IV. DISEASES OF FRUIT CROPS

A. POME FRUITS

APPLE

CROWN GALL (Agrobacterium tumefaciens). A preliminary examination of nursery stock of Delicious on E. M. #9 rootstock at Bowmanville, Ont., revealed that a high percentage of the trees were affected by crown gall and hairy root. Three trees from a proposed shipment of 20,000 trees to the United States were sent for examination; diagnosis was confirmed and A. tumefaciens was isolated. (H.N. Racicot, D.S. MacLachlan).

FRUIT ROT (Botrytis cinerea). Two apples were found infected in the orchard of the Exp. Farm, Kentville, N.S.; several severe frosts had already occurred (C.O. Gourley).

FIRE BLIGHT (Erwinia amylovora) was unusually sev. and widespread on apple and crabapple in Edmonton, Alta. (L.E. Tyner, W.P. Campbell). Specimens also received from Three Hills and Beverley (A.W. Henry). Fire blight was rather common on apple and crabapple around Saskatoon, Sask., in 1956. Specimens were also received from 4 widely separated points in Sask. (R.J. Ledingham). The most sev. epidemic of fire blight since that in 1941 occurred at the Exp. Farm, Morden, Man. No attempt to control the disease was made in the spring of 1956 following the apparent failure of a late spraying program in the springs of 1954 and 1955. Cankers of all sizes were abundant in the orchard in the fall of 1956. Mod. infections were general in the Winnipeg area. Requests for control methods were frequent (W.C. McDonald). Fire blight seemed more prevalent than usual in the London-St. Thomas area, Ont., on apples and pears. Infected blossoms and twigs were seen on McIntosh, Jonathon, Northern Spy, Tolman Sweet, and on some early varieties, such as Early Harvest and Astrachan. Infection was generally sl. but in two orchards there were also half a dozen trees sev. affected (W.S. Babbitt). The occurrence of fire blight was confirmed by isolations from specimens received from Mr. Babbitt. Sl. infections were also reported by B.J. Teskey supported by specimens from two Northern Spy orchards in the Collingwood and Meaford districts respectively (J.H. Carpenter). Fire blight was less sev. in the Hemmingford-Franklin district, Que., than in 1955. There was little spread. A sl. infection occurred on single trees of Fameuse and McIntosh in 2 orchards at St. Chrysostome and St. Gregoire respectively (R. Crete). A few twigs were infected on most of the McIntosh trees in an orchard at St. Hubert (L.J. Coulombe).

RUST (Gymnosporangium clavipes) was not prevalent in commercial orchards in Kings Co., N.S.; about 1% of the fruit was affected. A few aecial pustules were noted on a scab-resistant seedling (J.F. Hockey).

ANTHRACNOSE (Neofabraea malicorticis) was found on several trees in Vancouver, B.C., some were nearly destroyed (W.R. Foster).

PERENNIAL CANKER (Neofabraea perennans). Existing cankers showed appreciable enlargement in May and June on Newton in the Okanagan Valley, B.C. This enlargement is believed to be the result of tree damage by the low winter temperatures in 1955 (D.L. McIntosh).

BLUE-MOLD ROT (Penecillium expansum) was heavy in Toronto-Hamilton area, Ont., in two lots of Delicious in the same storage, but not in other growers' containers. These lots apparently were left in the orchard exposed to rain over a week-end before storing (W.S. Carpenter).

FROG-EYE SPOT (Phyllosticta limitata). A scattered infection occurred on leaves of Northern Spy received from Simcoe, Ont. (G.C. Chamberlain).

BLACK ROT (Physalospora obtusa). Sepal infections caused calyx-end injury in a tr.-1% of the Cortland apples in all blocks in a spray-test orchard at Cambridge, N.S.; leaf spot was also present in small amounts (J.F. Hockey). A sl. infection was seen in young trees at St. Gregoire, Que. (R. Crete).

POWDERY MILDEW (Podosphaera leucotricha) was almost absent in apple orchards of the B.C. Interior in 1956. Buds harboring the mycelium were nearly all killed during the severe winter of 1955 (D.L. McIntosh). Powdery mildew was prevalent in two orchards in Essex Co. Ont.; both orchards had been sprayed with organic fungicides only for the last four seasons. Jonathan was the most sev. affected. (R.W. Walsh). Powdery mildew was prevalent and caused considerable damage to McIntosh in the laboratory orchard, St. Catharines, Ont. (G.C. Chamberlain). Although powdery mildew was previously noticed in nurseries in the Toronto-Hamilton area in which sl. infections were again present this year, the first sev. orchard infection was noted at Agincourt on Cortland after glyodin was used for two years (W.S. Carpenter).

SCLEROTINIA ROT (S. sclerotiorum). Shallow lesions at the calyx end occurred on a few McIntosh apples at Coldbrook, N.S., apparently following sepal infections (J.F. Hockey).

SCAB (Venturia inaequalis) was sev. on one tree of Delicious at Agassiz, B.C.; the disease was also present on Hyslop crab and several ornamental crabs (H.N.W. Toms). Losses from scab were exceptionally light in the B.C. Interior in 1956; warm dry weather prevailed for most of the growing season (D.L. McIntosh). Sl. infections were observed in two gardens in Saskatoon, Sask. (R.J. Ledingham). Infection was mod. in the Exp. Farm orchard, Morden, Man. and sl. in the Univ. orchard, Fort Garry (W.C. McDonald).

Reports indicate that scab was fairly well controlled by the spray schedules now followed in commercial orchards in Ont. Unsprayed trees in the laboratory orchards at St. Catharines were heavily infected, the crop reduced and the fruit small and 99.6% scabbed. In the sprayed blocks, scab at harvest affected 0.8-80.2%, average 13%, of the fruits. Late season scab on the fruit was considerable in some treatments. Ascospore discharge first occurred during a 72-hour wet period, 27-29 April, when apple buds were in the green tip stage. Primary scab lesions were first observed on 21 May. Secondary lesions were present on 4 June and infections on the fruit were present on unsprayed trees on 8 June (G.C. Chamberlain). In the Toronto-Hamilton area primary infection occurred on 10, 12 and 13 May and scab first appeared on the leaves 26 May. An infection period 29 May caused some sepal infection. Mercurials alone or in combination were extensively used in the pre-cover sprays; most growers harvested a fairly clean crop. Captan gave relatively clean crops. In two orchards where Colsul sulphur paste 10-12 lb. was used in the pre-cover sprays it gave poor control although applications were well timed while some others were relatively clean. Considerable pin-point scab developed in orchard and storage as a result of a wet August and September (W S. Carpenter). Scab was again a problem in the London-St. Thomas area in ineffectively sprayed orchards, although it was shown that a satisfactory program would keep scab in check even in a wet year such as 1956. Eradicant sprays when used in combination with a protectant program proved their value. Less than 1% fruit scab was found in orchards where a wide variety of materials, including sulphur, captan and glydoin were used, as long as they were applied with an eradicant and correctly timed (W.S. Babbitt). In s.w. Que. conditions were favorable for scab in 1956. Over three inches of rain fell each month from May to July. Long infection periods occurred on 27-28 May at the pre-pink stage and 27-28 June during cover applications. Unsprayed orchards were plastered with scab on both fruit and foliage. Pedicel and sepal infections were heavy during the earlier infection period and as a result there was a high percentage of scabby apples on the ground later in the season in infected orchards. Despite favorable conditions for scab, most orchards were kept free of scab by frequent well-timed fungicide applications. Some late pin-point scab developed where fungicides other than ferbam were used in the cover sprays or late applications were omitted when there were traces of scab in the orchard (L. Cinq-Mars). A sl. infection was seen at St. Prime and Albanel, Roberval Co. where only a few trees are grown and at Chicoutimi, Kamouraska Co., on unsprayed orchards (H. Genereux). Scab caused partial defoliation and total loss of fruit on one crab apple tree in a garden at Gaspe (H.N. Racicot).

Apple scab was sev. this year in N.B., especially in poorly sprayed orchards. When fungicides were applied by the conventional spraying machines, scab affected 30-35% of the crop. Only those orchards using air-blast sprayers were comparatively free of scab. Primary discharge of ascospores took place on 3 May and subsequent cool showery weather throughout the season favored the spread of scab (J.L. Howatt).

Apple scab was late in developing in N.S. in 1956. There were 1 mod. and 3 light infection periods before bloom and 4 sev., 3 mod. and one light one in the 8 weeks after bloom. The use of eradicants has reduced the number of applications necessary to control the disease (J. F. Hockey). Scab presented more of a problem in 1956 in P.E.I. than in any recent year. Infection periods were frequent and unsprayed and poorly sprayed orchards suffered sev. damage. In one orchard where Kolo 100 was applied in seven applications, poor timing or poor coverage resulted in a very scabby crop (J.E. Campbell).

COLLAR ROT (cause undetermined) was found in several orchards of Northern Spy about Thornbury, Ont. Many mature trees were seen with extensive injury to the crown and extending into the heavy roots. The injury is believed to have started in the fall of 1954 and progressed until some trees are being girdled in 1956 (G. C. Chamberlain). Reports of collar rot, particularly on Northern Spy, have been increasing in the last two years in the Toronto-Hamilton area. Possibly injuries to the crown from an early November frost in 1953 and from hurricane Hazel in 1954 are now becoming evident. There appears to be no correlation between drainage and soil conditions and location of the affected trees (W.S. Carpenter).

LEAF PUCKER (virus). This new disease was first seen in two McIntosh trees at Summerland in 1954. The principal symptoms are a puckering and dwarfing of the leaves accompanied by bright yellow irregular blotches and flecks. These symptoms are exhibited only by leaves formed early in the season. Affected trees bear fruits with irregular depressions, which are usually russetted. The virus was successfully transmitted by spring grafting in 1955, foliage symptoms resulting in the summer of 1956 on McIntosh and Spartan, but not on Jonathan and Winesap. Test trees have not yet fruited (M. F. Welch, F. W. A. Keane).

'PITTING'. Although no additional information has been received concerning the occurrence of this disease in the Okanagan Valley, B.C., (P.D.S. 35:102) a similar "incompatibility" has been observed at Ste. Clothilde, Que. H. W. Guengerich and D. F. Millikan(Plant Dis. Reptr. 40:934-938. Nov. 15, 1956) have also presented evidence of its transmission by grafting. The evidence suggests that the disease is caused by a virus (I. L. C.).

CHLORORIS (Nitrogen deficiency). A case of nitrogen deficiency in the McIntosh trees growing at Pickering, Ont., was diagnosed from leaf samples (H. Hill, H.N. Racicot).

HAIL INJURY ? A small percentage of Yellow Transparent apples shipped from Kelowna, B.C. show small injuries, mostly on one side, which did not resemble insect injury and were free from micro-organisms (H.N. Racicot).

MUMPS (cause unknown) was found on Winesap in several orchards in the Similkameen Valley and in three in the Okanagan Valley, B.C. Swellings occur usually at base of watersprouts and around pruning wounds and sometimes at other points on lateral branches. Tissues are soft and appear to be very susceptible to winter injury, resulting in the formation of cankers. Damage is sl. on older trees, but it may be so sev. on young trees that they have become worthless. No evident correlation found with the nutrition of the trees; transmission experiments undertaken in 1956. Mild symptoms were observed in Golden Delicious topworked on affected Winesap (M.F.W., F.W.A.K.).

PURPLE BLOTCH (cause unknown) was first observed in orchards of Red Stayman at Westbank, B.C.; in one, one-third of the trees and in two others scattered trees were affected. Large irregular purple blotches become very evident about a month before picking, but flesh below is unaltered. Often the blotch is confined to certain limbs of affected trees. Transmission experiments undertaken in 1956 (M.F.W., F.W.A.K.).

SPRAY INJURY. Glyodin-lead arsenate injury was less apparent in the Toronto-Hamilton area, Ont., than in previous years, possibly because frequent rains did not permit a build-up of lead. Captan injury was found in two Delicious and one Melba block on a full schedule. In one orchard where captan injury showed on McIntosh foliage when used in the calyx spray for two years, ferbam was substituted at the calyx spray and no injury was seen. Parathion-mercurial combination sprays caused sev. injury at the pink stage to McIntosh, Delicious and Northern Spy when the spray was allowed to stand in the tank overnight before applying; sl. injury occurred when it was applied immediately. Full strength mercurial plus Colsul sulphur applied to Delicious in full bloom during cool cloudy periods following rain sev. reduced fruit set in Delicious, but only sl. on McIntosh and Northern Spy (W.S. Carpenter).

STIPPIN (physiological) affected the entire crop on one Delicious tree in an orchard at Port Dalhousie, Ont. (G.C. Chamberlain).

FROST INJURY. Low temperatures, as low as 23°F in some localities in the Toronto-Hamilton area, Ont., on 24 May when early varieties were in bloom, caused reduction of crop from 10% on the lower limbs to 40% of the total crop on trees in frost pockets. Frost rings were noticeable on many fruits at harvest. A temperature of 25°F. appeared to cause no damage in certain localities (W.S. Carpenter).

PEAR

FIRE BLIGHT (Erwinia amylovora) was more prevalent in the B.C. Interior than in 1955, but it was not present in epidemic proportions. Twig

and branch infections, chiefly on Bartlett, were common in many Okanagan and Kootenay orchards (D. L. McIntosh). A 5-acre orchard at Belle River, Ont., was pulled out after most trees were infected; old cankers had not been properly treated and the orchard had a continuous history of fire blight (R. W. Walsh).

The worst outbreak of fire blight in several years occurred in the Niagara Peninsula. Often 2-3 shoots per tree were infected and damage to twigs and spurs was reported from many orchards, mostly Bartlett. The disease was common even where cultural practices had not changed for many years (G. W. Eaton).

Infection in the trunk and larger branches of Clapp's Favorite was observed in an orchard at Port Dalhousie; active cankers were present. Bosc and Anjou varieties were also sl. affected (G. C. Chamberlain). Fire blight caused great damage in 3 orchards on Bartlett and Flemish Beauty in the Toronto-Hamilton area. Temperatures were around 60°F. during bloom with intermittant rain. The initial infection was then spread by further rains during the summer. Continued removal of infections reduced some trees to stumps (W. S. Carpenter).

SOOTY BLOTCH (Leptothyrium pomi). Heavily infected Kieffer pears were received from Vineland, Ont.; the disease was reported to be quite prevalent in the district (G. C. Chamberlain). A few complaints of sooty blotch on Bartlett and Kieffer pears were received from the Toronto-Hamilton area; the disease has not been apparent recently (W. S. Carpenter). Sooty blotch was rather sev. in several orchards on Kieffer in the London-St. Thomas area (W. S. Babbitt).

LEAF SPOT (Septoria pyricola) was conspicuous on Bartlett leaves received from Simcoe, Ont. (G. C. Chamberlain).

SCAB (Venturia pirina) affected 90% of the Flemish Beauty fruit in an orchard nr. Winona, Ont. where these trees are interplanted between Bartlett for pollination; Bartlett was not affected (G. W. Eaton). In an orchard at Port Dalhousie 20% of the Bartlett fruit were unmarketable on account of scab (G. C. Chamberlain). Two growers in the Toronto-Hamilton area suddenly found at harvest that not only their Flemish Beauty but also the Bartlett pears were affected by scab (W. S. Carpenter). A single sev. affected fruit was received from Stratford (H. N. Racicot). A sl. infection occurred on the foliage of a few pear trees in an orchard at Dunham, Que. (L. Cinq-Mars).

STONY PIT (virus). At Summerland, B. C., Bosc trees known to be affected with stony pit and Flemish Beauty suspected of being infected showed no recognizable symptoms; apparently lack of symptoms was an effect of the weather condition this year (M. F. Welsh, F. W. A. Keane). Two Anjou trees in a block of ten trees in the laboratory orchard, St. Catharines, Ont. produced a worthless crop on account of stony pit (G. C. Chamberlain).

B. STONE FRUITS

APRICOT

BLACK KNOT (Dibotryon morbosum). One knot was found in a planting of young apricot trees at the Exp. Farm, Kentville, N.S. (C.O. Gourley).

BLOSSOM AND TWIG BLIGHT (Monilinia fructicola). Blossom blight was prevalent and sev. on apricots in an orchard at Beamsville, Ont. Later it advanced into the twigs causing twig cankers and die-back (G. C. Chamberlain). All the blossoms in one orchard and on several isolated trees in others were blighted nr. Vineland (G. W. Eaton).

RING POX (virus). No spread of ring pox was observed in six apricot orchards in the Okanagan Valley where the disease had been previously noted, but it was recorded for the first time in a Penticton orchard. The occurrence of ring pox on apricot is frequently correlated with that of twisted leaf on cherry. However, there are no cherry trees near the diseased apricots at Penticton (T. B. Lott).

CHERRY

BLACK KNOT (Dibotryon morbosum). A single affected Prunus pensylvanica was found among the pin cherries growing along the river bank at Edmonton, Alta. (W. P. Campbell). Affected sour cherries were received from Isle Vert and St. Michel de Bellclose, Que. (D. Leblond).

LEAF SPOT (Higginsia hiemalis) was very prevalent in the latter part of the season in many orchards in the Niagara Peninsula, Ont. and premature defoliation was serious. A few primary infections were noted on 21 June on sour cherry at Burlington. Mod. infected leaves were received 27 July from Collingwood and sev. outbreaks were reported from Prince Edward Co. (G. C. Chamberlain).

Leaf spot caused mod.-sev. defoliation in most sour cherry orchards in the London-St. Thomas area; some growers failed to apply a post-harvest spray (W. S. Babbitt). Although sev. infection occurred throughout the Toronto-Hamilton area and some orchards were defoliated by late September, where the foliage was kept thoroughly covered and additional sprays were applied before and after harvest, control of the disease was significantly improved (W. S. Carpenter). Leaf spot had already caused 5% defoliation by 30 July in a young non-bearing orchard of sour cherries at Tupperville, N.S.; the trees were not receiving a full spray schedule (C.O. Gourley).

BROWN ROT (Monilinia fructicola). Losses from brown rot in Bing and Lambert cherries was very heavy in 1956 in several districts in the Kootenays, B. C. (D. L. McIntosh). Blossom blight was common on cherry and peach and very serious on apricots in the Niagara Peninsula, Ont. Sweet cherries were commonly infected by brown rot, and the disease was serious in early varieties of peaches. Later varieties ripened more slowly as a result of cool weather and brown rot appeared to spread rather slowly. Many mummied fruits with numerous sporodochia are present on the trees (G. W. Eaton). Brown rot affected 75% of the sweet cherry fruits in a closely planted orchard at Port Dalhousie, Ont. Trees were fully leaved and air drainage was poor (G. C. Chamberlain). Tr. infection was observed on both sweet and sour cherries at the Exp. Farm, Kentville, N. S. (C. O. Gourley).

DECLINE (Paratylenchus sp.). In an orchard about 20 years old at Vineland, Ont., the trees have been declining in vigor in recent years, leaves are smaller and the entire orchard will have to be replaced (J. L. Townshend).

POWDERY MILDEW (Podosphaera oxyacanthae) was common in nursery plantings of Montmorency cherry about St. Catharines, Ont.; causing mod. stunting of the terminal leaves. It was also reported to have been heavy in commercial orchards of Montmorency in Prince Edward Co. (G. C. Chamberlain). Powdery mildew has gradually become sev. in one Montmorency orchard where glyodin has been the fungicide for several years (W. S. Carpenter). A mod. infection was noted on young sour cherry trees in a nursery at Ste Anne de la Pocatiere, Que. (J. Ringuet).

LITTLE CHERRY (virus). Symptoms of little cherry were milder in the Kootenays, B. C., especially in the Creston Valley, than in any season since 1950. A large percentage of the fruits on diseased trees attained the size and color required for No. 1 cherries. It may be of some significance that the 1950 and 1956 seasons followed very severe winters (J. M. Wilks).

RASP LEAF (virus) sev. affected one sweet cherry tree in an orchard nr. Winona, Ont.; symptom expression was most striking (G. W. Eaton).

YELLOWS (virus). The development of the yellow leaf symptom with leaf drop, which is characteristic of yellows is dependent on weather conditions. Because the spring of 1956 was late, temperatures during March and April being low, yellows symptoms did not develop to any appreciable extent on the Niagara Peninsula, Ont. No tree was seen with more than a few leaves yellowed (T. R. Davidson).

FROST INJURY. Temperatures as low as 23°F. on 24 May destroyed 25-75% of the crop on the lower limbs and occasionally 60% of the entire crop in sour cherry orchards in the Toronto-Hamilton area, Ont. (W. S. Carpenter).

NITER BURN. A spring application of cyanamid caused marginal burning and yellowing of leaves with almost complete defoliation of some trees in a Montmorency orchard at St. Catharines, Ont. (G.C. Chamberlain).

PEACH

DIE-BACK (Cytospora leucostoma). A tr. was present on new wood of Early Red Fré trees at Grand Pré, N.S. (C.O. Gourley).

BLACK KNOT (Dibotryon morbosum). Only 3-4 infections, which were bearing the imperfect state of the fungus, were found 2 Aug. on trees at Grand Pré, N.S. On 17 May the perfect state was found on 10 knots in 2 orchards at Grand Pré. The knots were completely parasitized and no ascospores were observed (C.O.G.).

SCAB (Fusicladium carpophilum) was heavy in an orchard nr. Hamilton, Ont. 60-95% of the fruit being affected on one variety. Cankers were also present on the twigs. About 5% of the affected fruit were also affected by Coryneum Blight (Clasterosporium carpophilum) (G.W. Eaton). In any orchard in the London-St. Thomas area, failure of the sprayer resulted in the crop being poorly protected; scab was serious, 5-15% of fruit surface being covered by scab lesions (W.S. Babbitt). Tr. was present on peaches at Grand Pré, N.S. (C.O. Gourley).

BLOSSOM BLIGHT AND BROWN ROT (Monilinia fructicola). Blossom blight was more prevalent than usual in the Niagara Peninsula, Ont. In one orchard in Lincoln Co., 80-90% of the blossoms of Marigold were blighted; the infection was also moving into the twigs causing cankers and die-back. Brown rot caused considerable loss of harvest fruit in the midseason varieties. Fruit from the laboratory orchard after a period in common storage developed brown rot as follows:-

Treatment	After 2 days	After 6 days
Check	36.8	78.5
Captan	6.7	44.7
Thioneb	12.8	55.0
Sulphur	6.7	38.2

Brown rot was sev. in the London-St. Thomas area on account of continued rainy weather especially the last 2 weeks in August. Growers sprayed and dusted more frequently than usual and still did not get effective control (W.S. Babbitt).

A tr. of brown rot was present on all varieties and seedlings being grown about Grand Pré, Berwick and Annapolis, N.S. (C.O. Gourley).

REPLANT INJURY (Pratylenchus penetrans). Red Haven trees planted to replace failures on a knoll in an orchard at Grimsby Beach, Ont., are now unthrifty or dying after 2 years and will have to be replaced a second time (J. L. Townshend).

LEAF CURL (Taphrina deformans) was reported to be sev. on unsprayed trees by several home gardeners about Vancouver, B. C. Infection was mod.-sev. on six trees in the University orchard although a dormant spray had been applied (H. N. W. Toms). A very sl. infection occurred at Creston, B. C. (J. M. Wilks). Scattered infection occurred in many orchards in the Niagara Peninsula, Ont. First infections observed at St. Catharines on 22 May. On unsprayed trees 35% of the terminal growth was infected (G. C. Chamberlain). A sev. infection was seen on young trees in an unsprayed orchard at Niagara (G. W. Eaton). Leaf curl affected 1% of the foliage in peach orchards in King's and Annapolis Counties, N. S. (C. O. Gourley).

VERTICILLIUM WILT (V. albo-atrum) affected a single 2-year old tree in a block of 80 Jubilee trees at Virgil, Ont. (G. C. Chamberlain).

BACTERIAL SPOT (Xanthomonas pruni) became established in the variety orchard at Harrow in 1950, was epidemic in 1952 and was almost absent in 1953 and 1954. It may have been present earlier but was mistaken for arsenical injury in 1953 and 1954. In the variety orchard varieties have been found to vary widely in their susceptibility to the disease under natural conditions. Of the four most commonly grown varieties in s.w. Ont., Golden Jubilee appeared to be free from infection, Elberta was very sl. susceptible, Halehaven sl. susceptible and Redhaven mod. susceptible. The disease has a weakening effect on the tree and the fruit of some varieties are sufficiently injured to be unmarketable. Bacterial spot has not been controlled effectively at Harrow by the means usually recommended. Streptomycin A, 100 ppm., at the shuck split, shuck fall and first cover did not reduce infection in the very susceptible July Elberta. Bacterial spot was not present in the Harrow orchard in 1956 but was present in the occasional orchard of Redhaven in the district (T. B. Harrison).

WESTERN X-DISEASE (virus) was found on six affected trees in one orchard and scattered trees in neighboring orchards at Oliver, B. C. The orchards checked were known to have a history of western X-disease but no symptoms were present in the last several cool summers even on trees known to be infected until 1956 when symptoms were again apparent (M. F. Welsh, W. H. A. Wilde).

CROWN ROT. About 200 trees in an orchard of 1500 trees, 16-18 years old, were sev. affected by crown rot at Niagara-on-the-Lake, Ont. Many trees failed to bud out and others showed some growth but later wilted and died back. The area is flat and poorly drained. As a result of a very wet fall in

1955, trees failed to properly mature and suffered winter injury (G. C. Chamberlain).

WINTER INJURY. Peach, apricot and sweet cherry trees and forsythia, rose of sharon, and mountain ash in home gardens on heavier soils suffered considerable injury or were killed in Essex Co., Ont. as a result of a sudden drop of the temperature to 10°F. on 10 Nov. 1955 (R. W. Walsh).

PLUM

BLACK KNOT (Dibotryon morbosum). The scaffold limbs of about 40 out of 50 young Fellenburg trees were affected by knot in an orchard nr. Vineland, Ont.; the affected trees are useless (G. W. Eaton). Diseased specimens were received from St. Cesaire, Que. (D. Leblond). The disease is common on native plum and cherry in the Montreal district (P. Duval). Black knot was present on uncared-for plum trees in a back yard at Kentville, N.S. (C.O. Gourley). Black knot destroyed plum and cherry trees in a home garden at Springfield, P.E.I. Wild cherry trees in the neighborhood of the garden were also sev. attacked. Except to prune out dead branches, no effort was made to control the disease (J. E. Campbell).

SCAB (Fusicladium carpophilum). A tr. was present on fruit of P. ?nigra received from Carleton Place, Ont. (H.N. Racicot). Diseased fruit were received from L'Alverne, Bonaventure Co., Que. (D. Leblond).

BROWN ROT (Monilinia fructicola). Decayed fruit were received from Douglastown, Gaspe Co., Que. (D.L.).

PLUM POCKETS (Taphrina communis). Specimens were received from New Liskeard, Ont.; first noticed about 2-3 years ago (H.N.R.). Specimens received from three widely separated places in Que. (D.L.). A sl. infection was noted on Burbank plum at the Exp. Farm, Kentville, N.S. (C.O G.).

BACTERIAL SPOT (Xanthomonas pruni) affected 75% of the fruit on a few Climax trees at Beamsville, Ont. (G.C. Chamberlain). In an orchard near Winona, where the Japanese plum, Climax, was grafted on the centers of European plum trees, the Climax fruit were worthless on account of bacterial spot while the European plums were completely free of the disease (G. W. Eaton).

PRUNE DWARF (virus). No spread of this virus disease has been observed on the Burbank plum at Kentville, N.S. (C.O. Gourley).

HEAT OR DROUGHT SPOT (physiological) was common in many orchards of Fellenburg prune in the Niagara Peninsula, Ont. and almost the whole crop

was affected in several. The fruits show a purple water-soaked area with tendrils of gum exudate from the spots. Pacific prune showed extensive deep cracks on the fruit while Stanley prune was not affected (G. C. Chamberlain). Drought spot, or gum pockets, was present on many European varieties of plums and prunes in the Toronto-Hamilton area (W. S. Carpenter).

C. RIBES FRUITS

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola) was prevalent late in the season on black currants in the University garden, Winnipeg, Man. (B. Peturson). A mod. infection occurred on a red currant bush and a scattered infection on wild Ribes at Clearwater Bay, Ont. (W. L. Gordon). The rust was heavy on red currant leaves received from Bath (G. C. Chamberlain). Infection was heavy on black currants in a nursery at St. Bruno, Que. (J. Ringuet), and mod. on red currant in the Agr. School orchard at Ste Anne de la Pocatiere (D. Leblond).

ANTHRACNOSE (Drepanopeziza ribis) was seen on Ribes alpinum in two nurseries nr. Montreal, Que., causing heavy spotting of foliage and some early defoliation (J. Ringuet); the conidial state was present on the specimen received (DAOM 54679) (R. A. Shoemaker). A tr. was present on red currant at the Farm, Kentville, N. S. (KP2311) (C. O. Gourley).

POWDERY MILDEW (Sphaerotheca mors-uvae). A sev. infection was noted late in the season in several plantings at Lethbridge, Alta. (F. R. Harper). Mod. infected specimens of black currant were received from Scarborough, Ont. (H. N. Racicot). Affected specimens received from St. Romuald, Levis Co., Que. (D. L.). Powdery mildew caused loss of 10% of the fruit of White Smith at Waterville, N. S.; infection was less sev. than in 1955. Karathane applied as a spray to susceptible varieties of currants and gooseberries gave almost complete control of the disease (C. O. G.).

GOOSEBERRY

RUST (Puccinia caricina) was found on a species of Carex nr. Thorhild, Alta.; aecia were present on a nearby group of wild gooseberries (W. P. Campbell). The cluster cup stage was mod.-sev. on gooseberries being grown at the School, Ste Anne de la Pocatiere, Que. (D. Leblond). A tr. was present at the Farm, Kentville, N. S. (C. O. Gourley).

D. RUBUS FRUITS

RASPBERRY

CROWN GALL (Agrobacterium tumefaciens). An occasional plant was sev. infected in an old Viking planting in Queen's Co., P.E.I. (R.R. Hurst). The disease was also causing considerable damage in another planting in Queen's Co.; canes noticeably stunted, galls present on the roots, which were also hairy (J.E. Campbell).

SPUR BLIGHT (Didymella applanata). Affected specimens received from Rosthern, Sask. (T.C. Vanterpool). Sev. diseased specimens received from Matheson, Ont.; plants were reported showing die-back symptoms (H.N. Racicot). Spur blight was noted in several garden patches and in a few commercial plantings not being regularly sprayed in the Toronto-Hamilton area (W.S. Carpenter). A mod.-sev. infection was present in Newburg at Ste Foy, Que. this fall. Diseased specimens were also received from St. Michel de Bellechase and Drummondville (D. Leblond). A sev. outbreak of spur blight occurred on new canes on several patches in the Annapolis Valley, N.S. (K.A. Harrison). Infection was: Viking, tr.; Rideau, mod.; and Madawaska, sev. at the Farm, Charlottetown, P.E.I. (R.R. Hurst).

ANTHRACNOSE (Elsinoe veneta). Mod. infection in a planting at Brandon, Man. (J.E. Machacek). The most sev. outbreak of anthracnose in some years occurred in s.w. Ont. this year. In an 18-acre planting many leaves were turning yellow and dropping on 14 June on account of petiole lesions. Lesions were numerous on the new shoots (R.W. Walsh). Anthracnose was very common in the Niagara Peninsula causing infection on cane, leaf, petiole, peduncle and fruit. In a planting of Taylor at St. Catharines, sev. infection on new cane growth caused die-back and cessation of growth. Because of much late season infection the spray program only effectively controlled the disease on the lower part of the canes. Infected fruit specimens were received also from the London and Guelph area (G.C. Chamberlain). Anthracnose and spur blight were prevalent in raspberry plantings in the London-St. Thomas area; although these plantings are not extensive, the yield was materially reduced (W.S. Babbitt). Anthracnose was sev. in plantings about Huttonville, Clarkson and Waterdown and also in garden patches over a greater area; no spray program followed (W.S. Carpenter). Diseased specimens were received from Levis (D. Leblond). Anthracnose has infected a planting of Madawaska at Jemseg, N.B. for several years and no crop has been harvested in the last two; no control measures have been applied (S.R. Colpitts). Anthracnose has been sev. in small areas in N.S. and has caused some loss of fruit. Affected fruit have been received from Amherst, Hantsport and Kentville (C.O. Gourley). Heavily infected specimens were received from Prince Co. P.E.I. (R.R. Hurst).

CANE BLIGHT (Leptosphaeria coniothyrium). Sev. infection was noted in 2 plantings at Swan River, Man. (W.L. Gordon). The disease was heavy on several varieties in the plots at the Farm, Charlottetown, P.E.I. (R.R.Hurst).

YELLOW RUST (Phragmidium rubi-idaei) was observed on Washington in the Abbotsford area, B.C. Infection was sl. this year and no enquiries about the yellow aecial stage were received. Infection from overwintering telia was sl.-mod. on new canes but without any defoliation (H.N.W. Toms). Diseased specimens were received 17 Sept. from Ste Angele de Laval, Que. (D. Leblond).

LATE LEAF RUST (Pucciniastrum americanum). A fairly heavy infection was present on Viking on 1 Aug. nr. Winona, Ont.; damage was negligible (G.W. Eaton). A sl. infection was noted in 4 nurseries in Que. in the early fall (J. Ringuet). This rust was observed on Viking, Newburg and Indian Summer at Berwick, causing sl. defoliation; infection was less sev. than in 1955 (C.O. Gourley). A light infection developed late in the season on raspberry nursery stock in P.E.I. (J.E. Campbell).

LEAF SPOT (Septoria rubi) caused 10% defoliation on Trent at Berwick, N.S.; it was also observed at Melvern Square (C.O. Gourley). Leaf spot infection on raspberries at the Exp. Farm, Charlottetown, P.E.I. was: Trent, sev.; Washington 0-273 and Marcy, heavy; and Tweed, none (R.R. Hurst).

POWDERY MILDEW (Sphaerotheca humuli) mod. affected several small plantings in the Toronto-Hamilton area, Ont. (W.S. Carpenter). Infection was rather sev. on Latham (3 acres) whereas Viking (3 acres) and Newburg (1 acre) showed no infection in a nursery at Abbotsford, Que. (J. Ringuet).

WILT (Verticillium albo-atrum) affected about 35% of the plants in a 1/2-acre planting at Rougemont, Que.; the plants came from another planting that had shown the same symptoms in previous years (L. Cinq-Mars). Wilt affected about 10% of the canes in a new garden planting at Wolfville, N.S.; the land had previously been cropped to potatoes for several years (C.O. Gourley).

LEAF CURL (virus) was prevalent in garden patches at Saskatoon, Sask. in 1 garden only 3 years old. 90% of the plants were affected (T.C. Vanterpool). A few affected plants seen in a Viking planting at St. Catharines, Ont.; diseased Taylor canes sent in from Toronto (G.C. Chamberlain). A single plant of each variety was infected in a large commercial planting of Viking and Taylor at Berwick, N.S. (C.O.G.).

MOSAIC (virus). A sev. infection was seen in a planting at Brandon, Man. (J.E. Machacek). Some mosaic occurs in a number of the old, poorly-cared-for plantings in the Toronto-Hamilton area, Ont.; occasionally a low

percentage of plants is infected in plantings of the better growers (W.S. Carpenter). Infection was tr.-2% in 12/37 raspberry nurseries inspected in 1956. (J. Ringuet). Traces of mosaic were noted in plantings at Berwick and Melvern Square, N.S. (C.O. Gourley). A diseased specimen was received from Montague, P.E.I. (J.E. Campbell).

A special survey of raspberry plantations in Ontario was conducted by Dr. A.T. Bolton; the results are reported below:

Survey of Raspberry Plantations in Ontario

Some 400 acres of raspberries were examined in the major raspberry-growing localities in Ontario. This acreage was scattered through 50 townships in 23 counties, about 3 plantations, each some 1-3 acres in extent, were examined in each township. As many letters and samples of anthracnose-infected canes had been received from growers throughout the province, an attempt was made to estimate the damage caused by the disease. Because this survey was made after harvesting was complete it was necessary to obtain the grower's own estimates of the reduction in yield caused by the diseases. In many districts anthracnose became severe on the fruiting spurs during the final 10 days of harvesting and caused many of the immature fruits to dry and wither. Many growers reported that spots appeared on the fruits themselves as well as on the canes. Many of the samples sent in to the laboratory contained spotted and dried fruits. These spots on the fruits were also found on Tweed, Trent, and Madawaska raspberries in experimental plots at Ottawa, and the anthracnose organism was isolated from them. This direct attack upon the fruits themselves is quite uncommon even on the most susceptible varieties. In some plantations, however, the disease appeared after fruiting, and no direct reduction in yield was encountered. In all plantations examined, the disease was present, in various degrees of severity, on the new canes.

The percentage of new canes that were sev. infected (i.e. completely girdled by lesions) varied from about 40% to 100% and averaged about 70%. The estimated loss in yield varied from 5% to 60% and averaged 23.5%. As might be expected estimates of reduction in yield made by the growers themselves varied considerably. However, most growers estimated a considerable decrease and in most plantations where the estimated loss was high the infection on the new canes was very sev. The observations indicate that an effective spray program must be developed to control outbreaks of anthracnose such as occurred this year. The loss in yield is only a part of the damage caused by the disease for it is almost a certainty that a large percentage of the infected new canes will be lost as a result of winter killing.

E. OTHER FRUITS

BLUEBERRY

TWIG AND BLOSSOM BLIGHT (Botrytis cinerea and Monilinia vaccinii-corymbosi). A survey of 39 fields of low bush blueberry in Charlotte Co., N.B., in June revealed that 7 (17.8%) were infected by B. cinerea and 34 (87%) by M. vaccinii-corymbosi. The loss of crop caused by the two fungi was estimated to be 5 and 20% of the crop respectively. Culture studies on blighted twigs and blossoms from 5 fields showed 3-44% of the lesions were caused by Botrytis and 50-92% by Monilinia. In a similar survey of 23 fields in Cumberland Co., N.S. 3 were infected by Botrytis with 3% av. infection and 13 by Monilinia with individual fields showing up to 75% infection. Blighted twigs from affected fields in Kings Co., N.S. yielded 3-22% Botrytis and 50-77% Monilinia. Blossom and twig blight also occurred in the fields of high bush blueberry at Aylesford, N.S., but the level of infection was considerably less than in the low bush blueberry. B. cinerea also caused about 2% of berry rot in the Aylesford fields (C.L. Lockhart).

WITCHES' BROOM (Calyptospora goeppertiana). Several sev. affected specimens of V. vitis-idaea were found at Musquodoboit Harbour, N.S. (J.F. Hockey).

RED LEAF (Exobasidium vaccinii). A sl. infection was noted on native blueberries near Normandin, Que. Galls, about 1/4 in. in diam. on leaves and main stems, were present similar to those illustrated by Woronin in his original studies; this phase of the disease has not previously been observed. In one field in Cumberland Co., N.S. 30% of the shoots were infected; however, the av. infection was about 0.3% in low bush blueberry fields in N.S. and N.B. (C.L. Lockhart).

CANKER (Fusicoccum putrefaciens) caused sev. damage in many plantations of high bush blueberry at Pitt Meadows and on Lulu Island, B.C.; frequently there were several infections on a single plant (W.E. McKeen).

LEAF SPOT (Glomerella cingulata). The Gloeosporium stage sl. infected native blueberries at Musquodoboit Harbour, N.S. (C.L. Lockhart).

CANKER. A species of Hendersonia was isolated from a stem canker collected on blueberries at Steam Mill, N.S.; it proved to be pathogenic (C.L.L.).

LEAF BLIGHT (Lophodermium melaleucum) was found affecting V. vitis-idaea causing a browning or a graying of 1-2% of the leaves at Musquodoboit Harbour, N.S. (C.L.L.).

DIE-BACK (Phomopsis vaccinii). This organism is found in most native blueberry fields in N. S. It fruits abundantly, mostly showing up on twigs after they have produced a crop of berries (C. L. L.).

The conidial state of Valsa delicatula was found associated with Phomopsis vaccinii on blueberry twigs affected by die-back at Lower Chebogue, N. S. (C. L. L.).

GRAPE

DEAD ARM (Fusicoccum viticola). Reports and specimens of dead arm were received from many old Concord vineyards in the Niagara Peninsula, Ont. In some vineyards 20% of the vines are affected. Infection of current cane growth was sl. this year (G. C. Chamberlain). In 3 acres of Campbell's Early nr. Queenston 95% of the vines were affected; as the affected vines were not productive, the grower was advised to remove the entire vineyard (G. W. Eaton). In one large Concord vineyard at Milton, dead arm was sev., about 40% of the vines being infected (W. S. Carpenter).

DOWNY MILDEW (Plasmopara viticola). An outbreak of mildew appeared suddenly on vigorously growing vines of Agewan, sev. infecting the new growth at Niagara, Ont. At St. Catharines a scattered infection occurred on the foliage of Agewan and at Winona the fruit clusters of Fredonia, but not the foliage were affected (G. C. Chamberlain). Downy mildew was present in vineyards of Fredonia and Van Buren at Burlington, Milton, Oakville and Dixie. Mildew was heavy on both foliage and fruit and losses were sev. in 2 vineyards of Worden; one grower did not pick a bunch from a 6-acre planting. Where the applications were timely and coverage adequate infection was sl. Growers who missed the pre-blossom spray were hit the worst (W. S. Carpenter). Diseased berries were received from Carleton Place (H. N. Racicot).

POWDERY MILDEW (Uncinula necator). Infection was heavy and fruit damage sev. on a greenhouse vine at the University, Vancouver, B. C. A mod. foliage infection was observed on a vine in a neglected garden in n. Vancouver (H. N. W. Toms). Numerous fruit clusters were infected in a planting of Pineau Blanc at St. Catharines, Ont.; the variety appears to be extremely susceptible. Infections on the peduncles also caused, according to the grower, a loss of half the crop from shelling during handling in a planting of Lincoln at Port Dalhousie (G. C. Chamberlain).

CHEMICAL INJURY. Roadside spraying with 2, 4-D caused mod. to sev. injury to about a third of the vines in a vineyard of 21, 000 vines at Stamford, Ont. (G. C. C.).

LEAF SCORCH (potash deficiency) was common in vineyards in the St. Catharines area, Ont. in the late season (G. C. C.).

STRAWBERRY

GRAY MOLD (Botrytis cinerea caused a loss of 10-12% of the crop on Vancouver Island, B. C.; captan appeared to be partially effective (W. R. Foster). Infection was sl. at the end of a cool wet June, but, owing to sev. winter killing, damage to surviving plants was also sl. (H. N. W. Toms). Fruit rot destroyed 50-60% of the fruits in many gardens at Harrow, Ont. Heavy foliage on the vines and moist weather provided conditions very favorable for Botrytis (C. D. McKeen). Gray mold was very sev. in many plantings and losses were considerable throughout the Toronto-Hamilton area. In one 5-acre Premier patch not a berry was picked. Weather conditions were ideal for infection for prolonged periods; where foliage was dense, irrigation used and no fungicide applied, losses were high. Where captan was used in 6 pre-harvest sprays, the crop was greatly benefited. Programs started in early bloom appeared to give better results than those started later. In an experimental block of Premier, where 6 pre-bloom applications of captan, 3 lb. actual per acre, were used the av. results were as follows:

	Berries per box	Percentage of rotted fruits at picking	Percentage of rotted fruits 3 days after
Treated	81.4	5.3	16.2
Check	113.8	13.3	30.2

A high percentage of the lower fruits under dense foliage were affected in a planting of Senator Dunlop at Ste Foy, Que. (D. Leblond). A tr. to 5% of the fruits were rotted in plantings of Senator Dunlop about the Narrows, N. B. (S. R. Colpitts). Fruit rot was particularly sev. in all strawberry-growing areas in N. S. In unsprayed picking beds as high as 60% loss occurred; the average loss was about 5-10% of the crop (C. O. Gourley).

LEAF BLIGHT (Dendrophoma obscurans). A tr. was recorded on Senator Dunlop at the Farm, Kentville, N. S. (C. O. G.).

LEAF SCORCH (Diplocarpon earliana) was very prevalent on Premier in the Toronto-Hamilton area, Ont., even where bordeaux and captan had been used (W. S. Carpenter). A tr. was observed on overwintered leaves at Kentville, N. S. on 29 May, and again on the foliage of Senator Dunlop in September (C. O. G.). A sl. infection was seen on Premier in a garden at Charlottetown, P. E. I. (R. R. Hurst).

LEAF BLOTCH (Gnomonia fructicola). A very sl. infection was seen at MacDonalds Corners, N.B. 12 July (C.O.G.).

LEAF SPOT (Mycosphaerella fragariae) was generally prevalent on British Sovereign in small patches in home gardens in the Pemberton Valley, B.C.; in the Fraser Valley, this disease has not been noted on this particular variety (R.E. Fitzpatrick). Leaf spot was prevalent in the early season on susceptible varieties such as Louise, Erie and Empire in the Toronto-Hamilton area, Ont.; Premier was sl. infected (W.S. Carpenter). Infection was a tr. to 80% on the varieties cultivated in N.B. (S.R. Colpitts). Most varieties were infected in N.S., some of the more susceptible being rather sev. diseased. Spraying with captan has considerably reduced the infection level (C.O. Gourley). A sl. infection was noted on Sparkle at York, P.E.I. while Senator Dunlop and Catskill were free of infection (J.E. Campbell).

RED STELE (Phytophthora fragariae) was found in about 25% of the plantings examined on Vancouver Island, B.C.; 10 years ago about half the plantings were affected (W.R. Foster).

ROOT-LESION NEMATODE (Pratylenchus penetrans) was observed in a number of plantings of Premier examined in the Niagara Peninsula and Norfolk Co., Ont. Distinct brown scratch-like lesions could be seen on the white roots of daughter plants. The number of lesions present was closely correlated with number of P. penetrans in the soil. From these lesions root-rotting organisms spread into the roots (J.L. Townshend). Only a slight response to fumigation was noted in the yields of Empire the second cropping season in 3 fumigation plots laid down on a farm in Toronto-Hamilton area. Mr. Townshend found Paratylenchus and Pratylenchus present in above-average numbers (W.S. Carpenter).

POWDERY MILDEW (Sphaerotheca humuli). A sl.-mod. infection was generally distributed on s. Vancouver Island, B.C.; it was only sl. and patchy in the Fraser Valley (W.R. Foster). The disease was observed both on plants in the greenhouse and in outside plantings at the Univ., Edmonton, Alta. (A.W. Henry). Powdery mildew was noted in isolated spots in a few Premier plantings in the Toronto-Hamilton area, Ont. (W.S. Carpenter). A sev. infected specimen of Everbearing strawberry was received from St. Prime, Que. (D. Leblond). A rather heavy infection on Senator Dunlop at Waterville, N.S. was checked by an application of Karathane on 4 Sept. with very little damage resulting from the infection (C.O. Gourley). A very sl. infection was noted on Premier in a home garden and traces in commercial plantings throughout Queens Co. P.E.I. (R.R. Hurst).

WILT (Verticillium albo-atrum) is one of the most destructive diseases in the Toronto-Hamilton area, Ont. It has appeared occasionally in plantings

on new ground where a susceptible crop has not previously been grown. The disease is sev. in Premier, Louise, Erie and in some of the new Ottawa strains; mod. in Empire and Sparkle and very sl. in Catskill (W. S. Carpenter).

ROOT ROT (various pathogens) is a perennial problem particularly in 2-year-old patches in the Toronto-Hamilton area, Ont. A nematode survey conducted by Mr. Townshend revealed that even in healthy appearing plantings the roots were often in very poor condition. Abundance of soil moisture and cool temperatures probably kept many of these plantings from burning up (W. S. Carpenter). Affected specimens were received in 5 widely separated localities; loss at some of these places was appreciable (D. Leblond). Although most fields are infected by root rot in N. B. on account of a favorable picking season yields were generally good and the plantings suffered only a sl. reduction of yield from root rot (S. R. Colpitts). In recent years several cases of root rot in P. E. I. have been brought to the attention of the Charlottetown laboratory. However it is not considered to be a serious problem (J. E. Campbell).

GREEN PETAL (virus). A survey in N. B. revealed that a tr. occurred in most fields of Senator Dunlop examined. In N. S. it is also present in all areas where strawberries are grown; infection in most plantings was 1-2% (C. O. Gourley). In a small patch of Temple at Jemseg, N. B., 80% of the plants were affected (S. R. Colpitts).

JUNE YELLOWS (genetic breakdown) is very common in Climax in B. C.; in consequence the variety is unsuited for here (W. R. Foster). After a sev. outbreak of yellows in Premier in 1955, most of yellows this season was confined to patches of Premier that were held over for cropping another year. In some, 80% of the plants were affected (W. S. Carpenter). About 10% of the plants were affected in a Premier planting at Port Weller (G. C. Chamberlain). A tr. was noticed in Premier at Jemseg, N. B. (S. R. Colpitts).

The improved vigor of virus-free Premier, Empire, Erie, Catskill, Sparkle and the new Ottawa seedlings over present commercial stands of Premier, Sparkle and Louise in the Toronto-Hamilton area is very noticeable. In consequence, growers are increasing their plantings of all varieties available except Premier (W. S. Carpenter).

FROST INJURY A low of 23°F. on 24 May reduced the first 2 pickings in the Toronto-Hamilton area Ont. by 10-25% (W. S. C.).