resistant (S.G. Poppin). A prolonged wet period caused a severe epidemic in late September. Many growers of Green Mountain and Katahdin suffered losses from tuber rot (L.C. Callbeck).

LEAK (Pythium ultimum). Considerable loss from set rot occurred in a 2-acre field due to planting sets in warm soil at North Saanich; a slight loss also occurred when tubers were harvested during warm weather (W. Jones). Tubers affected by leak were received from Kentville, Ont. 22 Dec. 1948 (L.T. Richardson). Tubers affected by leak were found in samples sent in for examination from Porquis Junction and Barrie (D.S. MacLachlan). What was probably this disease was again present in district 3, but was not as serious as in 1948 (H.W. Whiteside, I.L. Conners). A small amount of leak was present in tubers in early storage at the Station, Ste. Clothilde, Que. (D.S. MacLachlan).

SILVER SCURF (Spondylocladium atrovirens) was more prevalent in district 3, Ont., than in 1948 (H.W. Whiteside). A light infection was noted in a few lots of Irish Cobbler and Green Mountain in Que. at bin inspection (B. Baribeau). Infection was sl.-sev. on every Katahdin tuber of 14 received from Bath, N.B. (H.N. Racicot). Silver scurf was present on 7% of the tubers in a lot of Irish Cobbler in storage in Queens Co., P.E.I., on 27 March (R.R. Hurst).

POWDERY SCAB (Spongospora subterranea) was not reported in any field or bin inspections in B.C., but heavily infected tubers were collected by the B.C. Marketing Board in Vancouver from a shipment of White Rose from Cloverdale (H.S. MacLeod). A moderately infected tuber of Netted Gem was seen from Burnaby (N.S. Wright). Warba potatoes grown at Hines Creek, Alta., were affected (A.W. Henry). A sl.-mod. infection was noted in a few lots at bin inspection, mostly in Temiscouata Co., Que. (B. Baribeau).

COMMON SCAB (Streptomyces scabies) was in general less prevalent in B.C. than in 1948. However, it was more prevalent in the Salmon Arm-Armstrong area and caused there a few crops to be rejected (H.S. MacLeod). Infection was considerable on White Rose and Green Mountain grown on muck soil at Keating (W. Jones). No scab was found on Netted Gem in Alta. this year but trace infections were observed on other varieties at Lacombe, Edmonton and Beaverlodge (J.W. Marritt, T.R. Davidson). Scab was severe on Early Ohio and particularly on Warba from adjacent fields at Algrove, Sask. (A. Charlebois). It was also severe on Canus grown on new land at Yorkton and on Bliss Triumph on very porous soil at Barford (H.W.M.). Two tubers with about 90% of the surface covered by scab were received from Prince Albert; they were from the 3rd successive crop after breaking and the land had been manured last year (T.C. Vanterpool). Infection was heavy on Canus grown near Brandon, Man. Scab was light in a few other fields in Man. and northwestern Ont. (D.J. Petty). Scab was more prevalent than usual in southwestern Ont.; many crops were moderately affected (F.J. Hudson).

Common scab again reduced the amount of stock that could be graded for seed by 20-25% in district 2. In some fields notably in Dufferin and Wellington Counties scab infection was 75-100% (W.L.S. Kemp). The incidence of scab remains unchanged in district 3. It was more prevalent on heavier soils. A slight increase in the depth of planting appeared to reduce the amount of scab. The use of fertilizers of a higher analysis (4-12-10) with acid fillers also seemed beneficial (H.W. Whiteside). Infection was generally sl.-mod. in Que. A few scabby lots had to be discarded due to excessive liming in previous years (B. Baribeau). A grower just starting to farm at Calumet used horse manure on his 8-acre potato field; the tubers were severely scabbed (H.N. Racicot). Scab infected up to 10% of the tubers in scattered lots in N.B.; in the severe cases the crop was grown on ground that had received a heavy application of lime (C.H. Godwin). Common scab was quite prevalent in N.S. in 1949 as a result of dry weather for part of the season and of planting potatoes on old orchard ground. The average infection in the bins so far inspected was about 7%. The 5 highest infections seen were: Pawnee, one lot 75%, another lot nearly 100% with 10% severe; Bliss Triumph 30% with 10% severe; and Irish Cobbler, 2 lots, 50% light scab (R.C. Layton). Common scab was prevalent on all varieties except Sebago in P.E.I. with an average loss of 3%; Sebago is relatively resistant (S.G. Peppin).

WART (Synchytrium endobioticum). An affected plant was received from Leonard Power, Colinet Island, St. Mary's Bay, Nfld. (F.L. Drayton). For a discussion of the wart situation in Nfld. see special report, Plant Diseases in Newfoundland, by J.F. Hockey, included in the Introduction (I.L.C.).

WILT (Verticillium albo-atrum). A few plants wilted down in a plot of Epicure at Saanichton, B.C.; the fungus was isolated from affected stems (W. Jones). A slight infection of both Verticillium wilt and Fusarium wilt were observed in Teton at Ste. Anne de la Pocatiere, Que. The organisms were isolated and their pathogenicity proved. Field symptoms were similar to bacterial ring rot (R.O. Lachance). Verticillium wilt was found in 57 (10%) of the fields inspected in N.S. and caused 6 to be rejected. Highest infection recorded was 11%. Specimens were collected for determination of the pathogen by the Kentville laboratory (R.C. Layton). There was a noticeable increase in the incidence of wilt in Prince and Queens Counties, P.E.I., whereas only an occasional field was affected in Kings. The increase in these two counties was attributed to the increase in the acreage of Sebago, which is very susceptible to wilt (S.G. Peppin). In a field of Sebago in Queens Co., 25% of the plants were infected. A slight to moderate infection occurred in many Sebago and Irish Cobbler fields in Queens and Prince Counties (G.W. Ayers).

FOLIAR NECROSIS (Solanum virus 6). Two seedlings showed severe foliar necrosis in a test plot in York Co., N.B. (D.J. MacLeod).

LATE LEAF ROLL (virus, undetermined) was common on potato fields in York, Sunbury, Carleton and Queens Counties, N.B. It was

observed in Pontiac, Irish Cobbler, Bliss Triumph, Sebago, and 12 seedlings. When scions from Pontiac and Bliss Triumph were grafted to Lycopersicum esculentum and L. hirsutum typical symptoms of the bunch top virus were produced. This result seems to indicate that late leaf roll is a phase of the current season symptoms of the bunch-top virus (cf. P.D.S. 27:69. 1948) (D.J. MacLeod).

LEAF ROLL (virus) was found in 260 (28.1%) of the fields inspected in B.C. and caused the rejection of 28 fields. Although fewer fields were infected, there was more disease in the affected fields than in 1948. The most noticeable increase occurred in the Salmon Arm district (H.S. MacLeod). Leaf roll was found in 43 (23.6%) of the fields inspected in Alta., an increase over 1948 attributed to late-season spread especially in Edmonton district but also about Lacombe (J.W. Marritt). Leaf roll was observed in 23 (32%) of the fields inspected in Sask. (A. Charlebois); in 20% of the fields inspected in Man. and caused the rejection of 2 with 10% leaf roll on one farm in the Portage la Prairie district. In northwestern Ont. leaf roll was present in half the fields and caused 5 fields to be rejected about Fort Frances, an increase over previous years (D.J. Petty). Leaf roll was present in several fields entered for certification in southwestern Ont. and caused one to be rejected (F.J. Hudson). Leaf roll caused 13 fields to be rejected in district 2. Planting varieties beside or near Katahdin seems to increase the incidence of leaf roll (W.L.S. Kemp). Only 6 fields were rejected for leaf roll in 1949 in district 3. Most growers whose fields were rejected in 1948 obtained new seed of Chippewa from Cochrane; all fields grown from seed from this source passed Foundation A (H.W. Whiteside). Leaf roll caused the rejection of 3 fields in eastern Ont. (O.W. Lachaine). Leaf roll was noted in only a few fields in Que. and only 5 fields (0.4%) were rejected (B. Baribeau). The disease was present in 22% of the fields inspected in N.B. and only 3 fields were rejected (C.H. Godwin). Leaf roll was reported in 121 (21%) of the fields inspected in N.S. and caused the rejection of only 5. Highest infection 3% (R.C. Layton). Leaf roll was much less prevalent than in 1948 in P.E.I. Only 15 fields were rejected in 1949 compared with 156 in the previous year (S.G. Peppin). In 25 table stock fields in Queens and Prince Counties, P.E.I., leaf roll infection ranged from a trace to 7% and averaged less than 0.5%, somewhat less than in 1948 (R.R. Hurst).

LEAF STREAK (Solanum virus 1, N strain). A trace was found in Chippewa, Katahdin, Sequoia, and 9 seedlings in York Co., N.B. (D.J. MacLeod).

AUCUBA MOSAIC (Solanum virus 8). Three Green Mountain plants showing a marked aucuba mosaic were found in a field of table stock in York Co., N.B. (D.J. MacLeod).

CRINKLE MOSAIC (Solanum viruses 1,2, and 3) was common in table stock of Green Mountain in York, Sunbury and Carleton Counties, N.B.; infection ranged from 1 to 3% (D.J. MacLeod).

LEAF ROLLING MOSAIC (Solanum virus 11). A trace was found in 2 fields of uncertified Green Mountain in York Co., N.B. (D.J. MacLeod).

MILD MOSAIC (Solanum virus 11). A trace to 3% was found in table stock fields of Irish Cobbler in York and Carleton Counties, N.B. (D.J. MacLeod).

MILD MOSAIC (Solanum virus 3). A trace to 7% was found in Green Mountain table stock in York, Sunbury and Carleton Counties, N.B. (D.J. MacLeod). This form of mild mosaic may be seen in many fields of Green Mountain in P.E.I.; infection ranged from a trace to 20% in the fields examined in Queens Co. (R.R. Hurst).

MOSAIC (virus) was found in 179 (19.3%) of the fields inspected in B.C. and only 5 fields were rejected; these figures represent a slight decrease from 1948 (H.S. MacLeod). Mosaic was found in only 8 (4.4%) of the fields inspected in Alta. (J.W. Marritt); in 33 (37%) with 1 field rejected in Sask. (A. Charlebois); in but 4 fields in Man. and in 20% of the fields with 1 field rejected in northwestern Ont. (D.J. Petty). A very few plants were affected with mosaic in the fields inspected in southwestern Ont. (F.J. Hudson). A single rejection on account of mosaic in district 2 (W.L.S. Kemp). Only a very mild type of mosaic was reported throughout district 3 and was only visible during first inspection in July (H.W. Whiteside). Mosaic was less prevalent in Que. than last year and only 25 fields were rejected; this decrease is attributed to the more general use of seed from tuber-indexed material (B. Baribeau). Mosaic symptoms were more prominent than usual in N.B. Katahdin, the most commonly grown variety, showed a small percentage, whereas a high count was recorded in Green Mountain (C.H. Godwin). Mosaic was found in 155 (27%) of the fields inspected in N.S. and caused 8 to be rejected. Mosaic has increased during the past 2 years (R.C. Layton). Mosaic was again about as prevalent as it was in 1947 in P.E.I.; the number of fields rejected on account of mosaic was 358 in 1947, 1,122 in 1948 and 242 in 1949 (S.G. Peppin).

RUGOSE MOSAIC (virus). A 25% infection was reported in a field of Green Mountain at Ashton, Ont. (H.N. Racicot). A trace to 4% of rugose mosaic (Solanum virus 2) was found in table stock of Green Mountain in York and Sunbury Counties, N.B. (D.J. MacLeod). Rugose mosaic affected 2-7% of the plants in several fields of Green Mountain table stock in Queens Co., P.E.I. (R.R. Hurst).

NET NECROSIS (virus) was found in 2 lots of Green Mountain table stock in the market at Fredericton, N.B. affecting 47 and 62% of the tubers respectively. Eight of these tubers gave rise to dwarfed, chlorotic plants. Solanum virus 14 (leaf roll) and bunch-top virus were found in all these plants. Thus this net necrosis was evidently due to a combination of the 2 viruses (D.J. MacLeod).

PURPLE DWARF or HAYWIRE (virus) was found in small amounts in 12 (6.6%) of the fields inspected in Alta. (J.W. Marritt).

PURPLE or BUNCH TOP (virus). Infection ranged from a trace to 7% in 52 (58%) of the fields inspected in Sask. (A. Charlebois). In Man. 55% of the fields inspected showed 0.5-2% of affected plants

and 7% in one field in the Selkirk district; in northwestern Ont. infection ranged from 0.5 to 2% in 95% of the fields inspected (D.J. Petty). The occasional plant was found affected in fields of Katahdin in southwestern Ont. (F.J. Hudson). Only an odd plant was affected by purple top in a few fields in district 2 (W.L.S. Kemp). Purple top was less prevalent in southern part of district 3 and more prevalent in the north especially in Katahdin, Sebago and Green Mountain (H.W. Whiteside). Typical symptoms of bunch top were present in Irish Cobbler plants from Richmond on 22 July; the grower stated the whole field (3 acres) appeared to be going down with the disease (H.N. Racicot).

Bunch top was general in potato fields in Carleton, York, Sunbury and Queens Counties, N.B., infection ranging from 1 to 42%. The current season symptoms of the disease were found in Green Mountain, Irish Cobbler, Bliss Triumph, Katahdin, Sequoia, Sebago, Chippewa, Pontiac, and Houma. The secondary or haywire stage was noted in Green Mountain, Sebago, Sequoia, and Katahdin. An examination of seed pieces that had remained firm and intact during the growing season in fields of Green Mountain, Irish Cobbler, Bliss Triumph and Katahdin revealed that 87% were infected with the bunch-top virus. A number of these produced weak plants showing the secondary or haywire stage of the disease when they were grown in the greenhouse. The bunch-top virus was transmitted by dodder from milkweed, Asclepias syriaca, to Lycopersicum esculentum. The milkweed plants showed severe symptoms of yellows (D.J. MacLeod). The transmission of bunch-top from milkweed to tomatoes by means of dodder should prove a useful technique in determining whether one or more strains of yellows occur in Canada, of which aster yellows is the oldest and best known. When this fundamental information is obtained it may be possible to determine what other vectors, besides Macrosteles divisus, are responsible for the transmission of this group of virus diseases in this country (I.L. Conners). Purple top, av. infection 1.8%, affected 12 fields of Katahdin and Sebago in N.S. (R.C. Layton). Purple top was more prevalent than usual in P.E.I. in 1949. Up to 50% of the plants were affected in some fields of Sebago, particularly those about Charlottetown (S.G. Peppin).

SPINDLE TUBER (virus). A trace was found on one farm in southern Alta. (J.W. Marritt). The disease affected 5% of the tubers in a first generation crop from certified seed at Birds Hill, Man. (W.A.F. Hagborg). Spindle tuber was virtually absent in Man. and northwestern Ont. (D.J. Petty) and in district 3 of Ont. (H.W. Whiteside). The disease was not reported in Que. in 1949, but there were many off shape tubers noted in areas where drought injury occurred (B. Baribeau). Three cases were reported in Irish Cobbler in N.B. (C.H. Godwin). Spindle tuber was noted in N.S. (R.C. Layton). The disease increased in prevalence in P.E.I. and caused 21 fields to be rejected. It was found in the 4 leading varieties, Irish Cobbler, Green Mountain, Katahdin and Sebago, particularly in the latter (S.G. Peppin). A trace to 1% of spindle tuber was found in 11 out of 16 fields of Irish Cobbler table stock examined in Queens Co., P.E.I. (R.R. Hurst).

WITCHES' BROOM (virus) was found in 106 (11.4%) of the fields inspected in B.C. and one field was rejected. The disease has been less prevalent for the past 2 years than formerly (H.S. MacLeod). Witches'

broom was found in 2 fields in the Peers district, Alta. (J.W. Marritt) and in a field of Green Mountain in the North Bay district, Ont. (H.W. Whiteside). A trace of witches' broom (Solanum virus 15) was found in Green Mountain stock sent in from N.B. for tuber indexing. The virus was transmitted by grafting to Lycopersicum esculentum and L. hirsutum in which it produced typical symptoms of witches' broom (D.J. MacLeod). The disease affected 2% of the plants in a field in Kings Co., P.E.I. (R.R. Hurst).

YELLOW DWARF (virus). A few cases were observed in northern Ont. (H.W. Whiteside). Two plants of a seedling were found affected by yellow dwarf (Solanum virus 16) in an experimental plot in York Co., N.B. (D.J. MacLeod).

FERTILIZER BURN was observed on tubers received from 2 places in Simcoe Co. The soil was said to be light and sandy (H.N. Racicot).

FROST INJURY. Net necrosis due to frost killing the plants was quite prevalent in the Cariboo and other areas in the interior of B.C. (H.S. MacLeod). Some frost necrosis was also observed at North Saanich (W. Jones). Several fields were injured by frost in northern Ont. and the tubers showed typical breakdown at harvest (H.W. Whiteside). Heavy frost in northern districts of Que. caused some tuber damage and a few growers had to regrade their stocks (B. Baribeau).

GIANT HILL was much more prevalent in B.C. than in 1948; it was reported to a slight extent in most crops and caused 2 fields to be rejected. The increase is attributed in part to late blight masking symptoms of the disease on second inspection last year (H.S. MacLeod). Small amounts of giant hill were seen in 16 (8.8%) of the fields inspected in Alta. (J.W. Marritt). Giant hill was more prevalent than usual in northern Ont. (H.W. Whiteside). A few cases of giant hill were noted in Que. (B. Baribeau). The disease was observed in one field of Green Mountain near Fredericton, N.B. (C.H. Godwin).

HEAT INJURY. Some light net necrosis due to heat or drought occurred in a few areas in B.C. (H.S. MacLeod). Some wilting and discoloration of the vascular ring was noted in district 3, Ont. (H.W. Whiteside).

LIGHTNING INJURY was observed in 3 widely scattered fields in Que. (B. Baribeau).

LOW TEMPERATURE INJURY. In all, 15 cases of severe chilling of potatoes in storage in Queens Co., P.E.I., were referred to the laboratory; in one lot 10% of the tubers were severely injured (R.R. Hurst).

MAGNESIUM DEFICIENCY caused moderate damage to a field of Green Mountain at Charlottetown, P.E.I., on land that had been heavily limed but had not received any manure for several years (D. Robinson).

NET NECROSIS was noted during bin and shipping inspection in Temiscouata, Champlain and Nicolet Counties, Que.; infection was light in Green Mountain (B. Baribeau). Except for a few lots of Green Mountain in Sunbury Co., less than 1% of the tubers showed symptoms in N.B. (C.H. Godwin).

STEM-END BROWNING. Only a few cases were observed in Green Mountain in Que.; the long growing season permitted the crop to mature fully (B. Baribeau).

WIND INJURY. Early in July several specimens of potato vines were received which had the appearance of having been twisted off at the ground level. The same condition was observed in several patches in the Harwarden area in Sask.; in these patches 20% of the plants similarily affected were dead or dying. A. Charlebois reported the trouble at Indian Head. In every case the plants were partially protected by a windbreak. It was concluded that the windbreaks caused a swirling of the high winds and where this occurred numerous plants were twisted partially or completely off (R.J. Ledingham).

## RADISH

CLUB ROOT (Plasmodiophora Brassicae) affected a few plants in the University seed-testing plots, Vancouver, B.C. (H.N.W. Toms).

## RHUBARB

CROWN GALL (Agrobacterium tumefaciens) found on one plant in a home garden at Summerland, B.C. (G.E. Woolliams).

CROWN ROT (cause unknown) severely affected 3 plants of Macdonald at Charlottetown, P.E.I. (D. Robinson).

RED LEAF (cause unknown) was severe on several varieties, especially Ruby and Valentine, at the Station, Lacombe, Alta. Canada Red and Macdonald appeared healthy (T.R.D.).

## SPINACH

DOWNY MILDEW (Peronospora Spinaciae). A survey of the marshes at Thedford, Ont., on 7 June revealed localized outbreaks of the disease, with considerable damage in one field (J.D. MacLachlan).

## SQUASH

POWDERY MILDEW (Erysiphe Cichoracearum) was present on most plantings late in the season in southern Essex Co., Ont. (C.D. McKeen).

SOFT ROT (Rhizopus sp.) severely affected 2 squash, the tips of which had been broken off, in a garden in Queens Co., P.E.I. (R.R. Hurst).

## SWEET CORN

SMUT (Ustilago Maydis). Traces were noted in single gardens at Ste. Anne de la Pocatiere, Ste. Croix and Rosemere, Que. (A. Payette). A specimen was received from Aroostook Junction, N.B. (H.N. Racicot). A few smutted ears were seen in a garden in Queens Co., P.E.I. (R.R. Hurst).

## TOBACCO

The diseases of tobacco in Ont. was summarized by L.W. Koch in a special report.

### Diseases in the Seedbed

BLUE MOULD (Peronospora tabacina) was first reported in the New Tobacco Belt, Ont., on 15 May, a day or so earlier than in any previous year. Infection quickly became widespread in this area, but damage was less than usual because not only were conditions generally unfavourable for the development of the disease but also spraying or dusting were widely practised for its control.

In the Old Tobacco Belt blue mould did not appear until after mid-May when transplanting had already begun. Damage was considerably less than for the past several years on account of abundant sunshine and low precipitation during the critical period.

YELLOW PATCH (excessive nutrients) caused mild damage in the Old Tobacco Belt in Essex and Kent Counties and moderate damage throughout the New Tobacco Belt. Although most growers are aware of the cause, many still err on the side of over fertilizing their tobacco seedbeds.

DAMPING-OFF (Pythium sp. and Rhizoctonia sp.) was responsible for the complete loss of some seedbeds, particularly in Kent Co., during the early season. These losses occurred during a prolonged wet period in unsteamed seedbeds.

MUSHROOMS caused moderate damage in Kent County seedbeds. In this area there appears to be a relationship between tobacco seedbed preparation and the trouble.

2,4-D (Dichlorophenoxyacetic Acid) INJURY. Several cases of injury from this chemical occurred again this year. One case was traced to the use of an improperly-cleaned knapsack sprayer.

### Diseases in the Field

BLUE MOULD (Peronospora tabacina). Mild damage was reported on the lower leaves of plants in some fields in the St. Thomas area.

BROWN ROOT ROT (nematodes) caused severe damage in some fields of burley tobacco in Essex County. As usual, the varieties Harrow Velvet and Halley's Special were most affected. Soil fumigants proved highly effective in control of the disease in field plots at Harrow.

BLACK ROOT ROT (Thielaviopsis basicola) caused stunting and moderate damage in certain fields of flue-cured tobacco in the New Tobacco Belt. Little damage occurred in the Old Tobacco Belt where resistant burley varieties predominate.

MOSAIC (virus) was widespread and caused very considerable damage in the burley tobacco crop of Essex and Kent Counties. The disease has increased markedly during the past few years and cucumber strains actually appear to predominate in certain areas.

RING SPOT (virus) was observed to be quite widespread in the Old Tobacco Belt, damage was slight.

FRENCHING (cause undetermined) was widespread in parts of Essex and Kent Counties. Again the disease was much more prevalent in poorly-drained fields or portions of fields. On the other hand, a few cases were observed on high, well-drained sandy soils.

SORE SHIN (?Rhizoctonia Solani) was again observed in a few fields in Essex County. Damage was slight.

ANGULAR LEAFSPOT (Pseudomonas angulata) was responsible for considerate late-season damage in Essex Co. Although this disease occurs to some extent each year, more damage was reported this year than usual, possibly due to abundant moisture during the harvesting season and the thin nature of much of the leaf.

## Other Observations

MOSAIC (virus). Young infected plants appeared to be more numerous than usual in the fields of the tobacco area in Que. this spring, but spread of the disease was curtailed by a long period of drought (F. Godbout).

## TOMATO

EARLY BLIGHT (Alternaria Solani). In general, infection was relatively light in fields of early tomatoes in the Leamington area, Ont. (C.D. McKeen). It was in general moderate in Ont., but there were a few severe outbreaks (J.D. MacLachlan). Early blight was general, particularly on the lower leaves, in the Montreal district, Que. (E. Lavallee). One basket in eight of mature green fruit was being discarded at harvest in early September in a field near Gaspereaux, N.S.; the field was in potatoes in 1948 (K.A. Harrison). Only traces of early blight were observed late in the season in Queens Co., P.E.I., but some affected fruit were brought to the laboratory in late October (R.R. Hurst).

GREY MOULD (Botrytis cinerea) affected the occasional fruit touching the ground late in the season at Kentville, N.S. (K.A. Harrison).

LEAF MOULD (Cladosporium fulvum) caused negligible losses in the greenhouse fall crop in southwestern Ont.; where the resistant variety, Improved Bay State, was grown; considerable infection and loss of foliage were observed where V121 had been used (C.D. McKeen). Leaf mould was prevalent in gardens and O.A.C. plots, Guelph, late in the season. Severe defoliation was common, but the disease developed too late to affect appreciably the yield and quality of fruit. A severe infection was present on the lower leaves of tripod-staked tomatoes in a field in Middlesex Co. on 13 July, but no further observations were made (J.D. MacLachlan). A trace was seen in one greenhouse in April in Queens Co., P.E.I. (R.R. Hurst).

ANTHRACNOSE (Colletotrichum phomoides) was particularly prevalent in the canning crop in Essex Co., Ont. The entire crop of an 11 acre field at Harrow was a total loss due to numerous lesions on most fruits (C.D. McKeen). A few severe outbreaks were recorded particularly in southwestern Ont. (J.D. MacLachlan). Although no anthracnose was observed on green fruits at harvest from a garden in Westboro it developed on a few fruits as they ripened indoors (H.N. Racicot). Anthracnose affected 20% of the fruits of Stokesdale in storage from a garden in Kentville, N.S. (K.A. Harrison). About 2% of the fruit were affected in a garden in Queens Co., P.E.I. (R.R. Hurst).

ROOT ROT (Colletotrichum sp.) practically ruined a crop of V121 in a greenhouse in Middlesex Co., Ont., by 13 July, while Michigan State yielded a moderate crop although the plants were affected by the disease. In another greenhouse in the county V121 was so severely affected that almost the whole crop was ruined. Specimens were also received from greenhouses in the Burlington area. The disease is characterized by sloughing of the cortical tissue. The pathogen has yet to be determined specifically (J.D. MacLachlan).

BACTERIAL CANKER (Corynebacterium michiganense) caused little damage in the Okanagan Valley, B.C., but in a crop being grown for seed at Vernon about 10% of the plants were affected (G.E. Woolliams). The disease caused some trouble in a breeding project at the Station, Swift Current, Sask. (H.W. Mead). Infection was a trace at the University farm, Winnipeg, Man., in a small planting probably grown from untreated seed. After the severe losses from bacterial canker in 1948, most of the seed planted at the University was treated with hot water at 50°C. for 25 min. with excellent results (W.A.F. Hagborg). Affected Bounty fruits were received from 2 fields in Essex Co., Ont. (C.D. McKeen). A moderate infection was reported from 2 farms at Neuville, Portneuf Co., Que. The disease was observed 2-3 years previously, but this year the damage was sufficient to cause some alarm. The pathogen was isolated and tested by inoculation into healthy plants (O. Caron, A. Payette). Diseased specimens were received from Leitches Creek, N.S. (K.A. Harrison).

FUSARIUM WILT (F. Lycopersici) caused severe damage in a commercial field at Medicine Hat and another at Taber, Alta. (M.W. Cormack). Wilt affected 50% of the plants in two 4-acre fields of early tomatoes at Kingsville, Ont.; yields were reduced 30% due to the wilting and premature death of the plants. Tomatoes had been grown continuously for several years in these fields (C.D. McKeen). One plant out of 60 was affected by wilt in a garden at Ottawa on 21 July (H.N. Racicot).

ROOT KNOT (Heterodera marioni) affected a single plant in a private garden at Vancouver, B.C.; the plants were originally greenhouse grown (H.N.W. Toms).

LATE BLIGHT (Phytophthora infestans) was observed in only 2 fields of tomatoes in Essex Co., Ont., in 1949. The relative freedom from disease in field crops was in marked contrast to its incidence in 1946, 1947, and 1948. However it caused considerable destruction of fruit and foliage in 4 widely separated greenhouses in southern Essex late in the fall (C.D. McKeen). Late blight was of no economic importance on field and garden tomatoes in Ont., due chiefly to the weather being hot and dry this summer. The harvest was well advanced in most fields before late blight became established in potato fields. The late blight warning service saved growers needless expenditures on sprays and dusts (J.D. MacLachlan). A moderate infection was present at West River, N.S., on 8 Oct. (R.G. Ross). Late blight caused considerable damage to the late tomato crop throughout P.E.I. (R.R. Hurst).

BUCKEYE ROT (Phytophthora parasitica) caused considerable damage in one greenhouse at Victoria, B.C. (W. Jones).

BROWN ROT (Pseudomonas solanacearum E.F.Sm.). The pathogen was isolated from a specimen submitted by an inspector from the Kitchener area, Ont. The affected plant showed the typical symptoms of brown rot and the organism isolated agreed well with P. solanacearum, but no pathogenicity tests were made. Whether the plants were imported or grown locally is unknown (E.H. Gerrard). This disease of the southern U.S. has not been reported previously in the Survey (I.L.C.).

BACTERIAL SPECK (Pseudomonas tomato). A large part of the fruit in one greenhouse at Leamington, Ont., were unmarketable on account of bacterial speck. It is reported that the disease has been present in the same greenhouse for the last 3 years (C.D. McKeen).

DAMPING-OFF (Pythium deBaryanum) destroyed about 20% of the seedlings in 100 flats of one grower in Lincoln Co., Ont. (G.C. Chamberlain). The disease virtually destroyed one flat in a greenhouse in Queens Co., P.E.I. (R.R. Hurst).

STEM ROT (Sclerotinia sclerotiorum). A trace was found in 2 fields of early tomatoes at Harrow, Ont. (C.D. McKeen). The same pathogen caused the rot of 3 fruit in a cluster at the Station, Kentville, N.S. (K.A. Harrison).

LEAF SPOT (Septoria Lycopersici). As in previous years, leaf spot was responsible for much defoliation in early tomato crops in Essex Co., Ont., in 1949. Many seedlings were found affected before they were set in the field. It is suspected that the pathogen survives in tomato refuse in the unsterilized compost soil used for the second transplanting (C.D. McKeen). Localized outbreaks were observed about Simcoe in Norfolk Co., and especially in Kent Co. (J.D. MacLachlan).

WILT (Verticillium albo-atrum) affected 20% of the plants in a greenhouse at Matsqui, B.C., making their removal necessary (I.C. MacSwan). Wilt was quite general in the B.C. Interior in commercial fields of tomatoes, affecting up to 50% of the plants (G.E. Woolliams).

BACTERIAL BLIGHT (Xanthomonas vesicatoria). Traces were seen in a planting in Queens Co., P.E.I., in late September (R.R. Hurst).

MOSAIC (virus) affected a few plants in a greenhouse at Haney, B.C., in Feb. and a quarter of the plants in a private garden at Chilliwack; in both instances the "fern-leaf" symptoms were common (H.N.W. Toms). Common mosaic caused slight injury to a greenhouse crop at Summerland (G.E. Woolliams). Mosaic was prevalent in many fields of canning tomatoes in Essex Co., Ont. In many instances the disease appears about 4 weeks after the plants are set in the field; the source of infection has not been determined (C.D. McKeen). Mosaic was generally light in Ont. with many areas entirely free of disease; it was less prevalent than usual (J.D. MacLachlan). About a third of 300 plants of an unknown variety were seriously stunted by mosaic in a greenhouse in Lincoln Co. A few plants were apparently affected by shoe-string mosaic; others were developing streak. Mosaic seriously affected 75% of the staked Harkness plants in a block also in Lincoln Co. (G.C. Chamberlain). Two fields, one at St. Martin and the other at St. Laurent, Que., were a total loss on account of mosaic (E. Lavallee). A trace to 2% of the plants were affected by mosaic in several fields visited in Kings Co., N.S. (K.A. Harrison).

PURPLE TOP (virus). Three plants affected by the bunch top virus (P.D.S. 27:79. 1948) were found in a plot at the Station, Fredericton, N.B. (D.J. MacLeod). A single affected plant was seen in a garden in Queens Co., P.E.I. (R.R. Hurst).

BLOSSOM-END ROT (non-parasitic). Diseased specimens from a home garden at Vananda, B.C. (I.C. MacSwan). Blossom-end rot was more common than usual in Sask., probably as a result of the hot spell of 1-8 Aug. (T.C. Vanterpool). Common in Ont., but no as severe as in 1948 (J.D. MacLachlan). This condition was confined to an area of a plantin of staked tomatoes that had received no sawdust mulch in 1948 in Lincoln Co., Ont. Where mulch was applied moisture conditions were improved sufficiently to prevent injury (G.C. Chamberlain). About 5% of the tomatoes were affected on Jesus Island, Que. (E. Lavallee). Blossom-end rot was noticed in many tomato fields in southern Que. (L. Cinq-Mars). The trouble was severe in plants transplanted in the

garden when they were in flower at Lorette, Quebec Co. (A. Payette). Blossom-end rot was affecting 40% of Stokesdale fruit picked on 8 Sept., declining to 25% in pickings made within the week in a garden at Kentville, N.S. (K.A. Harrison). The weather was such in P.E.I. that no blossom-end rot occurred (R.R. Hurst).

BLOTCHY RIPENING (non-parasitic) was very general in market gardens in Queens Co., P.E.I. (R.R. Hurst).

HORMONE INJURY. On 2 occasions tomato plants with mosaic-like symptoms, distorted and unthrifty foliage were seen in Kings Co., N.S., following application of Sure Set. It was impossible to determine the concentrations used (K.A. Harrison).

PUFFING (non-parasitic). Many fruits were found affected in one greenhouse at Leamington, Ont. The condition may have been caused by excess nitrogen during early growth of the plants (C.D. McKeen).

SKIN CRACKING (non-parasitic). Improved growing conditions in Ont. following the hot dry weather of the summer resulted in a high percentage of the fruit developing skin cracks. These cracks permitted the entrance of secondary fungi. Loss of quality was a major problem in the canning industry (J.D. MacLachlan). There were many reports of severe cracking throughout the Annapolis Valley, N.S., after a very dry July and early August followed by heavy showers in late August (K.A. Harrison). Skin cracking followed by secondary rots caused sl.-sev. losses in Queens Co., P.E.I. (R.R. Hurst).

SUNSCALD (non-parasitic) was quite prevalent in tomatoes, particularly in fields with poor foliage development in Ont. (J.D. MacLachlan). Sunscald was much more prevalent in the Montreal district, Que., than usual on account of the dry weather (E. Lavallee).

2,4,5-T INJURY caused the loss of 150' row of tomatoes near highway in a home garden on Lulu Island, B.C. The spray was carried by the wind into the garden. Stems were twisted with warty outgrowths, leaves became fern-like and fruits ceased to grow and turned hard.

## TURNIP

MILDEW (Erysiphe Polygoni). A light infection was observed in a field of Laurentian in Queens Co., P.E.I., on 29 Sept. (R.R. Hurst).

STORAGE ROT (Fusarium sp. and Rhizoctonia Solani) moderately affected some bins of Laurentian in L'Islet Co., Que. Pathogenicity trials were carried out. The disease corresponds to that described by Lauritzen (Jour. Agr. Res. 33:93-108. 1929) (R.O. Lachance).

BLACK LEG (Phoma lingam) caused a 20% average loss of Swede turnips in storage in the winter of 1948-49 and 25% in the field in September in Queens and Prince Counties, P.E.I. (R.R. Hurst).

CLUB ROOT (Plasmodiophora Brassicae) affected 2% of the plants in the University seed-testing plots, Vancouver, B.C. (H.N.W. Toms). The disease caused the complete loss of crop in a field of Swede turnips at St. Flavien, Que. (A. Payette). A trace of club root was seen in a field of Laurentian in Prince Co., P.E.I. (R.R. Hurst).

MOSAIC (virus) was prevalent on turnip in the Walkerton district, Ont. (J.D. MacLachlan).

BROWN HEART (boron deficiency) followed by soft rot caused severe damage to a field of Swede turnips at St. Alban, Que. (O. Caron, R.O. Lachance). Brown heart caused slight to severe damage across P.E.I.; up to 65% of the roots were affected with an average loss of 3%. The season was dry (R.R. Hurst).

## WATERCRESS

ROOT ROT (Rhizoctonia Solani). Affected plants received 24 April from a greenhouse at Islington, Ont., were stunted and yellow. Lateral roots were rotted, with an abundance of Rhizoctonia mycelium present (J.D. MacLachlan).

## WATERMELON

ANTHRACNOSE (Colletotrichum lagenarium) lesions were plentiful on the stems of plants in 2 fields in the Harrow area, Ont. Considerable fruit infection was also observed later in the season in many fields (C.D. McKeen).

WILT (Fusarium bulbigenum var. niveum) was found in 2 large fields at Harrow, Ont. Some 80% of the crop was lost in one field where watermelons had not been grown for 18 years. When isolates from the 2 fields were tested for pathogenicity on 2 varieties definite differences in virulence were obtained, indicating the existence of strains of the watermelon wilt organism in southwestern Ont. (C.D. McKeen).

ROOT ROT (cause unknown) has developed in the past 2 years in plants started in cubes of steamed soil in cold frames in Essex Co., Ont. The symptoms are a stunting of the plant and yellowing of leaves combined with the rotting of all fine secondary roots, which appear a few days before transplanting to the field. Affected specimens may outgrow the condition after setting in the field provided hot weather prevails. Otherwise affected plants die in a few days. A similar disease has also been observed in muskmelons grown in a similar manner (C.D. McKeen).