IV. DISEASES OF FRUIT CROPS

A. POME FRUITS

APPLE

LEAF SPOT (Cylindrosporium Pomi Brooks (Mycosphaerella Pomi Passer.). A moderately severe leaf spot on a crab apple (?Malus baccata hybrid) at Morden, Man., yielded a Cylindrosporium with spores 48-78.5 x 2-4 microns and 1-2 septa; microconidia 4-6.5 x 1.5-2 microns were also present. Although M. Pomi is generally mentioned as causing a fruit spot of apple and a fruit blotch of quince, the perfect stage was produced by Walton and Orton (Science 63:236. 1926) from apple leaves. Brooks (Bull. Torr. Bot. Club 35:453. 1908) described the spores as being 15-80 x 2-2.5 microns. Brooks and Black (Phytopath. 2:63-72. 1912) proved the connection between the Cylindrosporium and an evident micro-conidial stage that they identified with Phoma Pomi Passer. Previously reported on apple fruit from N.B. (P.D.S. 3:30. 1923). Probably insignificant in well sprayed orchards (W.L. Gordon, D.B.O. Savile).

DIE-BACK (Daldinia grandis) occurred to some extent at Morden, Man., near graft incisions; the fungus fruited on the diseased areas (J.E. Machacek).

FIRE BLIGHT (Erwinia amylovora) was again severe in all susceptible varieties at Lethbridge, Alta. Moderate to severe damage was seen in crab apples at Staveley and in apples and crab apples at Edmonton (M.W.C.). Blight was common and often severe in city gardens at Saskatoon, Sask.; it was also severe at Scott, causing extensive reduction in fruit set (H.W.M.). It was severe on a young tree at Saskatoon, the heaviest infection seen since 1933 (T.C. Vanterpool). Moderate twig and spur blight occurred in a planting of Dolgo at Winnipeg, Man. Blight was severe and general at Morden; Schizophyllum commune and Polyporus Tulipiferae often occurred on trunks and branches of infected trees (W.L.G.). A trace of blossom and twig blight was seen on Tolman Sweet, Ontario, Fameuse and King in the Niagara Peninsula, Ont. (G.C. Chamberlain). In an orchard at Britannia Heights blight was severe on Fameuse and Atlas, moderate on Wealthy and Golden Russet, slight on Melba, Cortland and Peerless, and absent from McIntosh, Lobo and Lawfam in July; it had been severe in all trees except those of Lawfam in 1943. In general blight was much less severe in the Ottawa district than in 1943. A specimen was received from Bothwell and small amounts were seen at Pointe Fortune and Chute a Blondeau. Traces were seen at Ste. Clothilde, Barrington, Hemmingford, Covey Hill, Ste. Chrysostome, St. Urbain, Ste. Martine, Ste. Philomene, and Chateauguay, Que. One affected tree was seen at Montreal, and specimens were received from Rosemere, Que. (H.N. Racicot). Two trees of Yellow Transparent at Ste. Rose, Laval Co., Que., showed twig blight and large branch cankers (J.E. Jacques). No heavy infections were seen in southwestern Que., but blight seems to have spread in many orchards (L.J.S. Laporte).

FLY SPECK (Leptothyrium Pomi) was heavy in an abandoned orchard in P.E.I. (R.R. Hurst).

TWIG BLIGHT (Nectria cinnabarina). Tubercularia vulgaris was abundant on branches of a crab apple at Morden, Man; most of the branches were dead or dying; perhaps killed or weakened by winter injury (W.L. Gordon). Four slightly infected trees were seen in Queens Co., P.E.I. (R.R. Hurst).

ANTHRACNOSE (Neofabraea malicorticis) has caused considerable losses during the last two or three years in the Salmon Arm district, B.C.; its severity depends upon fall weather conditions, since infection occurs at that time (H.R. McLarty).

PERENNIAL CANKER (Neofabraea perennans) has not been of much importance on trees in the Okanagan Valley, B.C., since the introduction of the woolly aphis parasite, Aphelinus mali. Some bull's eye rot occurs in storage, but severe orchard damage is rare (H.R. McLarty).

LEAF SPOT (?Phyllosticta limitata) was slight at Brandon and moderate at Charleswood, Man.; spores 4-7 x 3 microns (W.L. Gordon).

BLACK ROT (Physalospora obtusa) caused slight damage on a few trees at the Experimental Station, Sidney, B.C. (W. Jones). A slight to moderate leaf infection was general at Morden, Man.; Sphaeropsis Malorum was identified with three types of spot, (1) a small, circular spot a few mm. diam., (2) a larger, zonate, roughly circular spot about 1 cm. diam., and (3) an extensive, marginal, zonate spot (W.L. Gordon).

CANKER (Physalospora obtusa). Sphaeropsis Malorum was isolated in March, 1944, from both bark and wood of cankers on Fameuse trees at Whitby, Ont. (See P.D.S. 23:81. 1944 under Winter Injury). How much killing was due to winter injury and how much to the parasite is uncertain (R.S. Willison).

CROWN ROT (Phytophthora Cactorum). No change was seen in the general picture in the Okanagan Valley, B.C., about 2% of the mature trees being affected (R.E. Fitzpatrick).

POWDERY MILDEW (Podosphaera spp.). P. leucotricha caused slight damage at the Experimental Station, Sidney, B.C. (W. Jones). A 50% infection was seen on young McIntosh trees in York Co., N.B. (S.F. Clarkson). P. Oxyacanthae was generally light, but heavy on some trees at Morden, Man.; it was heavily parasitized by Cicinobolus Cesatii (W.L. Gordon). Only P. leucotricha has been reported on apple in Canada previously, but we have practically no herbarium material to support earlier reports. Contributors are asked to submit specimens when mature material can be found, to aid us in assessing the incidence of these two species.

BRANCH ROT (Schizophyllum commune) was seen on a few trees in a home orchard in N. Saanich Co., B.C. (W. Jones).

BROWN ROT (Sclerotinia fructicola) was widespread and destructive to fruit, especially crab apples, in the Winnipeg, Man., district; 75% of a purchase of Dolgo crabs were unfit for use 48 hours after picking (W.L. Gordon).

PINK ROT (Trichothecium roseum) caused severe damage to apples of an unidentified variety in Queens Co., P.E.I. (R.R. Hurst).

SCAB (Venturia inaequalis) was not severe in the northern Okanagan Valley, owing to the dry weather; it was, as usual, most prevalent on McIntosh. The three regular sprays, pink, calyx, and cover 2-3 weeks after calyx, generally gave good control; but rain in early September resulted in much pin-point

infection on McIntosh (G.E. Woolliams). Infection was severe in many apples and crab apples at Edmonton and Olds, Alta. At Edmonton, moderate to severe infection occurred in gardens some distance from the plots where the disease was first seen in 1943 (M.W.C.). Lesions were present on young apples sent in from Lloydminster, Sask. (H.W.M.). Slight to severe scab occurred on the leaves of several varieties at Morden, Man.; less occurred on the fruit. A trace was seen on the leaves of a crab at Winnipeg (W.L. Gordon).

Scab was prevalent in many orchards in central Ont. In poorly sprayed orchards 20-30% of the fruit was severely scabbed by June 30. In the Laboratory orchard, St. Catharines, unsprayed trees yielded no scab-free fruit, and 75% of the crop had fallen by the end of July (G.C. Chamberlain). Little scab occurred in the Ottawa district owing to the dry weather (D.B.O. Savile). Damage was slight in well sprayed orchards in southwestern Que. (L.J.S. Laporte). Specimens of late pin-point scab on McIntosh were received during the winter from Dunham, Que. (H.N. Racicot).

In the St. John River Valley, N.B., approximately 50% of the perithecia in the leaves were fully developed on May 17. Initial ascospore discharge occurred on May 27 during the full bloom stage. The bloom period was short and sprays were applied during the critical period of ascospore discharge. Dry weather following these timely early sprays simplified the satisfactory control of apple scab throughout the season. The field spray experiments indicate to date that ferric dimethyldithiocarbamate (Fermate) gives better control of scab in either wet or dry seasons than the standard recommended fungicides, without the spray injury often caused by the latter (S.F. Clarkson).

Although ascosporic inoculum was available for a longer period than usual, nearly eleven weeks, the weather was unfavourable to scab infection in Nova Scotia in 1944. Even in unsprayed trees scab was difficult to find during the summer. The first new infections were found June 5. The dry season to the end of August prevented further spread of the fungus. During September and October some late infection on the fruit was apparent, but in no case was it found to exceed 5% (J.F. Hockey).

In three orchards near Charlottetown, P.E.I., leaf infection of McIntosh averaged 15% in June; but in September only traces could be seen in well-sprayed orchards of this variety (R.R. Hurst).

MOSAIC (?virus) was seen on one tree at Lethbridge, Alta. (W.C. Broadfoot). A well defined mosaic without any distortion was seen on three Bethel trees at the Experimental Station, Fredericton, N.B. A seedling produced at the Station showed a marked mottling and crinkling of the leaves and a general dwarfing (D.J. MacLeod). A 10% infection was seen in an unidentified variety in Queens Co., P.E.I. (R.R. Hurst).

BITTER PIT (non-parasitic) was seen in Baldwin and Spy in Lincoln Co., Ont. It was prevalent in Baldwin, disfiguring up to 50% of a light crop (G.C. Chamberlain). Bitter pit was seen in many orchards in various parts of Ont. on Spy, Baldwin and Stark; it was especially noticeable on young Spy trees just starting to bear (J.E. Howitt). Affected specimens of Linda were received from Brittannia Heights, Ont.; the crop was stated to be light (H.N. Racicot).

DROUGHT SPOT and CORKY CORE (boron deficiency). A few samples were received from orchards in the Okanagan Valley, B.C., that had not been treated with boron (H.R. McLarty). Corky core was severe in Gravenstein, McIntosh and Wagener in an orchard at Melvern Square, N.S. The orchard had received borax at 2 lb./100 gal. in a spray in 1943. Smaller amounts of the trouble were seen in other orchards (J.F. Hockey). Four per cent corky core was found in a hamper of McIntosh purchased at Charlottetown, P.E.I. (R.R. Hurst).

LEAF SCORCH (cause unknown) did no serious damage in the Okanagan Valley, B.C., although some was seen in many orchards (R.E. Fitzpatrick).

SILVER LEAF (cause unknown) was moderate to severe in the horticultural plots at Edmonton, Alta.; heart rot was found in other trees. Silver leaf followed winter injury in a number of trees at Beaverlodge (M.W.C.). Slight to severe silvering occurred on various trees at Morden, Man. (W.L. Gordon). A number of trees of McIntosh and Cortland in the spray plots at the Experimental Station, Fredericton, N.B., had their leaves completely silvered (S.F. Clarkson). Four trees in the seedling nursery at Kentville, N.S. were completely silvered (J.F. Hockey). Silver leaf was seen in P.E.I. on Lobo after Red Delicious had been grafted on them (R.R. Hurst). There does not appear to have been any clear association with Stereum purpureum in any of these outbreaks. In view of the many cases of silver leaf observed, especially in Que. in 1934, associated with black heart due to winter injury but not with Stereum or any other fungus, it seems preferable to list this trouble as due to Stereum only when the association is clearly indicated. Silvering of the foliage must be regarded as a symptom of a disorder in the trees rather than as a disease (D.B.O. Savile).

SPRAY INJURY. In Grantham Twp., Ont., extensive marginal burning developed on Spy and Ontario following the calyx application of ½ strength lime sulphur and wettable sulphur. No injury was found where flotation sulphur had been used at the same time on McIntosh. The weather was damp and cool (G.C. Chamberlain). Severe russetting of various varieties occurred in N.B. when Bordeaux mixture 8-25-100 or 5-15-100 was used for the first cover spray in mid June (S.F. Clarkson).

SUN SCALD. A trace was seen in Lobo at Ste. Anne de la Pocatiere, Que. The same trouble was stated to have been serious in one orchard near Quebec (R.O. Lachance).

WINTER INJURY. Pith injury was universal in many year-old trees in Queens Co., P.E.I. Low temperatures following sub-cooled rain are thought to have been responsible (G.C. Warren). A severe die-back of McIntosh in Queens Co. was also attributed to severe cold; about 40 twigs were killed in each of several trees (R.R. Hurst).

PEAR

FIRE BLIGHT (Erwinia amylovora) was more prevalent than usual in the Okanagan Valley, B.C. About 25% of the trees were infected in one orchard in Kelowna. Several growers are using the zinc chloride solution

with fair to good success (H.R. McLarty, G.E. Woolliams). It was general and destructive at Morden, Man. (W.L. Gordon). A seven-year-old Bartlett orchard of 300 trees in Lincoln Co., Ont., was so severely involved that all the trees were removed early in 1944. The disease started in a few trees at one end in 1942 and spread throughout the block in 1943. In many instances the disease spread from spurs right down into the trunks. Cultivation and fertilization probably contributed to the heavy loss. Blight caused extensive killing of spurs and twigs of Bartlett and Flemish Beauty at Vineland Horticultural Station. The disease was epidemic in a number of young orchards in the west end of the Niagara Peninsula, particularly where it was prevalent in 1943; much less infection occurred in the eastern part where development is earlier (G.C. Chamberlain). Fire blight was seen in many orchards in the St. Thomas area and in the Essex peninsula; in some, many of the trees had already been ruined (J.E. Howitt).

LEAF SPOT (?Mycosphaerella sentina). A light to moderate spotting occurred on some trees at Morden, Man.; minute, immature, sparsely scattered pycnidia were seen, and the spots resembled those described for Septoria piricola (W.L. Gordon).

POWDERY MILDEW (Podosphaera leucotricha) is commonly present in all varieties in the Okanagan Valley, B.C., but caused no serious damage in 1944. The pink spray is sufficient to prevent fruit russetting (H.R. McLarty, R.E. Fitzpatrick).

SCAB (Venturia pirina) was general and moderately heavy in neglected orchards in coastal B.C. (W. Jones). It caused heavy loss in an orchard of Flemish Beauty in the Oliver district, where the fungus was apparently stimulated by the heavy dews in the river bottom land. It also occurs in the northern Okanagan Valley (H.R. McLarty). Thirty-five per cent of the fruit of inadequately sprayed Flemish Beauty in Lincoln Co., Ont., were unsaleable owing to severe and extensive blemishes (G.C. Chamberlain). Scab was heavy in an orchard of Flemish Beauty in Queens Co., P.E.I. (R.R. Hurst).

STONY PIT (virus) is present in most of the Bosc orchards in the Okanagan Valley, B.C., but this is not an important variety. It is also seen in Anjou and Winter Nelis. The severity varies from year to year in a given tree. (H.R. McLarty, R.E. Fitzpatrick).

BLACK END (cause unknown) was present to some extent in most plantings in the Okanagan Valley, B.C. (R.E. Fitzpatrick).

CORKY CORE (boron deficiency). Corky areas were seen in the flesh of Bartlett pears in an orchard in Louth Twp., Ont. The trouble, which had not been seen previously in this orchard, was thought to be due to boron deficiency (G.C. Chamberlain).

QUINCE

FIRE BLIGHT (Erwinia amylovora). Moderately severe twig blight was seen in a few young trees in Grimsby Twp., Ont. (G.C.Chamberlain).

B. STONE FRUITS

APRICOT

CORYNEUM SPOT (C. Beirinckii) was quite general in the Summerland district, B.C., but not further south in the Oliver and Osoyoos districts (H.R. McLarty). Specimens were received from Morden, Man. (J.E. Machacek).

LEAF SPOT (Phyllosticta circumcissa). A trace of a shot-hole type of spot was seen on Scout at Morden, Man.; spores were 4-6 x 2-2.5 microns; first record in P.D.S. on this host (W.L. Gordon).

BROWN ROT (Sclerotinia fructicola) caused considerable damage to the crop at Morden, Man. (W.L. Gordon).

BLACK HEART (Verticillium Dahliae) was seen for the first time in the Okanagan Valley, B.C. Damage was severe in one orchard, 20% of the trees being affected (R.E. Fitzpatrick).

RING SPOT (virus). One additional infected tree was found at Summerland, B.C. (T.B. Lott).

FRUIT SPOT (cause unknown). A fruit spot not due to Coryneum was seen in the Okanagan Valley, B.C.; damage was slight (R.E. Fitzpatrick).

GUMMOSIS (cause unknown). Many trees at Morden, Man., were dying and large balls of gum were exuded at soil level (W.L. Gordon).

SPRAY INJURY. Severe damage occurred in a 20-acre orchard in the Okanagan Valley, B.C., where the operator apparently failed to include lime in a leaf arsenate--lime sulphur spray; the orchard was almost completely defoliated (H.R. McLarty).

CHERRY

BLACK KNOT (Dibotryon morbosum) severely damaged sour cherries in Queens Co., P.E.I. It is abundant on wild cherries, but is not very troublesome in well sprayed orchards (R.R. Hurst).

LEAF SPOT (Higginsia hiemalis) lightly infected the upper leaves of Montmorency in Pelham Twp., Ont., in July; later the infection became general and conspicuous, in this and other orchards. The disease was evident in a young orchard of Schmidt's Bigarreau in Barton Twp., which was sprayed once only; otherwise little leaf spot was seen on sweet cherries (G.C. Chamberlain). Leaf spot was present in sour cherries in Essex Co., the St. Thomas area and Prince Edward Co., but caused less defoliation than in some years (J.E. Howitt).

POWDERY MILDEW (Podosphaera Oxyacanthae) was found on young, unsprayed trees of Montmorency in Grantham Twp., Ont., causing stunting of twigs (G.C. Chamberlain).

BROWN ROT, BLOSSOM and TWIG BLIGHT (Sclerotinia fructicola and S. laxa). Considerable blossom blight due to S. laxa occurred in some orchards in Keating Co., B.C. (W. Jones). In an orchard of Montmorency in Louth Twp., Ont., where bloom was heavy and the trees closely planted, 80-90% infection by S. fructicola occurred and stem rot caused almost complete loss of the crop. In general, infection ran 15-20%. Up to 75% infection was seen in Windsor and Schmidt's Bigarreau in Grimsby Twp., following heavy fogs during bloom; infection started usually in the calyx cup and involved the stem; it tended to be worse in short stemmed varieties and on trees heavy in bloom. Losses averaged 20-30% (G.C. Chamberlain). Blossom blight was serious throughout Lincoln, Welland and Wentworth Co., in all stone fruits, especially cherries, largely as a result of wet foggy weather during the blossom period; more rot occurred than for several years, but the loss was difficult to assess since the weather was also unfavourable for fruit setting (C.B. Kelly).

VERTICILLIUM WILT (V. Dahliae) was seen for the first time on cherries in the Okanagan Valley, B.C. (R.E. Fitzpatrick). Two 4-year old trees in a planting of 30 Windsor sweet cherries were affected by V. sp. in Grantham Twp., Ont., symptoms were wilting and defoliation, dying of branches, and gum exudation from trunks (G.C. Chamberlain).

BACTERIAL BLIGHT (Xanthomonas pruni) was severe in cherry, peach and plum varieties in the experimental nursery blocks at the Laboratory, St. Catharines, Ont. (R.S. Willison).

LAMBERT MOTTLE (virus). No increase was observed in this disease of Lambert cherries in the Okanagan Valley, B.C. (T.B. Lott).

LITTLE CHERRY (virus). Experiments by the B.C. Dept. of Agriculture have verified earlier indications that this disease is due to a virus. Cherries in the Nelson area are generally affected. Reports of small cherries were received from Creston, but the cause was not determined. The disease has not yet reached the Okanagan Valley (H.R. McLarty, T.B. Lott).

MOTTLE LEAF (virus). No spread of this disease was observed in the Okanagan Valley, B.C. (T.B. Lott).

NECROTIC LEAF SPOT (virus) was abundant in the five orchards of Montmorency under observation in Ont. Infection ranged from 9.0 to 44.8% in plantings of from 66 to 432 trees. The affected trees are stunted (G.C. Chamberlain).

RASP LEAF (virus). No spread in the Okanagan Valley, B.C., was observed in 1944 (T.B. Lott).

TATTER LEAF (virus) was found in two orchards in the Niagara Peninsula, Ont., causing considerable leaf tattering and fruit stunting; Black Tartarian seems to be particularly susceptible (G.C. Chamberlain).

TWISTED LEAF (virus). No spread in the Okanagan Valley, B.C., was observed in 1944 (T.B. Lott).

YELLOWS (virus) is common in Montmorency and Richmond in the Niagara Peninsula, Ont. Trees that showed heavy leaf fall in 1943 suffered only slight defoliation in 1944 (G.C. Chamberlain).

CHLOROSIS (iron deficiency). Prunes and other fruit trees suffer from chlorosis in certain orchards in the Okanagan Valley, B.C.; the trouble is thought to be due to unavailability of iron, but no effective remedy has yet been found (H.R. McLarty). In a localized area in Louth Twp., Ont., lime-induced chlorosis affected several trees; the foliage was particularly pale on the current year's growth (G.C. Chamberlain).

CRINKLE (bud sport) is common in the Okanagan Valley, B.C., on Bing, Black Tartarian and Republican. Some growers believe that is is spreading, but our experimental evidence is to the contrary (H.R. McLarty, T.B. Lott).

WINTER INJURY. In Barton Twp., Ont. 82% of buds of Windsor and 71% of Schmidt's Bigarreau were killed. Twigs examined on March 6, 1944, showed discoloration of cortex, especially in and at the base of bud spurs (G.C. Chamberlain).

PEACH

SCAB (*Cladosporium carpophilum*) was more prevalent than usual in Ont., especially in Rochester and Fisher in which fruit spotting resulted (G.C. Chamberlain).

BLOSSOM BLIGHT and BROWN ROT (*Sclerotinia fructicola*). In a block of Rochester in the Laboratory orchard, St. Catharines, Ont., one plot sprayed with Bartlett's standard wettable sulphur showed 1.9% blossom blight, a second plot given the same spray + Orthox spreader showed 3.1% infection, and the unsprayed control 4.0% infection. In an Elberta block in the same orchard no apothecial groups appeared under trees where cyanamide was applied at 300 lb./acre, compared with 0.37 groups/tree in the untreated plot; but blossom blight was actually higher in the cyanamide plot than in the control. A sprayed commercial orchard of Elberta at St. Catharines divided into 3 plots, yielded the results shown in Table 8 (R.S. Willison).

Table 8: Effect of Ground Treatment on Peach Blossom Blight.

Treatment	Cyanamide	Disced	Untreated
Apothecial groups/tree	0.125	0.0	4.3
Blossom blight, %	2.6	3.0	4.9

These results suggest that small experimental plots are unsatisfactory for this type of experiment, especially when the rate of infection is relatively low; small plots may be very erratically affected by outside sources of inoculum. It is also suggested that ground treatments will never be effective to the extent of allowing a reduced spray program unless they are universally adopted over rather wide areas (D.B.O. Savile).

The basic incidence of brown rot was higher than usual in the Niagara Peninsula, Ont., owing to the large amount of blossom blight (see also cherry and plum), but was not serious at harvest time. Table 9 summarizes spray experiments in the Laboratory orchard, St. Catharines.

Table 9: Effect of Sprays on Incidence of Brown Rot (%).

Variety	Check	Poorest Spray Plot	Best Spray Plot
Rochester	44.8	40	3.8-6.0
Elberta	70.4	40	8.7

The Elberta crop ripened about normally until half the crop was picked; ripening was then so rapid that the remainder was too soft for the fresh fruit market, but was excellent for canning and processing (R.S. Willison).

POWDERY MILDEW (Sphaerotheca pannosa) was present in many orchards in the Okanagan Valley, B.C., but rarely caused damage to fruit (H.R. McLarty, R.E. Fitzpatrick).

LEAF CURL (Taphrina deformans) was fairly general around home gardens in coastal B.C., and caused considerable damage to unsprayed trees (W. Jones). It was unusually abundant in parts of the Okanagan Valley, notably the Oliver district, but the total damage was small (H.R. McLarty, R.E. Fitzpatrick). In the Niagara Peninsula, Ont., small amounts were seen in all varieties, especially Elberta; damage was slight except in orchards damaged by wet and cold in 1942-43 (C.B. Kelly). A scattered infection was seen on Elberta in Grimsby Twp.; early infection was largely confined to terminal growth where spray coverage was poor (G.C. Chamberlain). In unsprayed orchards throughout Ont. many trees were again defoliated by this disease (J.E. Howitt).

WILT (Verticillium Dahliae) was observed for the first time in the Okanagan Valley, B.C. (R.E. Fitzpatrick).

BACTERIAL BLIGHT (Xanthomonas pruni) was present in 90% of the 120 trees in a block of Elberta in Louth Twp. bordering Lake Ontario; defoliation was less than in 1943 and no fruit infection occurred. Valiant and Vidette were not infected (G.C. Chamberlain).

WESTERN X DISEASE (virus). The situation in B.C. may be summarized as follows: Mapped orchards. In 1940, 13 orchards including 4,020 trees were

mapped for the study of the spread of this disease. In 3 orchards there has been little or no spread. In the other 10 orchards including 2,457 trees, spread has been slight but steady. The percentage of disease in these orchards rose from 2.7% in 1940 to 4.3% in 1941, 5.5% in 1942, 6.1% in 1943, and 7.7% in 1944. These figures were obtained by expressing the total number of trees that had shown the disease as a percentage of the total number of trees originally present in the orchards. As in other years the orchards were examined twice in the latter part of the summer. As formerly the expression of the disease was variable and some trees that had previously shown the disease did not show those symptoms that make definite diagnosis possible. Some of these trees were weak and thin. New infections have occurred with little relation to former infections except in part of one orchard where a very definite local spread appears to be indicated.

In 3 mapped orchards in Okanagan Falls, Summerland and Peachland, single diseased trees were found in 1940. In the Okanagan Falls orchard, slight spread occurred in 1941 only. In the Summerland and Peachland orchards, no spread has occurred.

Unmapped orchards. In the years 1940 to 1943 inclusive, the disease was not observed north of Okanagan Falls except in single trees in Summerland and Peachland. In 1944 the disease was found in Kaleden and on the opposite side of Dog Lake, on the flat in Penticton, and in two orchards in Summerland. These places are respectively about five, ten and twenty miles north of the area in which the disease was previously known to occur. It was not found on the benches in Penticton, in Maramata, Peachland and Westbank in the Okanagan Valley, or in Keremeos and Cawston in the Similkameen Valley (T.B. Lott).

X DISEASE (virus). Five new cases were seen in the four orchards surveyed annually in Lincoln Co., Ont. Three of these constituted confirmation of trees suspected of being infected in 1943. Percentage of infection in the four orchards was 0.7%, 0.24%, 0.35%, and 0.6% (G.C. Chamberlain).

DIE-BACK (boron deficiency). Several cases of die-back were seen in the Okanagan Valley, B.C., where boron had been applied 3 years ago. It appears that a boron application will not be effective in peaches for as long a period as in apples (H.R. McLarty).

SPRAY INJURY. In several orchards in Clinton Twp., Ont., where Elgetol (1-80) was used in the dormant spray for leaf curl control, lateral buds were killed and dropped off. The spray penetrated and killed a small area of wood below the bud. Terminal buds were not generally affected (G.C. Chamberlain).

PLUM

SHOT HOLE (Cercospora circumcissa) was widespread and destructive to leaves of plums and plum x cherry hybrids at Brandon, Man. A moderate infection occurred at Winnipeg (W.L. Gordon).

BLACK KNOT (Dibotryon morbosum) was severe in a few trees in a farmyard at Cloverdale, B.C. (W. Jones). A single infected Japanese plum tree (P. salicina) was seen in Wentworth Co., Ont.; these varieties seldom show the disease. Isolated and scattered infections were seen on Italian prune in Niagara Twp.; Stanley prune is quite susceptible (G.C. Chamberlain). A specimen was received from Renfrew, Ont. (H.N. Racicot).

SHOT HOLE (Higginsia prunophorae (Cylindrosporium prunophorae) was severe on Cooper at Morden, Man. (W.L. Gordon). A slight infection was seen on several varieties at Ste. Clothilde, Que. (H.N. Racicot). A shot hole was light at Edmonton and Oliver, Alta., and moderate at Lacombe, but no organism could be found (M.W.C.). A trace of an unidentifiable shot hole was also seen in Queens Co., P.E.I. (R.R. Hurst).

LEAF SPOT (Phyllosticta virginiana (Ell. & Halsted) Tassi) was moderately heavy on an Assiniboine seedling at Morden, Man.; spores rod-shaped 4.5-5 x 1 micron; first record in Man. on cultivated plum; see also Sand Cherry and Prunus (W.L. Gordon).

BLOSSOM BLIGHT and BROWN ROT (Sclerotinia fructicola). From a trace to 20% blossom infection occurred in most varieties in the Niagara Peninsula, Ont. (See under Cherry). In Grand Duke, which is very susceptible, blossom infection was 30-40% (G.C. Chamberlain). Brown rot affected 100% of the fruit at Bonny River, Charlotte Co., N.B. (S.F. Clarkson). In mid August brown rot infection was heavy on twigs in P.E.I. and caused severe cankers; later the fruit was severely affected, especially Victoria of which it was difficult to find any sound fruit (R.R. Hurst).

PLUM POCKET (Taphrina communis). Specimens were sent in from Bounty, Sask. (H.W.M.). A specimen was received from Rideau Ferry, Ont. (H.N. Racicot). One case was reported from Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL BLIGHT (Xanthomonas pruni) caused leaf spotting and defoliation of young trees of a European variety at the Laboratory, St. Catharines, Ont. (G.C. Chamberlain).

MASKED VIROSIS. Some apparently healthy Shiro trees, 1-2 years old, were indexed on peach in 1943 at the request of the grower. On peach in the spring of 1944 delayed foliation, dwarfing and ring spotting of the leaves was seen; in August a striking mosaic pattern appeared. Present information suggests that this is distinct from all the known virus diseases of stone fruits in Ont. (R.S. Willison).

PRUNE DWARF (virus). No spread was seen in the Okanagan Valley, B.C. (T.B. Lott).

CHLOROSIS (excess lime) was severe on some trees at Winnipeg, Man. At Brandon, chlorosis was general and severe on plums, plum x cherry hybrids, and other stone fruits. Owing to the severity of chlorosis and leaf spots, half the stone fruit orchard has been cleared (W.L. Gordon).

DEFOLIATION and FRUIT DROP. This trouble, reported last year on Italian prune, is thought to have been connected with the winter injury of 1942-43, as most of the affected trees were in low or poorly drained areas. Most of the trees have recovered, though a few of the more severely affected still show symptoms. Some of the marking and rolling of leaves may be attributable to mites (R.S. Willison).

SPRAY INJURY. Extensive injury due to Bordeaux mixture, was seen in 8 orchards in Lincoln Co., Ont., on Shiro which is very susceptible; yellowing, shot hole and defoliation occurred. Humid weather at the time of spraying is thought to have aggravated the damage (G.C. Chamberlain).

SAND CHERRY

SHOT HOLE (Cercospora circumscissa) was widespread and destructive on sand cherry and sand cherry hybrids at Brandon, Man. (W.L. Gordon).

LEAF SPOT (Coryneum Beijerinckii) was moderately heavy at Morden, Man., on Grace Wright; it was also present on a hybrid sand cherry x Red June (P. salicina) P-2-12 (W.L. Gordon).

LEAF SPOT (Phyllosticta virginiana (Ell. & Halsted) Tassi). A moderate infection occurred at Morden, Man. on a cross of sand cherry x Red June P-2-12. First record in the Survey. See also Plum and Prunus (W.L. Gordon).

POWDERY MILDEW (Podosphaera Oxyacanthae) was heavy on Grace Wright at Morden, Man. (W.L. Gordon).

BROWN ROT (Sclerotinia fructicola). A specimen was received from Renfrew, Ont.

C. RIBES FRUITS

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola) was found in black currant plantings in various parts of the Okanagan Valley, B.C. (G.E. Woolliams). At Morden, Man., rust was light on Boskoop Giant, heavy on Kerry and moderate on Magnus black currants; was light to moderate on Climax and light on White Imperial white currants; infection was heavy on Ribes glandulosum and moderate to heavy on R. hudsonianum (W.L. Gordon). Boskoop Giant in a nursery at Goderich, Ont., was almost completely defoliated (G.C. Chamberlain).

Rust was reported on black currants from many new locations in Ont.; it seems to be increasing (J.E. Howitt). Serious defoliation was caused by blister rust at Frelighsburg, Que. (L.J.S. Laporte). Only slight damage was caused in Queens Co., P.E.I. (R.R. Hurst).

SEPTORIA LEAF SPOT (Mycosphaerella Grossulariae) was heavy and general on Boskoop Giant, Kerry and Magnus black currants, Climax and White Imperial white currants and on red currants, and slight on Ribes glandulosum and R. Hudsonianum at Morden, Man.; it was also severe on black currants at Charleswood, Man. (W.L. Gordon).

CLUSTER CUP RUST (Puccinia Pringsheimiana) was heavy on black currants at Craik, Sask. (H.W.M.).

POWDERY MILDEW (Sphaerotheca mors-uvae) slightly infected black currants at Kelwood, Man. (J.E. Machacek). At Morden it was light on Boskoop Giant and White Imperial, and was heavy on the new growth of Climax (W.L. Gordon). Infection was estimated at 90% at Frelighsburg, Que., and damage was very heavy (L.J.S. Laporte).

GOOSEBERRY

WHITE PINE BLISTER RUST (Cronartium ribicola). At Morden, Man., infection was a trace on spineless gooseberry, moderate on Ribes Cynosbati and slight on R. oxyacanthoides (W.L. Gordon).

ANTHRACNOSE (Drepanopeziza Ribis) was heavy on English gooseberry and Ribes Cynosbati at Morden, Man. (W.L. Gordon). It was moderately heavy on Abundance and Pixwell at Kapuskasing, Ont. (J.W. Groves).

SEPTORIA LEAF SPOT (Mycosphaerella Grossulariae) was heavy at Morden, Man., on English gooseberry, spineless gooseberry and Ribes oxyacanthoides (W.L. Gordon).

LEAF SPOT (Phyllosticta Grossulariae). A trace was found on English gooseberry at Morden, Man., with spores 4-7 x 2.5-3 microns; a trace was also seen on Ribes Cynosbati, with spores mostly 4-5 x 1 micron but sometimes 5-6 x 3 microns; Grove draws attention to the co-existence of both spore types. Previously reported only in B.C. (W.L. Gordon).

CLUSTER CUP RUST (Puccinia Pringsheimiana). A trace occurred at Edmonton, Alta. (G.B. Sanford).

POWDERY MILDEW (Sphaerotheca mors-uvae) occurred on leaves and fruit at the Experimental Station, Summerland, B.C.; much fruit was spoilt. It was most prevalent on Oregon Champion (G.E. Woolliams).

D. RUBUS FRUITS

BLACKBERRY

ANTHRACNOSE (Elsinoe venata) was heavy on leaves of wild blackberry under cultivation at Morden, Man. (W.L. Gordon).

ORANGE RUST (Gymnoconia Peckiana). A specimen was received from Knowlton, Que. (H.N. Racicot).

SEPTORIA LEAF SPOT (Mycosphaerella Rubi) was heavy on some leaves of Siberian dewberry (?Rubus caesius) at Morden, Man. (W.L. Gordon).

RASPBERRY

CROWN GALL (Agrobacterium tumefaciens) was seen occasionally in Queens Co. and once in Kings Co., P.E.I.; damage was sometimes severe (R.R. Hurst).

DODDER (Cuscuta Gronovii) heavily infested a nursery planting at Charleswood, Man. Adjacent Canada thistle and golden rod were also attacked. This is the same infestation mentioned in P.D.S. 23:103, under Aster. Mr. E.G. Anderson has confirmed the identity of the dodder as C. Gronovii or the doubtfully distinct C. curta; he states that such an unusual habitat for this species is sometimes explained by the custom of using black muck from infested swamps to enrich the soil of gardens etc. (W.L. Gordon).

SPUR BLIGHT (Didymella applanata). A moderate infection was reported from Edmonton and St. Albert, Alta. (A.W. Henry). Moderate infections were seen on Madawaska at Morden, Man.; Taylor was slightly affected. A general moderate infection occurred at Winnipeg (W.L. Gordon). In Ont. spur blight was commonly found in Latham plantings where cane growth or weeds were heavy (G.C. Chamberlain). A neglected planting at Woodstock, N.B., showed extensive cane and bud injury (D.J. MacLeod). Spur blight was reported from Yarmouth and Kings Co., N.S. (J.F. Hockey). An entire fruiting plantation of Viking was destroyed in Queens Co., P.E.I. (R.R. Hurst).

ANTHRACNOSE (Elsinoe veneta) was moderate to heavy on Rideau and Indian Summer at Morden, Man., but little occurred on most red raspberries. Some canes of wild red raspberry under cultivation were moderately infected. Infection was moderate to heavy on the following black or purple varieties: Manchurian Briar, Morrison, Porter #1, Porter #2, Bristol, Dundee, Quillan, Logan, Marion, and Black Beauty (W.L. Gordon).

CANE BLIGHT (Leptosphaeria Coniothyrium). Specimens of affected Latham canes were received from Kent Co., Ont. Drying up of fruiting canes was stated to have caused 30% reduction of crop. Pycnidia and perithecia occurring on the canes close to the crowns suggested that winter injury may have been a predisposing factor (G.C. Chamberlain). A specimen was received from Craigville, Ont. (L.T. Richardson).

SEPTORIA LEAF SPOT (Mycosphaerella Rubi) was moderate and general at the University, Winnipeg, Man. At Morden it was moderate on Latham, Rideau, Viking, Madawaska and Ottawa; and was slight and widespread on other varieties and on cultivated wild raspberry (W.L. Gordon).

YELLOW RUST (Phragmidium Rubi-idaei) was general on Cuthbert in coastal B.C., but caused slight damage (W. Jones).

LATE YELLOW RUST (Pucciniastrum americanum). At Morden, Man., infection was moderate on Ottawa, and a trace to slight on other varieties and on cultivated wild raspberries (W.L. Gordon). Late rust was common on both wild and cultivated plants in Kings Co., N.S. (J.F. Hockey). Two light infections were reported on Viking in Queens Co., P.E.I. (R.R. Hurst, R. Bagnell).

POWDERY MILDEW (Sphaerotheca Humuli). Specimens were received from Prince Albert, Sask. (H.W.M.). Mildew was moderately severe in nursery plantings of Latham in Ont. Latham is extremely susceptible under nursery conditions (G.C. Chamberlain).

WILT (Verticillium albo-atrum) attacked several plants of Washington in a plantation near Victoria, B.C. (W. Jones). Wilt was found in a Viking plantation near Forest, Ont.; affected plants were completely defoliated by Sept. 5 (G.C. Chamberlain). Traces were found in Lloyd George and Viking in Queens Co., P.E.I. (R.R. Hurst).

DECLINE (virus) was general in Cuthbert in coastal B.C. (W. Jones).

LEAF CURL (virus) severely affected 5% of the plants in two gardens at Summerland, B.C. (H.R. McLarty). Two per cent of Cuthbert in a planting near Woodstock, Ont., were infected and severely stunted (G.C. Chamberlain).

MOSAIC (virus) infected 40% of Ottawa (O 275) in a variety test at the Experimental Farm, Agassiz, B.C. (W. Jones). Nearly 100% of Taylor in the plots at the Experimental Station, Summerland, were infected; none was seen in other varieties (H.R. McLarty). Mosaic was a factor in Cuthbert and Viking plantations in Ont. intended for certification; infection was 1-5% (G.C. Chamberlain). Infection was 1% in a Latham planting in Sunbury Co., N.B., and 2% in a Viking planting in York Co. Mosaic was common in wild raspberries in Sunbury, York, Queens, Westmoreland and Carleton Co. (D.J. MacLeod). A Viking plantation in Queens Co., P.E.I., showed 16% infection (R.R. Hurst).

E. OTHER FRUITS

GRAPE

DEAD ARM (Fusicoccum viticola) was seen in 15 varieties in a vineyard in Lincoln Co., Ont.; infection was less than 1% but more than is usual in well-managed vineyards (C.B. Kelly). Light infections were seen on Concord in a number of vineyards in Lincoln and Welland Co. (G.C. Chamberlain).

LEAF SPOT (Phyllosticta spermoides Pk.) was heavy and destructive on cultivated Vitis vulpina at Morden, Man.; spores were 3-5 x 1 micron (W.L. Gordon). Known from Man. and Ont., but not previously reported in P.D.S.; this fungus is evidently confined to V. vulpina.

DOWNY MILDEW (Plasmopara viticola) was present on the leaves of some varieties at Morden, Man. It was severe on Vitis vulpina at Morden and Roland, but was not seen on the wild grapes at Winnipeg. This is the first Man. record on V. vulpina; the fungus was previously reported on cultivated grapes in 1927

only (W.L. Gordon). An affected specimen of V. vulpina was received from London, Ont. (L.T. Richardson). In a vineyard in Niagara Twp. 25% of the clusters of Fredonia were affected; downy mildew was seen in several other vineyards of this variety (G.C. Chamberlain). A little downy mildew developed early in the season on V. vulpina at Ottawa, but soon disappeared with the onset of dry weather (D.B.O. Savile).

POWDERY MILDEW (Uncinula necator). At the Experimental Station, Summerland, B.C., some powdery mildew was present in 75% of the European varieties; fruit infection caused heavy loss in 50% of these varieties. Some mildew was present on leaves of American varieties, but there was no fruit injury (H.R. McLarty). Powdery mildew was moderately heavy on Agawam and Fredonia in Pelham Twp., Ont., causing shelling of fruit (G.C. Chamberlain).

CHLOROSIS (cause unknown) severely affected several plants at Lethbridge, Alta. (M.W.C.).

STRAWBERRY

FRUIT ROT (Botrytis sp.) caused a soft rot of 5% of the fruit of Premier in Louth Twp., Ont., following heavy rain and prolonged fog; the loss was greater where growth was heavy (G.C. Chamberlain). It was very destructive to the late season crop in P.E.I. (R.R. Hurst).

LEAF SCORCH (Marssonina Fragariae (Diplocarpon Earliana). A specimen was received from Morden, Man., late in September; first Man. record on cultivated strawberry (W.L. Gordon). Material was collected near Ste. Anne de la Pocatiere, Que. by H.N. Racicot and C.E. Perrault (I.L. Conners).

LEAF SPOT (Mycosphaerella Fragariae). A specimen was received from Regina, Sask. (H.W.M.). A moderate, general infection occurred at Morden, Man. (W.L. Gordon). A scattered infection occurred in many plantings of Senator Dunlap in Queens Co., P.E.I., but did not cause appreciable damage (R.R. Hurst).

LEAF SPOT (Phyllosticta fragaricola Desm. & Rob.). A trace was found on cultivated strawberries at Morden, Man., and a considerable amount on wild strawberry; it was associated with Ramularia Tulasnei and may, as Grove has suggested, be connected with it; Ph. obscurans (E. & E.) F. Tassi is probably synonymous (W.L. Gordon).

POWDERY MILDEW (Sphaerotheca Humuli). A light infection occurred on Senator Dunlap in Queens Co., P.E.I. (R.R. Hurst).

JUNE YELLOWS (genetic breakdown). Four scattered infections of Premier were seen in Grantham Twp., Ont. (G.C. Chamberlain). All plants in a small planting of Dick were affected in P.E.I. (R.R. Hurst).

FROST INJURY. Up to 10% of the early buds of Senator Dunlap were killed in some sections of Queens Co., P.E.I. (R.R. Hurst).

NITROGEN DEFICIENCY. In two plantings of Senator Dunlap near Montague, P.E.I. the leaves were yellowish and small; they later developed red margins and many withered (R.R. Hurst).

POTASH DEFICIENCY caused moderate damage in three plantations in Queens Co., P.E.I.; the leaves developed a purplish cast (R.R. Hurst).

ROOT ROT (cause unknown) was prevalent in several fields in the Saanich district, B.C. (W. Jones).

WINTER INJURY. In some plantings of Senator Dunlap, Premier, and Catskill in York and Queens Co., N.B., 50-100% of plants showed severe root and crown damage (S.F. Clarkson).