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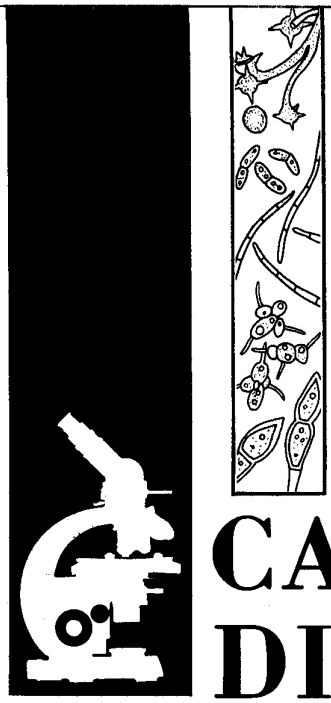
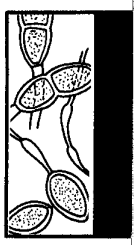


CANADIAN PLANT DISEASE SURVEY



DITOR: D.W. CREELMAN

RESEARCH BRANCH CANADA DEPARTMENT OF AGRICULTURE

VOL.45, No.2, JUNE, 1965

CANADIAN PLANT DISEASE SURVEY

RESEARCH BRANCH CANADA DEPARTMENT OF AGRICULTURE

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"The Canadian Plant Disease Survey is a periodical of information and record on the occurrence and severity of plant diseases in Canada. It will also accept other original information such as the development of methods of investigation and control, including the evaluation of new materials. Review papers and compilations of practical value to phytopathologists will be included from time to time. It will not accept results of original research suitable for publication in more formal scientific journals".

NEW AND NOTEWORTHY DISEASES

Cereal rusts caused no significant losses to cereal crops in western Canada in 1964. There was a sharp increase, from 5-38%, in the number of cultures of crown rust of oats (Puccinia coronata) virulent on the 'Landhafer-Santa Fe' type of resistance. There was also a decided increase, from 3.5-26%, in the number of cultures of the potentially dangerous race 6AF of stem rust of oats (Puccinia graminis avenae). This race can attack all oat varieties currently grown in Canada.

Common root rot of wheat (Bipolaris sorokiniana, Fusarium spp.) was more prevalent and severe in Saskatchewan than in any year since 1951. Its high incidence was correlated with below-normal rainfall. Considerable damage was also recorded in central Alberta. Root rot incidence in barley in Saskatchewan was also higher than in 1963. Wheat scab (Gibberella zeae) was unusually prevalent in the Peace River area. An outbreak of basal glume rot (Pseudomonas atrofaciens) occurred in southeastern Saskatchewan and western Manitoba and resulted in a considerable amount of black tip in kernels.

Agropyron mosaic was commonly found in winter wheat fields in western Ontario where wheat streak mosaic was identified for the first time in eastern Canada. Wheat spot mosaic virus was isolated from wheat in Alberta for the first time since 1955. Oat blue dwarf virus was isolated, for the first time in Canada, from oats at Winnipeg, Manitoba.

Net blotch (Drechslera teres) and scald (Rhynchosporium secalis) of barley were widespread and frequently severe in central and northern Alberta. Aster yellows was found in most barley fields surveyed in Manitoba and barley yellow dwarf in half of the fields.

Crown bud rot (Rhizoctonia solani, Ascochyta imperfecta, Fusarium spp.) was general in irrigated stands of alfalfa in southern Alberta and damage from snow mold, caused by the low-temperature basidiomycete was seen in all fields surveyed in northern Alberta. Clover phyllody was less severe in eastern Quebec than for a number of years. Red clover vein mosaic was recognized, for the first time in Canada, in red clover and in sweet clover in British Columbia. Seed smut (Thecaphora deformans) was collected, for the first time in Canada on lupine, in Alberta.

Flax wilt (Fusarium oxysporum f. lini) was severe in western Quebec where pasmo (Septoria linicola) was reported for the first time. Generally light infections of aster yellows were found in all flax fields visited in Manitoba. Unusually heavy infections of downy mildew (Peronospora manshurica) and leaf spot (Septoria glycines) occurred on soybeans in Ontario and anthracnose (Colletotrichum truncatum) was discovered, for the first time in Canada, in the same province.

Sunflower rust (Puccinia helianthi) was commonly found in eastern Ontario. There is evidence that a race or races different from race 1, commonly found in Manitoba, exist in Ontario. Leaf spot (Septoria helianthi) affected yields in some fields in Manitoba and Sclerotinia minor was reported, for the first time in Canada on sunflowers, in Ontario.

Stalk rot (Fusarium graminearum) caused serious damage to field corn in western Ontario where ear and kernel rots (Fusarium moniliforme) were more prevalent than in previous years. Two conditions of unknown etiology, red stripe and silk cut, affected a high proportion of kernels of some varieties and lines of corn in Ontario. Field losses from black root rot of tobacco (Thielaviopsis basicola) were extremely heavy in Ontario. Weather fleck became quite severe toward the end of the season in Ontario tobacco fields.

Ryegrass mosaic virus was found, for the first time in Canada, in Lolium perenne in British Columbia. Snow mold caused extensive damage to lawns and turf in central and northern Alberta.

The sugar beet nematode (Heterodera schachtii) caused damage to both table beets and cabbage in Ontario. Neither of these crops had previously been reported as hosts

of this nematode in Canada. Club root (Plasmodiophora brassicae) caused extensive losses in cabbage crops in eastern Newfoundland.

Aster yellows caused high losses in unsprayed carrot and lettuce fields in Prince Edward Island. Black rot (Xanthomonas campestris) was a serious problem in cauliflower crops in Ontario. Cucumber scab (Cladosporium cucumerinum) was responsible for heavy losses in New Brunswick and Nova Scotia.

Stem and bulb nematode (Ditylenchus dipsaci) was found in onions in western Ontario and white rot (Sclerotium cepivorum), introduced on infected transplants from the U.S.A., infested many onion fields in the Okanagan Valley, B.C. and poses a serious threat to the onion industry. Onion smut (Urocystis magica) caused losses in British Columbia and Ontario. Early blight (Alternaria solani) of tomatoes was serious in British Columbia, Ontario and New Brunswick.

Cylindrocarpon radicicola and Stemphylium botryosum caused lesions on parsnip crowns in Nova Scotia. White rust (Albugo occidentalis) was reported, for the first time in Canada, on spinach in British Columbia. Skin spot (Rhizoctonia solani) affected swede turnips in Prince Edward Island while scorch, caused by a virus complex, was responsible for considerable losses to swede crops in southern and western Ontario.

Black leg (Erwinia atroseptica) was again the major cause of rejection of seed potato fields in Canada while the incidence of ring rot (Corynebacterium sepedonicum) showed a marked decrease in all provinces but Manitoba. Late blight (Phytophthora infestans) caused no significant losses. Wilt (Verticillium albo-atrum) was widespread in potato fields in Ontario and pink-eye, a condition associated with verticillium infection, was severe in some varieties in Ontario and Nova Scotia.

Fire blight (Erwinia amylovora) continues to be a major disease in apple and pear orchards in western Ontario. Apple scab (Venturia inaequalis) was very well controlled in commercial orchards throughout the country and little pin point or storage scab developed. The apple virus diseases chlorotic leaf spot, McIntosh leaf pucker and stem pitting were recognized for the first time in Ontario. Frost during bloom caused extensive reductions in the apple crop in southwestern Quebec. Infection by Gloeosporium album caused losses in storage in both apples and pears in Nova Scotia.

Leaf spot of sour cherries (Higginsia hiemalis) was more serious than for some years in southern Ontario and brown rot (Monilinia fructicola) was severe on both cherries and peaches in British Columbia and Ontario. Symptoms of necrotic ring spot, a virus disease, were prevalent and pronounced in sour cherries in southern Ontario. Coryneum blight (Stigmina carpophila), previously considered to be serious only on apricots, was very severe on peaches in British Columbia.

Canker (Fusicoccum putrefaciens) continues to be troublesome in commercial plantings of highbush blueberries in Nova Scotia. Dead arm (Cryptosporella viticola) has caused great damage to many plantings of French hybrid grapes in Ontario despite rigorous pruning and extensive use of fungicides.

Red stele (Phytophthora fragariae) of strawberry was more than usually widespread in the Fraser Valley of British Columbia. An undetermined species of Rhizoctonia again caused extensive losses of cold-stored dormant strawberry plants in New Brunswick. Wilt (Verticillium dahliae) caused damage in strawberry fields in six Ontario counties.

Anthracnose (Gloeosporium apocryptum) was reported on maples throughout eastern Canada. Leaf scorch and general deterioration of maples planted along streets and roadsides continues to cause concern in Ontario. Root rot, caused by several species of Phythphora again caused extensive damage to Chamaecyparis plantings in British Columbia. Rust (Puccinia sparganioides) continues to be destructive on ash trees in western Nova Scotia and twig blight (Phomopsis juniperovora) was unusually widespread on junipers in British Columbia.

A die-back of spruce caused by Sphaeropsis ellisii was reported for the first time in Canada from Quebec. Septoria musiva caused damage to poplars in Alberta, Saskatchewan and Quebec. Cercospora handelii and Diplodina eurhododendri were reported, for the first time in Nova Scotia, as the causes of leaf spots of rhododendron. Willow blight (Pollacia saliciperda) was severe in Quebec and Nova Scotia. Extensions in range of the Dutch elm disease (Ceratocystis ulmi) were reported in Ontario and New Brunswick.

Wilt (Verticillium albo-atrum) was destructive in chrysanthemum plantings in British Columbia and a root rot caused by Thielaviopsis basicola was severe on poinsettia in eastern Ontario. Leaf and flower spot (Botryotinia draytoni) caused extensive damage on gladiolus in Quebec while gray mold (Botrytis cinerea) seriously affected blooms in Nova Scotia. Gladiolus corms bore extensive lesions caused by Curvularia trifolii f. sp. gladioli in southern Ontario.

THE WEATHER AND ITS INFLUENCE ON PLANT DISEASE

The weather in the lower Fraser Valley of British Columbia was relatively mild during the winter of 1963-64 with one 4-inch snowfall in January but only trace amounts in the two following months. At the seacoast a minimum temperature of 25°F was recorded during the last week in February.

After the last frost in April the cold, late spring delayed growth of perennial forages and the seeding of annual grains, potatoes, peas and other crops. Blossom set was also delayed and some small fruits were late coming into maturity. Because of the low temperatures there was considerable loss of plants in strawberry fields by mid.-June from Rhizoctonia infection. This situation occurs no more than once in several years. However, strawberry yields were fair on good farms but, where control measures were not followed, rotted fruit (Botrytis cinerea) lowered yields considerably. Raspberry yields were generally down despite mold control programs and sugar content was often poor owing to the low temperatures.

As in 1963 growth of ornamental annuals was much delayed and peculiar cold temperature effects were again observed. The cool, rainy summer weather was detrimental to putting up good quality hay and silage. Harvesting of the oat crop was also delayed. This was the third successive summer season with below-average temperatures. It was also notable for excess rainfall and deficiency of bright sunshine.

Late blight in potatoes first appeared in mid.-July but foliar infection was not severe. By September downy mildew was severe in susceptible varieties of onion. September was the coolest and one of the wettest on record. Frost was reported in low, peat bog land during the second week and a 25% blueberry crop loss was claimed in the press. By mid.-October some loss of potatoes occurred in bin storage, caused both by late blight and a Pythium - bacterial soft rot complex. The first general killing frost was recorded on 28 October (H.N.W.Toms).

Mean temperatures in the Okanagan Valley of British Columbia for all months of the 1963-64 winter were remarkably close to average, and no extremes were experienced. There was an unusually prolonged period with snow on the ground from early December until the end of January but no snow cover throughout February. For February and March total rainfall at Summerland was 0.55 inches, approximately one-fifth average. By contrast, the weather from the first week of June until the third week of September was unusually wet, with a total of 7 inches rain (35-year average, 4 inches). Hours of sunshine were appreciably below normal for these months, and mean temperatures slightly below normal for August and September. October was unusually dry and sunny.

The result of this sequence of weather conditions was an unusually large crop of stone fruits and pears, and an average crop of apples; but lower than normal quality for all fruits, and relatively high incidence of several fungus and bacterial diseases.

The crop of field tomatoes was reduced by an estimated 50% because cool, damp weather delayed ripening. Unsprayed fields suffered severe damage to foliage and fruit from early blight. Sprayed fields were not seriously affected, and mold counts in canneries were low. On all other vegetables, incidence of fungus and bacterial diseases was high. Onions suffered particularly, with serious occurrences of smut, downy mildew, pink root, bulb rot and neck rot.

The dry conditions in April and May provided no infection periods for apple scab through the southern part of the Okanagan Valley, but one infection period at full bloom (May 20-21) occurred in the northern districts. In these northern districts there were leaf infections on earliest-formed leaves, but no subsequent leaf or fruit infections where recommended dodine or dichlone programs were followed, despite numerous infection periods in June and later months. No reports were received of pin-point scab despite prolonged wet periods in August and September.

Powdery mildews, after 13 successive winters without extreme temperatures reached almost record levels of severity on most tree fruits, especially apple. Bull's eye rot did not develop seriously in stored apples

of the 1963 crop. Undoubtedly the sunny, dry conditions during the 1963 picking season reduced opportunity for infection of the fruits entering storage.

During the unusually dry spring period no brown rot blossom blight occurred on any of the stone fruits, although there was abundant overwintering of inoculum from the 1963 season. However, infections occurred in some orchards on green apricot fruits during the wet period in June and July, and ripe fruit infections occurred on cherry, apricot, peach and plum. Cherry losses were heavy only in some Kelowna orchards where the cherries ripened slowly and late.

Fire blight, which reached epidemic proportions in many south Okanagan orchards in 1963, was much less prevalent in these districts in 1964. Apparently in the B.C. Interior region very favorable conditions for infection in midsummer are not effective in inducing widespread infection if they are preceded by exceptionally dry weather in April and May. In north Okanagan districts, which did suffer rainy periods in May, fire blight was even more destructive than in 1963.

Fruit symptoms of the apple virus diseases McIntosh leaf pucker and Newtown ring russeting were moderate to fairly severe. Heat units recorded during the 2 weeks following full bloom were slightly below average. Thus the negative correlation between heat units and severity of virus symptoms observed in 8 previous seasons has been suported (M.F.Welsh).

Rainfall in the grain area of the Rocky Mountain foothills in north and central Alberta was adequate throughout the growing season. Barley leaf diseases, and particularly scald, were generally prevalent in this area. Conditions were progressively drier proceeding eastward to the Saskatchewan border and in this area there was a very low incidence of leaf diseases and stem rust was not observed. Conditions in the Peace River region were dry at the outset but soon were characterized by consistently heavy precipitation with the result that level fields remained flooded during most of the season. Some rarely encountered diseases such as Fusarium scab of cereals were therefore, fairly prevalent (W.P.Skoropad).

Abnormally heavy precipitation in April and early May delayed seeding of spring crops in south Alberta. The cool, wet conditions followed by normal June weather favored the growth of winter wheat and reduced the expected losses from wheat streak mosaic. Cereal root rot development was reduced. Powdery mildew of peas and pea root diseases too, were less severe than in 1963. Conversely, symptoms of bacterial ring rot of potato appeared earlier in inoculated plots this year and the incidence of cereal leaf spots was abnormally high (E.J. Hawn).

Adequate moisture for seed germination was provided throughout Saskatchewan by general rains of 1 to 2 inches during the first week in May. Thereafter precipitation was generally low through June. Unusually high temperatures from May 17 to 21 resulted in leaf banding in wheat and heat canker in flax at several locations. Leaf rust of wheat, speckled blotch of wheat, and net blotch of barley were favored in eastern sections by frequent rains during July, but were held in check by dry conditions through the rest of the province. August was marked by twice the normal rainfall in the mid-section of western Saskatchewan and by cool weather with widespread frosts, August 11 to 13. These, with killing frosts on September 10 and 11, followed by high temperatures from the 16th to 18th, caused considerable injury to grains. The germination of the frozen wheat was remarkably good, but barley and oat samples germinated rather poorly. Harvest was delayed in many areas for several weeks by frequent rains, consequently, many samples of grain were bleached or weathered in appearance (B.J.Sallans).

The spring weather in Manitoba favored good development of cereals but frosty nights until 10 June prevented the proper establishment of tender garden crops. A relatively dry July and a cool August helped to slow the development of cereal rusts. Cool wet periods and frost in August lowered the grade of wheat (W.J.Cherewick).

Close to normal weather conditions in southwestern Ontario for the first seven months of the year gave rise to no unusual incidence of plant diseases during that time. Weather permitted the timely spraying of fruit and vegetable crops with protective chemicals. The cool, wet weather that set in late in July and continued throughout August and the first ten days of September caused slow ripening of canning tomatoes in Essex and Kent Counties and extensive cracking and leather-end of fruits. The heavy, drenching rains that fell in Middlesex and Huron counties in early August caused plant drowning and heavy defoliation in many fields of dry beans. Normal weather conditions held aphid populations at low levels and consequently there were no aphid-borne virus epidemics in burley tobacco, pepper, tomato and cucurbit crops (C.D.McKeen).

The mean temperature in May was three degrees above normal in the La Pocatière, Que. region. Normal temperatures prevailed in June and precipitation was above normal. These conditions were not too favorable for the initiation of apple scab.

July was cool and wet. Consequently, root disorders were noticed in some oat fields in Matapedia and l'Islet Counties and a complex of soil organisms was involved. The population of leafhoppers was greatly reduced and diseases like clover phyllody and strawberry green petal were much less abundant than usual in 1964.

Mean temperature in August was two degrees below normal and 2.46 inches of rain were recorded. These cool conditions initiated late blight but, in general, its development was retarded by the deficiency of rainfall. These conditions favored the development of powdery scab of potato in sandy soil, loose smuts of wheat and oats, and ergot of rye.

Dry conditions which prevailed in September and frost which occurred at the middle of the month, checked the spread of potato late blight. In other hand, black dot disease was more abundant in sandy soils (H. Généreux).

Both temperatures and precipitation were below the 50-year average in New Brunswick. The cool weather delayed the maturity of many crops, notably corn, strawberries, processing beans and tomatoes; in some cases up to two weeks. Apple scab ascospore discharges did not occur until late May and were then well spaced with the result that scab was well controlled by a protective spray schedule only.

The cool weather favored some development of gray mold on strawberries and on potato foliage, though in neither case did it become serious. Cool, showery weather in August was conducive to the development and spread of cucumber scab and early blight of tomatoes. Both diseases became widespread and destructive. The low temperatures in August hindered the development of late blight of potatoes with the result that that disease was virtually absent in the province (S.R.Colpitts).

Weather in Nova Scotia was favorable for the development and spread of apple scab and, where good spray practices were not followed, scab readily developed on the foliage and fruit. Perithecia containing mature ascospores were found on April 20 but the first spore discharge did not occur until May 10 with the first infection period on May 11-12. At this time the early varieties were at the green-tip stage of development. Scab lesions appeared about June 4. There were 15 infection periods up to July 30 with one on July 3-6 of 80 hours' duration. Considerable late or pin-point scab appeared near harvest in poorly-sprayed orchards.

The growing season in 1964 was rather cool for vegetable production. May had above-average temperatures and low rainfall but monthly temperatures were below normal during the rest of the summer. June was 0.8°F below, July, 3.4°, August, 2.7° and September, 2.2°. Rainfall for each month was close to the mean except for August when 3.19 inches of rain in one day caused an excess of 1.8 inches for the month. The regularly recommended spray programs were effective against foliage diseases. Late blight of potatoes and tomatoes developed slowly. The first infection in potato fields was not found until early August but it progressed steadily so that by mid.-September some cases of defoliation were reported in unsprayed fields. Unsprayed tomato fields were a total loss before the end of the season. Foliage blights of carrots were also late in developing but were controlled by 3 applications of fungicide. Onions were raised commercially on a larger scale than usual and Botrytis diseases proved to be troublesome with some loss of bulbs after harvest (R.G.Ross).

In Prince Edward Island the summer and fall of 1964 were characterized by below-normal temperatures and rainfall. Despite lack of normal precipitation, excellent crops were harvested. Apparently the effects of low rainfall were balanced by cool temperatures and overcast skies with a consequent retardation of the evaporation rate.

Because of relatively short periods of free moisture in the soil and on foliage surfaces diseases favored by such conditions did not become serious at least until very late in the growing season. Well-sprayed potato fields contracted little late blight infection and poorly-sprayed fields had only slight to moderate infection up to the time of top-killing in late September or early October. Unsprayed tomatoes showed little infection by mid.-September. The above-normal yields of barley and oats testify to the lack of damaging effects of diseases affecting these crops. Cherry leaf spot, extremely serious in 1963, did not cause serious damage in 1964, probably due to the relative absence of free moisture. Some club-root infection of crucifers occurred in June when soil moisture levels favored spore germination and host penetration. Lack of free soil moisture in July and August precluded infection by the club-root organism (G.W.Ayers).

DISEASES OF CEREAL CROPS

WHEAT

LEAF SPOT (Ascochyta sorghi) was more prevalent than usual on spring wheat in s. Alta. (J.S.H.). Seven fields in w. and s.w. Sask. were affected; durum wheat at Leader was moderately infected, the 6 others showed tr. infections (R.D.T., B.J.S.)*

DRY-SOIL MOLD (Aspergillus sp., Penicillium sp.). Moderately affected seedlings were received from Headingly, Man. (W.A.F.H.).

BLACK POINT (Bipolaris sorokiniana). A specimen was received from Morrin, Alta. (A.W.H., D.S.). B. sorokiniana was isolated from the darkened peduncles of a specimen received from MacGregor, Man. Some of the plants submitted had died prematurely (W.A.F.H.).

COMMON ROOT ROT (Bipolaris sorokinana, Fusarium spp.) caused considerable damage at Amisk, Fabyan, and Blue Ridge and lighter damage at Neerlandia, Twin Butte and Vermilion, Alta. (A.W.H., D.S.). Two fields at Benalta in c. Alta. suffered 30% damage (B.B.). It was rated 13-tr. 11-sl. 5-mod. in winter wheat fields in s. Alta. (J.S.H.). Field ratings of common root rot in Sask. averaged 13.5, the highest level reached since 1951. The average ratings over the past 23 years have shown two periods of upward trends separated by a reverse trend. Ratings rose from 6.0 in 1942 to 13.7 in 1951, fell to 7.5 in the very favorable crop year of 1952 and again in 1955; then rose to its present level of 13.5. The 1964 ratings for crop districts 1 to 9 were, respectively, 14.2, 11.5, 17.0, 13.4, 14.3, 17.2, 9.0, 13.8 and 9.0. June rainfall in crop districts 3 and 6, with the highest disease ratings, was much below normal. It was also well below normal in crop district 8 where common root rot was considerably higher than usual. The low ratings in crop districts 7 and 9 in n.w. Sask. were related to better than average moisture conditions in June (B.J.S.). It was rated 8-tr. 6-sl. 1- mod./22 fields surveyed in Lincoln and Welland Counties, Ont. (T.R.D.)

ERGOT (Claviceps purpurea). Specimens were received from Grande Prairie and Belloy, Alta. (A.W.H., D.S.). Trace infections were noted at Crooked River and Englefeld, Sask. (R.J.L.). Distinct mottled-brown to dark discolorations occurred on the lemmas of florets infected with the sphacelial stage of ergot at Parkdale, Man. (W.A.F.H.).

POWDERY MILDEW (Erysiphe graminis) was rated 2-tr. 9-sl./30 fields surveyed in n. & c. Alta. It was fairly extensive at Spirit River (W.P.S., A.W.H.). It was tr. in 1 winter wheat field in s. Alta. (J.S.H.). It was rated 1-tr. 4-sl. 4-mod./22 fields surveyed in Lincoln and Welland Counties, Ont. (T.R.D.). Infection was sl. and not as heavy as in 1963 in e. Ont. (R.V.C.).

SCAB (Gibberella zeae) was unusually prevalent in the Peace River district of Alta. It was rated 5-sl./15 fields surveyed (W.P.S.). A specimen was received from Wanham, Alta. (A.W.H., D.S.). Infection was variable, averaging 1% at St. Francois Xavier and Rosser, Man. (H.A.H.W.).

TAKE-ALL (Ophiobolus graminis) was mod.-sev. at Amisk and was identified in specimens received from Alhambra and Dewberry, Alta. (A.W.H., D.S.). It was 1-tr./224 fields surveyed in Sask. (B.J.S.) and 1-sl./22 fields visited in Lincoln and Welland Counties, Ont. (T.R.D.).

ROOT ROT (Plenodomus sp.) caused 5% damage to winter wheat in experimental plots at Lacombe, Alta. in May. (A.W.H., B.B.).

BASAL GLUME ROT (Pseudomonas atrofaciens) caused mod. damage in 3/15 fields surveyed in the Peace River district of Alta. (W.P.S.). Specimens were received from Fairview, Ponoka and Woking, Alta. (A.W.H.). One field at Hirsch, Sask. had 20% of the heads affected. A sl. infection also occurred at Alameda (B.J.S.). An outbreak of basal glume rot occurred in s.e. Sask and w. Man. resulting in bacterial black tip in the kernels. Infections ranged as high as 21% and were suspected of lowering grades of wheat. However, much of the low-grade wheat resulted from frost damage (W.A.F.H.) (see under 'Frost Injury' below (D.W.Creelman).

STEM RUST (Puccinia graminis) was rated 19-tr. 4-sl./244 fields visited in Sask. (B.J.S.). It was 6-sl. 6-mod. 10-sev./

* See Appendix "A" for list of contributors, their addresses and affiliation.

22 fields surveyed in Lincoln and Welland Counties, Ont. (T.R.D.). Trace infection was seen in a small plot at La Pocatière, Que. (H.G.). Infections were generally only tr. but were sev. in a few areas in e. Ont. (R.V.C.).

*LEAF RUST (Puccinia recondita) was 5-sl./30 fields surveyed in n. and c. Alta. (W.P.S.). Infections of bread wheat in Sask. were rated 75-tr. 31-sl. 24-mod. 19 sev./212 fields surveyed. Traces were recorded in 2/28 fields of durum wheat. Severe infections of bread wheat occurred se. of a line through Weyburn, Melville and Kamsack. Traces occurred w. of a line through Moose Jaw, Saskatoon and Nipawin (B.J.S.). It was rated 2-tr. 6-sl. 11-mod. 3-sev./22 fields in Lincoln and Welland Counties, Ont. (T.R.D.) and was tr. only in e. Ont. (R.V.C.).

STRIPE RUST (Puccinia striiformis)was unusually prevalent on winter wheat in the s. w. corner of Alta. during the fall of 1963 but was not common in 1964. Despite an unusually mild winter there was only one instance where there was any suspicion that the rust might have overwintered in the area (T.G.A., M.N.G.).

BROWNING ROOT ROT (Pythium graminicola Subram. (P. arrhenomanes Drechsl.). Two fields at Kinley, Sask. were moderately affected (B.J.S.).

SPECKLED LEAF BLOTCH (Septoria spp.) was rated 14-tr. 31-sl. 7-mod. 5-sev./ 244 fields surveyed in Sask. (R.D.T., B.J.S.).

GLUME BLOTCH (Septoria nodorum). Infections were 12-sl. 8-mod./30 fields visited in n. and c. Alta. (W.P.S.). Specimens were received from Fairview, where it was abundant, Claresholm, Grande Prairie, Topland, Vermilion, Wanham and Woking, Alta. (A.W.H., D.S.). Ratings in Sask. were 2-tr. 7-sl. 2-mod. 1-sev./224 fields. The disease occurred in the e. half of the province (B.J.S.).

COMMON BUNT (Tilletia caries, T. foetida) was fairly abundant on a specimen from Mellowdale, Alta. (A.W.H., D.S.) and was 2-tr./ 30 winter wheat fields in s. Alta. (J.S.H.). Bunt was present in plots at La Pocatière, Que. (H.G).

LOOSE SMUT (Ustilago tritici) was found in Sask. only in durum and the bread variety 'Lee'. The average percentage in 29 fields of durum was 0.42. All 3 fields of 'Lee' examined were infected with an average of 2% loose smut (B.J.S.). Twenty-five/35 fields of durum examined in Man. were affected. Infections ranged up to 9% with a mean of 1.5%. All 46 fields of common wheat examined were free of loose smut (J.J.N.). It was mod. in a plot at La Pocatière, Que. (D.L.).

BACTERIAL BLACK CHAFF (Xanthomonas translucens). A specimen was received from Frobisher, Sask. (B.J.S.).

AGROPYRON MOSAIC (agropyron mosaic virus). In some winter wheat fields in York, Simcoe, Huron, Middlesex and Perth Counties, Ont., 75-100% of the plants at the borders of fields near diseased Agropyron repens were affected. Higher than normal fall temperatures favored its spread to wheat (J.T.S.).

ASTER YELLOWS (aster yellows virus). Infected plants observed in experimental plots of durum wheat at 2 locations in Man. AYV was recovered from them by leafhopper transmission (C.C.G.)

BARLEY YELLOW DWARF (barley yellow dwarf virus). A trace infection occurred at Evesham, Sask. (R.D.T.). Infection was rated 4-tr. 5-sl. 1-mod./15 fields surveyed in Man. (C.C.G.).

SOIL-BORNE MOSAIC (virus). Incidence in York, Simcoe, Huron, Middlesex and Perth Counties, Ont. was very low in winter wheat fields where the disease was common in other years. Higher than normal soil temperatures in the fall of 1963 were probably responsible for the low incidence (J.T.S.).

WHEAT SPOT MOSAIC (wheat spot mosaic virus). This virus, isolated repeatedly between 1952 and 1955 and not encountered since, was isolated from wheat in Alta. in 1964 by T.G.Atkinson (J.T.S.).

WHEAT STREAK MOSAIC (wheat streak mosaic virus). Severe damage was observed in the vicinities of Lethbridge, Magrath and Welling., Alta. (A.W.H., D.S.). It was general on winter wheat in the fall of 1963 in the e. half of the winter wheat area of s. Alta. (C.P.D.S. 43: 154-159. 1963) and many severely diseased fields were cultivated out in the spring of 1964. However, the cool, moist spring was most favorable for wheat growth and appeared to be particularly unfavorable for disease expression and multiplication and spread of the vector. As a consequence, losses were minimized and satisfactory yields were obtained from many fields that would have been severely affected under circumstances more favorable for disease development. In a few cases losses were sustained on spring wheat crops adjacent to diseased winter wheat (T.G.A., M.N.G.). WSMV was isolated and identified from winter wheat in a field nr. Clandeboye,

*For a more complete review of the prevalence and importance of the cereal rusts in 1964, see Can. Plant Dis. Survey 45: 13-32. 1965.

Middlesex Co., Ont. This is the first known record of this virus in Ont. (J.T.S.).

WHEAT STRIATE MOSAIC (wheat striate mosaic virus) occurred as trace infections at Kindersley and Lemsford, Sask. (R.D.T.). About 10% of the numerous fields examined in Man. showed tr. infections (C.C.G.).

SPLOTCH (physiological) was rated 3-tr. 3-sl. 1-mod. 1-sev./29 fields of durum wheat examined in Sask. (R.D.T., B.J.S.).

BRITTLE DWARF (aphid injury). A few plants in experimental plots near grass roadways at Saskatoon, Sask. were affected (B.J.S.).

CHEMICAL INJURY (herbicides). Considerable damage was noted in fields at Regina, Weyburn and Yorkton, Sask. (B.J.S.).

CHLOROTIC LEAF BANDING (high temperatures). Specimens were received from Bloomsbury, Derwent and Vegreville, Alta. (A.W.H., D.S.). It occurred at Webb (B.J.S.) and severely damaged seedlings were received for diagnosis from Englefeld, Sask. (W.A.F.H.).

FROST INJURY. Seed submitted from Yarbo, Sask. showed typical frost damage (R.J.L.). In 12 samples of wheat received from s.e. Sask. the principal cause of a very low grade (#6) was frost damage. From meteorological records and farm service reports the damage was shown to be caused by frosts occurring in the week ending Aug. 17. Frost was reported during that period from Broadview, Ceylon, Francis, Lipton, Melville and Minton in the area from which the samples were received (W.A.F.H.).

HEAD DISCOLORATION (physiological melanism) occurred in tr.-sl. amounts in the vicinity of Winnipeg, at Portage la Prairie, Holland and Dauphin, Man. Isolations yielded either no organism or Alternaria tenuis. A single collection from Oakburn, Man. yielded A. tenuis and Nigrospora sp. (W.A.F.H.).

STEM BREAK (2,4-D injury and wind) caused 10% damage in several fields nr. Young, Sask. Fields were sprayed late, apparently causing elongation of the upper node at which point plants collapsed in high winds (R.D.T.).

WEED STAIN. Wheat kernels received from Stewart Valley, Sask. showed irregular black stains occurring randomly over the surface. These stains were attributed to Russian thistle fragments, the sample having been exposed to a light rain (B.J.S.)

OATS

ANTHRACNOSE (Colletotrichum graminicola) caused 5% damage in 1/9 fields surveyed in the Peace River district of Alta. and B.C. (B.B.). It was sev. on late plantings at Ste. Petronille and Ste. Famille, Montmorency Co. and at Deschambault, Portneuf Co., Que. (D.L.).

LEAF BLOTCH (Drechslera avenacea). The pathogen was isolated from heavily infected specimens from the Willingdon district, Alta. (A.W.H., D.S.). Infection was mod. on 'Scotia' oats at Nappan, N.S. (C.O.G.).

ROOT ROT (Fusarium culmorum) was mod. in a field at Broderick, Sask. and 10% of the plants were killed in a plot at Saskatoon. No infection was seen in 25 other fields visited (R.J.L., B.J.S.). 'Scotia' had 1% infection at Nappan, N.S. (C.O.G.).

GLUME AND STEM BLIGHT (Fusarium sp.) was mod. on the basal portion of glumes and on stems, particularly near the nodes, at Nicolet, Que. (D.L., M.F.).

HALO BLIGHT (Pseudomonas coronafaciens). An infection of 8% was reported nr. Calgary, Alta. (A.W.H., D.S.). It was rated 1-tr. 6-sl./26 fields surveyed in Sask. (B.J.S.). It was found in 4/4 fields observed in Man. In the most severely affected field the mean loss of leaf area was estimated at 5% (W.A.F.H.). Ratings were 7-tr. 1-sl./11 fields surveyed in Lincoln and Welland Counties, Ont. (T.R.D.).

STRIPE BLIGHT (Pseudomonas striafaciens) was sev. on an oat cover crop at the Research Station, Lethbridge, Alta. in Oct. (T.G.A.)

CROWN RUST (Puccinia coronata). In w. Canada, damaging infections were confined to the Red River Valley in Man. where intensities of 20-40% were recorded in mid.-Aug. Crown rust infections were generally light n. of the Trans-Canada Highway, rarely reaching 10%. Trace amounts only occurred in Sask. (G.F.). It was present, at maturity, in all areas surveyed in e. Ont. (R.V.C.). Infection was recorded in 9/17 Quebec Seed Board variety plots. Based on a maximum figure of 10, four of the plots had significant infections in the following ratios: La Pocatière, 5.00; Riviere Ouelle, 2.66; St. Flavien, 2.33 and Thetford Mines, 1.66 (D.L., M.F.).

STEM RUST (Puccinia graminis) was rated 3-tr. 1-sl./29 fields surveyed in Sask. (B.J.S.).

LEAF RUST (Puccinia recondita). Infections in Sask. were 1-tr. 2-sl./29 fields (B.J.S.). It was found in all areas of e. Ont. at maturity (R.V.C.).

SPECKLED LEAF BLOTCH (Septoria avenae f. sp. avenae). Trace infections occurred in 2/26 fields examined in Sask. (R.D.T.). It appeared late in e. Ont. but became ex-

tremely heavy (R.V.C.). It was trace on 'Scotia' oats at Nappan, N.S. (C.O.G.) and mod.-sev. on 'Fundy' in plots at St. John's West, Nfld. (G.A.N.).

LOOSE SMUT (Ustilago avenae). Neither loose nor covered smut were found in 48 fields examined in Man. (J.J.N.). Loose smut infection was 3% in 1/7 fields examined in N.B. (S.R.C.).

RED LEAF (barley yellow dwarf virus) was general in s. Alta. but damage was only slight (T.G.A.). Traces were seen at Whitewood and Cudworth, Sask. (R.J.L., B.J.S.). Incidence was usually light in e. Ont but it was extremely heavy in the Kapuskasing and New Liskeard areas (R.V.C.). It was widespread in Man. and fields as far n. as The Pas were infected. It was rated as 11-tr. 5-sl. 7-mod. 1-sev./27 fields surveyed (C.C.G.). It was feared early in the summer that large acreages of grains in Carleton Co., N.B. were infected with BYDV. Heavy aphid populations were found in grain fields. The symptoms, however, could not be aphid-transmitted to healthy seedlings and similar symptoms were obtained with the feeding of moderately heavy populations of non-viruliferous aphids. Plants in affected fields recovered considerably during the latter part of the season but yields were reduced by almost half (T.C.C., S.R.C.).

BLUE DWARF (oat blue dwarf virus) was observed in an oat nursery nr. Winnipeg, Man. Experimental transmission was obtained from oats to barley, flax and oats by the six-spotted leafhopper (C.C.G.). This is the first report, to the Survey, of the occurrence of this disease in Canada (D.W. Creelman).

BLAST (physiological). A field with 75% of the heads affected was reported at Barrhead and less severely affected ones at Edmonton and Grande Prairie, Alta. (A.W.H., D.S.). It was present to a slight degree in most oat fields visited in Sask. (B.J.S.). Blast was rated 8-tr. 3-sl./11 fields surveyed in the Vineland-St. Catharines area, Ont. (T.R.D.).

GRAY SPECK (manganese deficiency). Specimens were received from Crooked Creek, Alta. (A.W.H., D.S.). It was rated 1-sl. 3-mod. 1-sev./9 fields in the w. part of c. Alta. and 3-tr. 2-sl. 2-mod./9 fields in the Peace River district (B.B.).

NUTRIENT DEFICIENCY (probably potassium deficiency) affected large patches in fields at Lotbiniere, Ste. Claire, Ste. Sabine, and Notre Dame du Lac, Que. It was probably aggravated by generally poor weather conditions (D.L.).

BARLEY

SPOT BLOTCH (Bipolaris sorokinana) was rated 1-tr. 2-sl./33 fields surveyed in Sask. (R.J.L., B.J.S.). Infection was mod.-sev. on 6-row barleys in 8 fields between St. Francois Xavier and High Bluff, Man. (H.A.H.W.). 'Charlottetown 80' was 10% infected at Nappan, N.S. (C.O.G.) and infection was mod.-sev. on 'Vantage', 'Parkland' and 'Montcalm' in plots at St. John's West, Nfld. (G.A.N.).

COMMON ROOT ROT (Bipolaris sorokiniana, Fusarium spp.). The average rating in 33 Sask. fields was 15.3, somewhat higher than in 1963 (B.J.S.). It was sev. in patches on 6-row barley at Rosser, Man. (H.A.H.W.). Infection was general but slight on 'Herta' in P.E.I. (C.B.W.).

NET BLOTCH (Drechslera teres) was rated 8-sl. 10-mod. 12-sev./41 fields examined in n. and c. Alta. (W.P.S.). Reports from Airdrie, Calgary, Enilda, Grimshaw, Standard, Sylvan Lake and Rockyford, Alta. indicated infections ranging from 15-100% (A.W.H., D.S.). Ratings were 3-sl. 15-mod./21 fields surveyed in the Peace River district of B.C. and Alta.; it was mod. in 4/9 fields at Bonnyville; in 4/8 fields in c. Alta. and tr.-mod. in 2/6 fields at Myrnam, Alta. (B.B.). Ratings in Sask. were 6-tr. 13-sl. 6-mod. 1-sev./33 fields examined (R.D.T., B.J.S.).

SCAB (Fusarium sp.). A specimen received from Ardmore, Alta. contained 0.2% pinkish kernels bearing conidia of the causal fungus (A.W.H., D.S.).

STEM RUST (Puccinia graminis) was 4-tr./33 fields examined in Sask. (B.J.S.). It was found in 7/15 Quebec Seed Board plots with notable infections occurring at Honfleur, Bellechasse Co. and at St. Hyacinthe (D.L., M.F.).

LEAF RUST (Puccinia hordei) was observed in 11/15 Quebec Seed Board plots. Taking maximum infection as 10, the ratios in the most notably infected plots were: Honfleur, 4.86; La Pocatiere, 3.71; St. Gedeon, 3.71; St. Hyacinthe, 3.00; Normandin, 2.57; Thetford Mines, 2.29 (D.L., M.F.). Infection was 1% on 'Charlottetown 80' at Nappan, N.S. (C.O.G.).

SCALD (Rhynchosporium secalis). Infections in n. and c. Alta. were rated 6-sl. 3-mod. 4-sev./41 fields examined in contrast to its rare appearance in 1963. (W.P.S.). It was reported as sev. in a field at Stony Plain, fairly extensive at Millet, Airdrie and Calgary, abundant at Grimshaw and mod. at Fort Saskatchewan and Strathcona, Alta. (A.W.H., D.S.). Ratings

were 5-sl. 4-mod. 7-sev./21 fields surveyed in the Peace River district of B.C. and Alta. and 2-tr. 1-sl. 2-sev./8 fields in c. Alta. where average damage was between 5 and 10% (B.B.). Scald was slight at Regina, Sask. (B.J.S.).

SPECKLED LEAF BLOTCH (Septoria passerinii) was slight in 1 field at Bishopric out of 33 surveyed in Sask. (R.D.T.). It was tr. on 'Charlottetown 80' at Nappan, N.S. (C.O.G.).

COVERED SMUT (Ustilago hordei). Infections were rated 4-tr. 3-2% 1-3%/32 fields surveyed in Sask. The average infection was 0.31%. A specimen was also received from Stenen, Sask. (B.J.S., R.J.L.). Four/51 fields examined in Man. had infections ranging up to 5% with a mean at 0.2% (J.J.N.).

LOOSE SMUT (Ustilago nuda, U. nigra). A specimen of U. nuda was received from Thorsby, Alta. (A.W.H., D.S.). Nine/32 fields examined in Sask. had 4-tr., 1, 2, 3, 6 and 8% infection with an average of 0.66% (B.J.S.). U. nuda was found in 18/51 fields in Man. with infections ranging up to 8% and a mean of 0.6% while U. nigra occurred in 16/51 fields with infections up to 4% and a mean at 0.6% (J.J.N.). The variety 'Charlottetown 80' carried tr. infection at Nappan, N.S. and 'Vantage' less than 1% at St. John's West, Nfld. (G.A.N.)

BACTERIAL BLIGHT (Xanthomonas translucens) was rated 4-sl. 5-mod./41 fields surveyed in n. and c. Alta. (W.P.S.). A mod. infection was seen at Eastend, Sask. (R.D.T.).

ASTER YELLOWS (aster yellows virus) was found in 18/20 fields examined in Man. Infection in farmers' fields ranged from tr.-4.3%. The highest rate of infection in experimental plots was 5% on 'Parkland' barley (C.C.G.).

BARLEY STRIPE MOSAIC (barley stripe mosaic virus) was trace in one and mod. in another experimental plot in Man. None was seen in farmers' fields (C.C.G.).

YELLOW DWARF (barley yellow dwarf virus) was trace at Kindersley, Sask. (R.D.T.). Trace infections were found in about half the fields surveyed in Man. Infection was sev. in one late-sown field. Symptoms were often difficult to distinguish from those caused by aster yellows virus (C.C.G.).

CHLOROTIC LEAF BANDING (high temperature). Specimens were received from Brownville, Edmonton and Pibroch, Alta. At Brownville, 10-30% of the seedlings were affected (A.W.H., D.S.).

RYE

STEM RUST (Puccinia graminis). Infection was slight at Virgil, Ont. (T.R.D.).

LEAF RUST (Puccinia recondita) caused slight damage to the varieties 'Tetrapetkus' and 'Prolific' at St. John's West, Nfld. (G.A.N.).

ERGOT (Claviceps purpurea). Infection was sl.-mod. in all rye fields in the La Pocatière region, Que. (H.G.).

DISEASES OF FORAGE AND FIELD CROPS

A. Forage Legumes

ALFALFA

BLACK STEM (Ascochyta imperfecta). Infection was 40% at Milo, fairly extensive at Spirit River and observed at Camp Creek, Alta. (A.W.H., D.S.). It was mod. at Regina and at Nipawin, Sask. (B.J.S., R.D.T.).

LEAF SPOT (Ascochyta imperfecta) was observed at Fort Vermilion, Alta. (A.W.H., D.S.).

SNOW MOLD (low-temperature basidiomycete). Ratings were 4-tr. 12-sl. 8-mod. 4-sev./28 fields surveyed in the Edmonton, Alta. area (E.J.H.).

BACTERIAL WILT (Corynebacterium insidiosum). Infections were 9-tr.-sl. 44-tr.-mod. 22-tr.-sev./86 fields examined in s. Alta. (E.J.H.).

STEM NEMATODE (Ditylenchus dipsaci) was rated 11-tr.-sev./86 fields in s. Alta. (E.J.H.).

CROWN BUD ROT (Fusarium spp., Rhizoctonia solani, Ascochyta imperfecta) was observed at Gibbons (A.W.H., D.S.) and was general in s. Alta. in irrigated alfalfa fields more than 1-year old. Ratings were 22-tr.-sl. 49-tr.-mod. 8-tr.-sev./86 fields surveyed (E.J.H.)

YELLOW LEAF BLOTCH (Leptotrochila medicaginis). Infections were 2-sl. 1-sev./5 fields observed in c. Alta. (B.B.).

DOWNY MILDEW (Peronospora aestivalis) was reported at Camp Creek, Alta. (A.W.H., D.S.).

COMMON LEAF SPOT (Pseudopeziza trifolii f. sp. medicaginis-sativae) was observed at Camp Creek (A.W.H., D.S.) and was rated 1-sl./5 fields observed in c. Alta. (B.B.). Infection was sev. in a field at Giffard, Que. (D.L.) and was rated 50% in one at Kentville, N.S. (C.O.G.).

POTASSIUM DEFICIENCY caused a sev., small, white spotting at St. Flavien, Lotbiniere Co., Que. A similar spotting was observed on clover in the same field the previous year (D.L.).

WHITE SPOT (physiological) was observed at Colinton, Foisey, Markerville, Red Deer, Wetaskiwin and Waskatenau, Alta. (A.W.H., D.S.).

WINTER KILLING occurred in a low-lying field at Sussex, N.B. (S.R.C.).

COMMON CLOVER

SOOTY BLOTCH (Cymadothea trifolii) was rated as mod.-sev. on red and alsike clovers in 6/6 fields visited on Ile Orleans, Que. (D.L.).

POWDERY MILDEW (Erysiphe polygoni) appeared late in the season on alsike, red and white clovers in the Okanagan and Thompson Valleys, B.C. but caused little damage (G.E.W.). It was rated 1-tr. 1-mod./5 fields of alsike and 1-sl. 1-mod./7 fields of red clover in the Peace River districts of B.C. and Alta. (B.B.). Powdery mildew was found as mod.-sev. infections in 6/6 fields surveyed on Ile Orleans, Que. (D.L.). Infection on red clover was light at Kentville, N.S. (C.O.G.).

NORTHERN ANTHRACNOSE (Kabatiella caulivora). Infection was rated 1-tr. 2-sl. 1-sev./7 red clover fields examined in the Peace River district of B.C. and Alta. Five/9 fields in c. Alta. showed 3-10% infection and infection was 20% at Sylvan Lake (B.B.).

BROWN ROOT ROT (Plenodomus meliloti) caused mod.-sev. damage to clovers at the Exp. Farm, Mile 1090, Alaska Highway, Yukon (W.P.S.).

COMMON LEAF SPOT (Pseudopeziza trifolii f. sp. trifolii-pratensis) was mod.-sev. in 6/6 fields of red and alsike clovers visited on Ile Orleans, Que (D.L.).

RUST (Uromyces trifolii) was sl. in 2/5 fields of alsike visited in the Peace River district of B.C. and Alta. and infection of alsike was 10% nr. St. Paul. Traces were seen on white clover at Breton in c. Alta. (B.B.), at Falher, Alta. (A.W.H., D.S.), and on red and alsike clovers on Ile Orleans, Que. (D.L.).

MOSAIC (virus). Traces were seen on white and alsike clovers in plots at Breton, Alta. (B.B.) and sl.-mod. infections occurred in all 6 fields of red and alsike clovers surveyed on Ile Orleans, Que. (D.L.).

PHYLLODY (clover phyllody virus) was less sev. than usual on Ladino clover in the La Pocatière region, Que. A sl. infection was observed in plots at Truro, N.S. (H.G.).

RED CLOVER VEIN MOSAIC (virus) was observed, for the first time in B.C., at Point Grey in 1964. It is symptomless in Ladino clover and causes a yellow vein-banding to mosaic in red clover (M.J.P.)

SWEET CLOVER

ROOT ROT (Phytophthora cactorum) caused mod. damage in 1/10 fields surveyed in the Taber area, Alta. (E.J.H.).

RED CLOVER VEIN MOSAIC (virus) was observed on sweet clover at Point Grey, B.C. It caused a chlorotic vein-banding that disappeared by mid-summer (M.J.P.).

LUPINE

SEED SMUT (Thecaphora deformans Dur. & Mont.) was collected on lupine at Lacombe, Alta. Its identity was confirmed by D.B.O. Savile (B.B.). Its occurrence on Lupinus consitiutes a new record for Canada although Savile (Can. J. Bot. 35: 280-286. 1957) records it from Canada on Astragalus bisulcatus, Lathyrus ochroleucus and Vicia ?caroliniana). Fischer's "Manual of the North American Smut Fungi" records it on Lupinus from Wyoming and Colorado (D.W.Creelman)

B. Oil-seed Crops

FLAX

WILT (Fusarium oxysporum f. lini) occurred to a considerable degree in a few lines of 'Raja' at Ottawa, Ont (R.V.C.). It was sev., about 50% infection, on 'Norland' in 7 fields in Laprairie Co., Que. where flax had been grown frequently in the last few years. 'Marine', the only variety grown commercially in Que. was also quite heavily attacked with 25-50% infection. Greenhouse tests of 12 varieties with soil from 2 of the fields showed 'Norland' and 'Marine' to be much more susceptible than 'Raja' and other Ottawa-produced varieties (W.E.S.).

RUST (Melampsora lini). Traces were observed on 7 July at St. Norbert, Man. (W.A.F.H.).

SEEDLING BLIGHT (Rhizoctonia solani) was present in plots at Macdonald College, Que. No losses were reported from the Laprairie region where losses of up to 10% occurred in 1963 (W.E.S.).

PASMO (Septoria linicola). A specimen was received from Heward, Sask. (B.J.S.). It was found in plots at Macdonald College, Que. This is the first record from Que. but it has been reported from e. Canada at Ottawa (W.E.S.).

ASTER YELLOWS (aster yellows virus) was tr. in 2/8 farmers' fields visited in Sask. and in plots at Regina and Saskatoon (B.J.S.). Infections were rated tr.-5% in 20/20 fields surveyed in Man. (C.C.G.); and it was 1% in a field nr. Winnipeg (W.A.F.H.)

CHEMICAL INJURY. Plants received from Moose Jaw and Swift Current, Sask. showed herbicide injury consisting of killed main stems, 3-4 inches high, with several small branches that arose in the axils of the cotyledons (B.J.S.).

HEAT CANKER. Specimens showing constrictions and breaking near the soil line were received from Wiseton, Sask. (B.J.S.).

MUSTARD

WHITE RUST (Albugo cruciferarum). A 5-acre field at La Pocatière, Que. was sev. infected, though damage appeared light (H.G.).

RAPE

WHITE RUST (Albugo cruciferarum). Infection was about 5% in 3/6 fields visited in the n.w. Peace River area and 20% in 2/6 fields at Spirit River, Alta. (W.P.S.).

RING SPOT (Mycosphaerella brassicicola) was sev. in 1/5 fields observed in Sask. (R.J.L.).

SOYBEAN

BROWN STEM ROT (Cephalosporium gregatum) was common in s.w. Ont. The effect on individual plants was sev. but fewer than 1% were affected (J.H.H.).

ANTHRACNOSE (Colletotrichum truncatum (Schw.) Andrus & Moore) occurred, frequently in association with Septoria glycines on leaflets but alone in tan-colored, necrotic streaks on petioles, on the varieties 'Merit' and 'Lincoln' at the Central Exp. Farm, Ottawa, Ont. Acervuli developed on plant tissue in a moist chamber. The curved conidia, averaging 23.4 x 3.2 μ, appear to fit C. truncatum (W.L.S.). This disease has not been previously reported to the Survey (D.W.Creelman).

ROOT INFECTION (Corynespora cassiicola) was again prevalent on roots of mature plants of all varieties at the Central Exp. Farm, Ottawa, Ont. in field plots in which soybeans had been grown in rotation with corn for several years (W.L.S.).

STEM CANKER (Diaporthe phaseolorum var. caulivora). Incidence was negligible in s.w. Ont. in 1964 (J.H.H.).

POD AND STEM BLIGHT (Diaporthe phaseolorum var. sojae) was present on almost 100% of the senescent stems in s.w. Ont. but caused no apparent yield reduction (J.H.H.). It was prevalent on early varieties at maturity at Ottawa, Ont. (W.L.S.).

DOWNY MILDEW (Peronospora manshurica). Heavy infections occurred in s.w. Ont. but caused no economic losses (J.H.H.). A 1-acre field of the variety 'Blackhawk' at Strathroy, Ont. had tr.-mod. foliar infection. Infection was mod. only in low-lying areas in the field and near bush (V.R.W., M.D.S.).

STEM AND ROOT ROT (Phytophthora megasperma var. sojae). Symptoms were neglibible on 'Harosoy' and completely absent on 'Harosoy 63' planted in the same fields in s.w. Ont. (J.H.H.).

LEAF SPOT (Septoria glycines) was present in epidemic proportions in fields in s.

w. Ont. but did not result in defoliation (J.H.H.). It was widespread and sev., especially on 'Merit' at Ottawa, Ont. Large areas of leaf were non-functional due to coalescing of numerous lesions. Infection was less sev. on 'Lincoln' (W.L.S.).

SUNFLOWER

DOWNY MILDEW (Plasmopara halstedii) was tr. in 1 field of 'Peredovik' in s. Alta. (J.S.H.). It affected a few to 2% of the plants in 14 fields and 10-15% of the plants in 4 fields out of 40 inspected in Man. None was seen in Sask. (J.A.H., E.D.P.). It is found regularly in plots at La Pocatière, Que. (W.E.S.).

RUST (Puccinia helianthi). Traces were seen in 3 fields in s. Alta. (J.S.H.). No rust was found in 7 fields of 'Admiral' and 'Advent' in Man. but it occurred in all 33 fields of 'Peredovik' and 'Mennonite' inspected. Fifty-100% of the plants were lightly infected in 10 fields and the other 23 showed trace infection. Losses were negligible. Rust was tr. in a few fields in Sask. (J.A.H., E.D.P.). Rust was found in plantings at Vankleek Hill and Kemptville in e. Ont. Preliminary tests indicate the presence, in this region, of races other than the common race 1 encountered in most farm fields in Man. Rust in e. Ont. was present even in areas where sunflowers had not been grown before. It is possible that some wild species of Helianthus may occur in the region and serve as a source of inoculum (W.E.S.).

HEAD ROT (Rhizopus sp.) affected 2-3% of the plants in 1 field in Sask. (J.A.H., E.D.P.).

SCLEROTINIA WILT (Sclerotinia minor Jagger) was found in 1 field in e. Ont. The reporter has collected this species on sunflower in South America but not previously in Canada (W.E.S.).

SCLEROTINIA WILT (S. sclerotiorum) caused little damage in Man. where it was rated tr.-2% in 17/40 fields surveyed. It was tr. in 50% of the fields visited in Sask. (J.A.H., E.D.P.). Some infected plants were found in e. Ont. (W.E.S.).

LEAF SPOT (Septoria helianthi) affected 50-70% of the plants in 22/40 fields seen in Man.; in 7 of these it was mod.-sev. on 100% of the plants. Yields in these 7 fields were undoubtedly affected (J.A.H., E.D.P.).

LEAF MOTTLE (Verticillium albo-atrum) caused less damage in 1964 than in the 3 previous years. Symptoms in 1964 were generally mild. Observations indicate that 'Peredovik' possesses more resistance than 'Mennonite' or the hybrid varieties. No leaf mottle was observed in Sask. (J.A.H., E.D.P.).

CHEMICAL INJURY caused by 2,4-D was 3-tr. 1-sl. 1-mod. in s. Alta. (J.S.H.). All fields examined in Sask. showed injury suggestive of drift of 2,4-D or a similar herbicide (J.A.H., E.D.P.).

FROST INJURY. Two days of below-freezing temperatures in mid.-Sept. caused yield reductions in Man. from an estimated 900-1000 lb./acre to 600 lb./acre. Oil content was also reduced (J.A.H., E.D.P.).

PREMATURITY BLIGHT (cause unknown) was sl. in 1 field in s. Alta (J.S.H.).

C. Root Crops

SUGAR BEET

LEAF SPOT (Ramularia beticola) was mod. but general in several acres of young plants grown for seed on Westham Island in the Lower Fraser Delta, B.C. (H.N.W.T.).

BORON DEFICIENCY. Slight-sev. injury was seen in several sugar beet fields in the St. Jean, Que. area (R.C.).

D. Miscellaneous Crops

FIELD CORN

NORTHERN LEAF BLIGHT (Bipolaris turcica (Pass.) Shoem.). A trace infection was recorded on an inbred line of hybrid corn at Morden, Man. (J.A.H.). All previous reports of this organism in Canada have been from Ont. (D.W.Creelman). This disease, which reached epidemic proportions in Essex and Kent Counties, Ont. in 1961 and 1962 has been virtually absent in 1963 and 1964. The decline may have been due to the absence of prolonged

wet periods in Aug. in the last 2 years and to increased planting of blight-resistant hybrids (R.E.W.). (The organism has been previously reported in the Survey under the binomial B. turcicum. However, in making the new combination, Shoemaker, Canad. J. Bot. 37: 879-887. 1959, did not change the specific epithet to agree gramatically with the new generic name. Bipolaris turcica (Pass.) Shoem. is the correct name (D.W. Creelman).

MOLD (Cladosporium cladosporioides). Ears in some cribs in s.w. Ont. were completely overgrown and blackened by C. cladosporioides. Affected ears had a high moisture content, probably well over 30%. The infection resulted in pockets of moldy and heating corn in the center of the crib (R.E.W.).

SEED ROT (Fusarium graminearum). Seed rots and damping-off, though largely controlled by seed treatment, were found in a few instances in s.w. Ont. The Harrow selection 632-335 was heavily infested with F. graminearum (R.E.W.).

STALK ROT (Fusarium graminearum) was serious and infection approached 100% in some s.w. Ont. fields planted to susceptible hybrids. In 60-90% of the cases stalk rot could be traced to previously rotted roots. Five-20% of the infections were associated with above-ground nodes and 2-10% with corn borer tunnels. Stalk breakage was further aggravated by heavy frosts during the first week of Oct. (R.E.W.).

EAR AND KERNEL ROTS (Fusarium moniliforme) were more prevalent than in previous years in s.w. Ont. and much of the kernel rot was associated with bird damage. There was also considerable superficial growth of F. moniliforme on cobs of late-maturing varieties (R.E.W.).

RUST (Puccinia sorghi) was rarely found in field corn in Ont. and was not sev. in any field (R.E.W.)

SMUT (Ustilago maydis) was found in most fields visited in s.w. Ont. It was serious in only one field, nr. Tilbury, where about half the plants had smut galls on the lower stalks (R.E.W.).

LEAF SPOT (cause undetermined). A new leaf spot, characterized by circular or oblong spots with brown margins and gray, almost transparent centers appeared in a few fields in s.w. Ont. late in the growing season. Its cause is not yet known (R.E.W.).

RED STRIPE (cause unknown). A longitudinal red striping of kernels, not previously seen in the area, was found in all fields visited in Essex and Kent Counties, Ont. The kernels nearest the tip of the ear were the most intensely colored (R.E.W.). Dr. A.J.Ullstrup, plant pathologist at Purdue University, Lafayette, Indiana reports in a personal communication that "red stripe" has been reported from s.e. Michigan, n.e. Indiana, Ohio, Idaho, Maryland and Wisconsin. It first came to the attention of the seed trade in 1963. He further states that, to his knowledge, the cause or the conditions influencing its appearance are as yet unknown (D.W.Creelman).

SILK CUT (?genetic). This condition, characterized by a transverse rupture of the pericarp appeared in many samples submitted from s.w. Ont. to the Seeds Research Laboratory, Plant Products Division, C.D.A., Ottawa. In a high proportion of the affected kernels, Fusarium moniliforme was growing from the rupture. (T.F.C., V.R.W.). According to Dr. Ullstrup (see above) certain inbred lines of corn show a tendancy to develop "silk cut" in some years, but not every year. Some of them tend to transmit the weakness to their hybrid progenies. The condition is illustrated in Dr. Ullstrup's 1961 bulletin on corn diseases (U.S.D.A. Handbook 199, p. 14, plate 3) (D.W.Creelman).

DROUGHT was the most important factor in losses in field corn in s.w. Ont. in 1964 (R.E.W.).

FROST. Early frosts in s.w. Ont. arrested maturity and contributed to stalk breakage (R.E.W.). Reports from the Seeds Research Laboratory, Ottawa, suggest that frost injury may have also adversely affected germination (D.W.Creelman).

SUNSCALD was widespread in Essex and Kent Counties in July, appearing on flag leaves shortly before tassel break (R.E.W.).

WIND DAMAGE. Severe damage to seedlings was caused by high winds in s.w. Ont. in 1964 (R.E.W.).

TOBACCO

LEAF SPOTS (Alternaria spp.), combined with spots of unknown origin, were mod.-sev. in s.w. Ont. in 1964. They caused some reduction in grade (Z.A.P., L.W.K.).

DAMPING-OFF, BED ROT (Pythium spp., Rhizoctonia solani) was the most common seedbed disease in s.w. Ont. in 1964. It occurred in patches in most greenhouses and overall losses were estimated at 5%. A measure of control was obtained by the use of soil drenches (Z.A.P., L.W.K.).

SORE SHIN (Rhizoctonia solani, Pythium spp.) was sev. in s.w. Ont. fields immediately after transplanting (Z.A.P., L.W.K.).

BLACK ROOT ROT (Thielaviopsis basicola) caused some damage in improperly sterilized seedbeds in s.w. Ont. Field losses were extremely heavy in 1964, in some instances as high as 30%. Weather conditions in the area generally favored disease development (Z.A.P., L.W.K.).

TOBACCO ETCH (tobacco etch virus) developed late in the season in s.w. Ont., was comparatively light in affected fields, and damage was sl. (C.D.McK.).

OTHER VIRUS DISEASES observed on flue-cured and burley tobacco in s.w. Ont. were: tobacco mosaic, cucumber mosaic, streak, ring spot, alfalfa mosaic, curly top, potato Y and mottle. Losses from these diseases were insignificant (Z.A.P., L.W.K.).

WEATHER FLECK (air pollution) became quite sev. in s.w. Ont. toward the end of the season and caused mod. losses (Z.A.P., L.W.K.).

YELLOW PATCH (excess nutrients) caused only negligible losses in s.w. Ont. in 1964 (Z.A.P., L.W.K.).

E. Cultivated and Other Grasses

AGROPYRON-Wheatgrass

TAR SPOT (Phyllachora graminis). A sev. infection was observed on A. repens at Giffard, Que. (D.L.).

STEM RUST (Puccinia graminis) was sev. on A. repens at St. Perrre, Ile Orleans, Que. (D.L., M.F.) and on the same host at Kentville, N.S. (C.O.G.).

LEAF RUST (Puccinia recondita) was sev. on A. repens and heavily parasitized by Darluca filum at Ste. Famille, Ile Orleans, Que. Leaves were bleached while the stems were still green (D.L.).

STEM SMUT (Ustilago spegazzinii) occurred commonly at Trout Creek Point, B.C. (G.E.W.).

AGROPYRON MOSAIC (agropyron mosaic virus) was recovered from A. repens from Redvers, Sask. (C.C.G.) and it was observed in many areas of w. Ont. (J.T.S.).

BRITTLE DWARF (aphid injury). A few plants of intermediate wheatgrass, A. intermedium, were affected at Saskatoon, Sask. (B.J.S.).

BROMUS-Brome

ERGOT (Claviceps purpurea). About 5% of the clones of B. inermis at Regina, Sask. bore numerous sclerotia while the remainder were largely free of infection (B.J.S.).

LEAF BLOTCH (Drechslera bromi). A severely infected specimen was received from Halfway River Valley, B.C., 17 miles w. of Mile 143, Alaska Highway. It was reported to be serious in a 50-square mile area. Trace amounts only were seen in plots at Lacombe, Alta. (B.B.).

LEAF SPOT (Selenophoma bromigena) was prevalent, but of minor importance, in plots at Lacombe, Alta. throughout the season (B.B.). Slight infections occurred at Regina and traces at Saskatoon, Sask. (B.J.S.).

DACTYLIS-Orchard grass

ERGOT (Claviceps purpurea) was heavy on D. glomerata on the University Campus, Point Grey, B.C. (H.N.W.T.) and was sl. on the same host at St. Laurent, Ile Orleans, Que. (D.L.).

ANTHRACNOSE (Colletotrichum graminicola). Infection was sev. on D. glomerata at St. Pierre, Ile Orleans, Que (D.L.).

RUST (Uromyces dactylidis). Moderate infections were seen on D. glomerata at St. Laurent, Ile Orleans, Que. (D.L.).

ELYMUS-Wild rye

LEAF SPOT (Alternaria tenuis) was mod. on E. junceus at the Exp. Farm, Swift Current, Sask. (J.B.L.).

ROOT ROT (Fusarium culmorum) was mod. in a field at Swift Current, Sask. (J.B.L.).

LEAF SPOT (Septoria ?elymi). Infection was mod. on E. junceus in a plot at Regina, Sask. (B.J.S.).

LOLIUM-Ryegrass

RYEGRASS MOSAIC (ryegrass mosaic virus) was found on L. perenne on roadsides nr. Ladner, B.C. (J.T.S.). This is the first report of this disease to the Survey (D.W.C.).

PHLEUM-Timothy

EYE SPOT (Heterosporium phlei) was mod.-sev. on P. pratense in the St. John's area, Nfld. (O.A.O.).

STEM RUST (Puccinia graminis). Slight-mod. infections were seen at St. Pierre and a mod. infection at St. Laurent, Ile Orleans, Que. (D.L., M.F.).

STRIPE SMUT (Ustilago striiformis). Infection was tr. on P. pratense at St. Pierre, Ile Orleans, Que. (D.L.).

SMUT CONTAMINATION. A sample of timothy seed from the Plant Products Seed Laboratory at Saskatoon, Sask. was found to be contaminated with spores of Ustilago reticulata, probably from Polygonum scabrum according to D.B.O.Savile (B.J.S.).

POA-Bluegrass

STEM RUST (Puccinia graminis) was extremely heavy in a lawn of pure Merion blue grass at Ottawa, Ont. (A.E.S.).

LAWNS AND TURF

SNOW MOLD (low-temperature basidiomycete) was fairly extensive at Drumheller (A.W.H., D.S.) and was rated 2-tr. 6-sl. 2-mod. 14-sev. in the Red Deer and Edmonton areas, Alta. (J.B.L.).

MELTING-OUT (Bipolaris sorokiniana) occurred at Vulcan, Alta. (A.W.H., D.S.).

ANTHRACNOSE (Colletotrichum graminicola) caused fairly extensive damage in one lawn at Edmonton, Alta. (A.W.H., D.S.).

LEAF SPOT (Drechslera poae (Baudys) Shoem. = D. vagans (Drechs.) Shoem.) was sev. in a lawn at Lethbridge, Alta. (J.B.L.).

POWDERY MILDEW (Erysiphe graminis) was fairly extensive at Mannville, Alta. and was also conspicuous in lawns at Edmonton (A.W.H., D.S.).

FAIRY RING (Marasmius oreades) was sev. in 7 lawns at Lethbridge, Alta. (J.B.L.) and was common but not damaging in lawns at Saskatoon, Sask. (B.J.S.).

SLIME MOLD (Physarum cinereum). Specimens were received from a lawn at Nicholsville, Kings Co., N.S. (R.G.R.).

DISEASES OF VEGETABLE CROPS

ASPARAGUS

DIE-BACK (Fusarium sp.) was sev. in a large, old planting nr. Milton, Ont. that has shown a decline for several years. The disease was patchy in the field with 5-10% of the plants showing symptoms. Fusarium sp. was isolated from the crowns of several affected plants (J.F.B.).

BEAN

GRAY MOLD (Botrytis cinerea). Infection on pole beans in the Lower Fraser Valley was generally light, about 3-5% kill. Two extremely wet fields, however, were reported to have suffered 50% damage (H.N.W.T.). All 7 fields visited in the Florenceville, N.B. area were affected with the average damage estimated at 4% (S.R.C.). Mod. infections were common in home gardens in P.E.I. (J.E.C.).

ANTHRACNOSE (Colletotrichum lindemuthianum). A large field of green beans nr. Woodbridge, Ont. was 90% infected and loss was sev. Earlier plantings were free of the disease (J.F.B.). It was tr.-sl. in e. Ont. (R.V.C.). It was tr. in 7/7 fields observed at Florenceville, N.B. (S.R.C.). Fields of 'Jacob's Cattle' beans at Morristown and Grafton, N.S. had 75-100% infection with consequent sev. losses. Tops were dead by mid.-July (K.A.H.). It was widespread in home gardens in P.E.I. (J.E.C.).

HALO BLIGHT (Pseudomonas phaseolicola) is not common in coastal B.C. It was found in 1964 in 1 field in the Matsqui region (H.N.W.T.). Infection was mod. in 1/4 fields of garden beans nr. Bow Island and sl. in 2/2 field bean plantings nr. Burdett, Alta. (F.R.H., J.S.H.). Some centers of slight infection were observed in 2 plantings of 'Michelite' field beans in the Ste. Martine region, Que. (E.L.). Infection was sev. on 50% of the plants in a field of 'Jacob's Cattle' beans also affected by anthracnose at Morristown, N.S. The field was ploughed under to protect an adjacent field of canning beans (K.A.H.).

STEM CANKER (Rhizoctonia solani) affected 2% of the plants of 'Golden Wax' in a home planting at Ottawa, Ont. (D.W.C.)

WILT (Sclerotinia sclerotiorum). Infection of mature pole beans in the Lower Fraser Valley, B.C. was generally light. However, one field at Queensborough on Lulu Island and one on Barnston Island had 100% and 95% kill respectively. Infection was greater on young plants before climbing (H.N.W.T.). It was seen on the variety 'Saginaw' in 1/27 field bean plantings surveyed in s.w. Ont. (M.D.S., V.R.W.). Wilt was tr. in 7/7 fields visited at Florenceville, N.B. (S.R.C.).

RUST (Uromyces phaseoli var. phaseoli) was mod.-sev. in pole bean fields in B.C. where the poles or posts had not been treated. Where they had been dipped in formaldehyde

infection was tr.-sl. late in the season (H.N.W.T.).

COMMON BLIGHT (Xanthomonas phaseoli). An infected specimen of snap beans was received from Woodlands, Man. (W.A.F.H.). It was found in 1 field of 'Sanilac' and 1 of 'Saginaw' out of 27 fields inspected in s.w. Ont. (M.D.S., V.R.W.). It was present in 2,700 acres of canning beans in the Florenceville, N.B. region but only in limited areas did it cause extreme damage. Some pods showed lesions but infection was late so that losses were minimized (S.R.C.).

FUSCOUS BLIGHT (Xanthomonas phaseoli var. fuscans) was observed in only 1/27 fields surveyed in s.w. Ont. (M.D.S., V.R.W.).

MOSAIC (bean mosaic virus) affected a few plants of 'Golden Wax' in a home garden at Ottawa, Ont. (D.W.C.).

YELLOW MOSAIC (bean yellow mosaic virus). Ten per cent of the plants of a green-podded variety were affected in a home planting at Ottawa, Ont. (D.W.C.)

CHEMICAL INJURY (residual herbicide effect). Bush beans, planted on the site of corn herbicide plots (Tordon) at Ladner, B.C., were severely affected. Some seedlings had emerged by 22 July but did not grow beyond the cotyledon stage. On these few plants the taproots bore many flattened, sac-like, deformed laterals just below the soil surface. Plants immediately adjacent to the 1963 Tordon plots showed a severe downward cupping of the leaflets and some chlorosis (H.N.W.T.).

CHEMICAL INJURY (herbicide drift). Damage from 2,4-D drift was mod.-sev. in some home gardens at Ottawa, Ont. (D.W.C.). Drift from an aerial application of 2,4-5-T completely arrested growth in 11 fields and caused an estimated 80% damage at Oromocto, N.B. (S.R.C.).

DROWNING. Many inadequately-drained bean fields in s.w. Ont. suffered from retarded growth, deterioration of leaf tissues and defoliation (R.N.W.).

FROST INJURY was sev. on several acres of early-planted beans at Ste. Clotilde, Que. (R.C.).

SUNSCALD was general in all 27 fields surveyed in s.w. Ont. in 1964 (M.D.S., V.R.W.). Hot, sunny weather following dull conditions caused damage to young foliage in a market garden at York, P.E.I. (J.E.C.).

BEET

SUGAR BEET NEMATODE (Heterodera schachtii) caused a 40% loss in a 4-acre field of table beets at Woodbridge, Ont. The normal yield is 2250 bunches per acre. Second stage larvae of the nematode were recovered at the rate of 4100 per pound of soil (J.L.T.). This represents the first report of H. schachtii on table beets in Canada (D.W.Creelman).

SCAB (Streptomyces scabies) was sl.-mod. in a 15-acre field at Sherrington, Que. (R.C.).

BORON DEFICIENCY caused 20% loss in a planting at Oromocto, N.B. (S.R.C.).

BROAD BEAN

WILT (Fusarium oxysporum f. fabae) was observed at Ste. Foy and specimens were received from L'Ascension and Levis, Que. (D.L.).

BROCCOLI

CLUB ROOT (Plasmodiophora brassicae). About 80% of the transplants in a field at Florenceville, N.B. were affected. Little death of plants occurred but yield was reduced (S.R.C.).

BORON DEFICIENCY caused 10% loss in a field at Florenceville, N.B. (S.R.C.).

BRUSSELS SPROUTS

CLUB ROOT (Plasmodiophora brassicae) was observed in 7/8 fields in the Rogersville area, N.B. Five per cent of the plants died in the fields and yields were reduced (S.R.C.).

CHEMICAL INJURY (2,4-D). About half of a 6-acre field at Mt. Buchanan, P.E.I. was severely damaged when an improperly washed sprayer was used. Loss of plants in the affected portion of the field was 50% (J.E.C.).

WHIPTAIL (molybdenum deficiency) was general in 8 fields at Rogersville, N.B. Yield reductions were experienced (S.R.C.).

INTERNAL BREAKDOWN (physiological) caused serious losses in commercial plantings of brussels sprouts in the Fraser Valley, B.C. (A.R.M.).

CABBAGE

NEMATODES (Heterodera schachtii) affected cabbage at Burlington, Ont. The sugar beet nematode has been spread in an area immediately n. of Hamilton to Toronto as a result of growing rhubarb which is also a host. Second stage larvae were recovered at the rate of 234 per lb. of soil (J.L.T.).

CLUB ROOT (Plasmodiophora brassicae). A specimen was received from Ste. Rose,

Dorchester Co., Que. (D.L.). A field at Oromocto, N.B. suffered about 40% damage (S.R.C.). Reports from Bonavista to Ferryland indicate that club root caused considerable losses in e. Nfld. in 1964. The growing season was cool and very wet (O.A.O.).

BLACK ROT (Xanthomonas campestris). Infection was 20% in a canning crop nr. Chatham, Ont. The transplants were imported from Georgia, U.S.A. and the disease was probably introduced with them (C.D.McK). Two fields at Ridgetown, Ont. suffered 20 and 40% losses, respectively. The plants, like those above, were from the U.S.A. (H.C.P.).

BORON DEFICIENCY caused a trace of damage in 5/7 fields visited at Oromocto, N.B. (S.R.C.).

CARROT

LEAF BLIGHT (Alternaria dauci). Infection was general over 10 acres at St. Sulpice, Que. Little damage was evident at the time of the observation in July but severe damage could be expected by the end of the season (E.L.). Infection was light at Ste. Clotilde, Que. in 1964 (R.C.) and was about 50% in a 10-acre field at Berwick, N.S. in early Aug. (C.O.G.)

STORAGE ROTS (Botrytis cinerea, Erwinia carotovora, Sclerotinia sclerotiorum) caused about 7% loss in the crop of about 90 acres at Oromocto, N.B. Continuous cropping to carrots by the grower seems responsible (S.R.C.).

LEAF BLIGHT (Cercospora carotae) was very light in intensity and caused no visible damage at Ste. Clotilde, Que (R.C.).

BLACK MOLD (Chalaropsis thielavioides) occurred on washed roots in a Marketing Board warehouse in the Lower Fraser Valley, B.C. It was reported on carrots from the same warehouse in 1961 (H.N.W.T.).

?CRATER ROT (?Rhizoctonia carotae). A field of about 5 acres at St. Hyacinthe, Que. was 100% infected in Sept. with a dense white mold at the bases of the leaf stalks. According to the growers this disease causes a serious problem in storage (E.L.).

SCLEROTINIA ROT (S. sclerotiorum). Specimens were received from Colinton, Edmonton, Fort Saskatchewan and Nanton, Alta. (A.W.H., D.S.).

BLACK ROT (Stemphylium radicinum). Infection was tr. in stored carrots at Grand Pre, N.S. (C.O.G.).

ASTER YELLOWS (aster yellows virus). A high incidence was reported in a field at Rosemary, Alta. (A.W.H., D.S.). There was a 14% infection in plots at the Research Laboratory, St. Catharines, Ont. but the disease was of minor importance in the district (T.R.D.). Incidence was extremely low at St. Clotilde (R.C.) and was mod. at Ste. Foy, Que. (D.L.). It was widespread in N.B. All fields visited in the Oromocto and Gagetown districts showed infections ranging from 7-40% (S.R.C.). Losses in some districts of P.E.I. were slightly greater than in 1963 and ranged, in untreated fields, from 20-46% (L.S.T.).

CHEMICAL INJURY. Drift from an aerial application of 2-4-5-T caused sev. stunting of late-planted carrots at Oromocto, N.B. Some 20% of the roots also developed wart-like growths. Early-planted crops were not affected (S.R.C.).

WIND DAMAGE. Strong, dry winds caused sl.-mod. damage in 20 acres of carrots at Sherrington, Que. (R.C.).

CAULIFLOWER

BLACK ROT (Xanthomonas campestris) became a serious problem in a few crops on the muck soil of the Bradford and Holland Marshes, Ont. and on the surrounding high land in Sept. and Oct. (C.C.F.).

BORON DEFICIENCY caused about 3% losses in 9/11 fields examined at Oromocto, N.B. It resulted in a breakdown of heads permitting soft rot organisms to invade (S.R.C.).

WHIPTAIL (molybdenum deficiency) affected 90% of the plants in a field at Oromocto, N.B. (S.R.C.).

CELERY

SOFT ROT (Erwinia carotovora) caused fairly extensive damage at Brooks, Alta. (A.W.H., D.S.).

BACTERIAL BLIGHT (Pseudomonas apii) occurred as a slight infection on most plants of the variety 'Utah 1611' in a field nr. Sherrington, Que. (R.C.).

ASTER YELLOWS (aster yellows virus). Infection was tr. in a large commercial field nr. St. Catharines, Ont. (T.R.D.). Its incidence was extremely low at Ste. Clotilde, Que. (R.C.).

CUCUMBER

LEAF BLIGHT (Alternaria cucumerina) affected 75% of the foliage in a greenhouse at Grand Pre (C.O.G.) and the variety 'Marketer' was 40% infected in a field at Habitant, N.S. (C.L.L.). 'Highmoor' was 100% infected in a late planting at York, P.E.I. (J.E.C.).

GRAY MOLD (Botrytis cinerea). Infection was mod. on stems and blossoms of 'Burpee Hybrid' in greenhouses in Essex Co., Ont. Most of the damage seen resulted from blossom infection. Dyrene seemed to be the best fungicide for control (J.R.R.).

SCAB (Cladosporium cucumerinum) was again reported on fruits of pickling cucumbers on Lulu Island, B.C. (H.N.W.T.). Infections in experimental plots at L'Assomption, Que. did not appear until 31 Aug. as compared with 19 Aug. in 1963. Only by 11-19 Sept. did the disease become general in all plots. However, there were some reasonably heavy infections in growers' fields by mid.-Aug. In a test of varieties for scab resistance at L'Assomption the following mean percentages of scab were recorded: 'Fletcher', 0.8; 'Windermoor', 5.4; 'Polaris', 14.4; 'Ashley', 22.5; 'Palomar', 25.2; 'Marketer', 28.8; 'Saticoy', 45.6 (E.L.). Scab was found in 18/24 fields examined in N.B. The average rate of infection was 40%. Cool Aug. weather was ideal for spread and many growers took serious losses. Resistant varieties stood up well (S.R.C.). Night temperatures above 58°F were the exception rather than the rule in the Annapolis Valley, N.S. in the summer of 1964 and scab was widespread and severe. Plants in several fields were severely affected before they began to fruit. Fungicidal sprays did not control the disease and the estimated average loss was 50% of the fruits (C.O.G.).

BACTERIAL WILT (Erwinia tracheiphila) was sev. in 1 field at Ste. Dorothée, Laval Co., Que. where the grower had failed to apply an insecticide for the control of striped cucumber beetle (E.L.).

POWDERY MILDEW (Erysiphe cichoracearum). Infection was mod. in both greenhouses and fields in Essex Co., Ont. Although not as serious as in some years it still presented a problem (J.R.R.). It was heavy in a home garden at Ottawa, Ont. (D.W.C.).

ANGULAR LEAF SPOT (Pseudomonas lachrymans). A specimen was received from Swift Current, Sask. (R.J.L.). Moderate infections occurred in all 10 fields of pickling cucumbers surveyed in the Winnipeg, Man. area by Prof. J.D.Campbell (W.A.F.H.). Specimens were received from Lotbiniere and Levis, Que. (D.L.). Infection averaged 60% in 22/24 fields surveyed in N.B. (S.R.C.).

SCLEROTINIA ROT (S. sclerotiorum) caused sev. damage to about 75% of the plants in a commercial greenhouse at Summerland, B.C. Affected plants were killed soon after they came into production (G.E.W.).

WILT (Verticillium albo-atrum) was present in most fields of both pickling and slicing cucumbers in the Annapolis Valley, N.S. Infection was generally estimated to be in the range of 2% although it reached 10% in a field at Habitant (C.O.G., C.L.L.).

MOSAIC (cucumber mosaic virus) was seen in 11/24 fields in the Oromocto district, N.B. Infection averaged 20% (S.R.C.).

DILL

BLIGHT (Phoma anethi) occurred on dill at Redvers, Sask. The identity of the organism was confirmed by Dr. D.B.O.Savile (R.D.T.). The only previous report, to the Survey, of the disease in Canada is from Streetsville, Ont (C.P.D.S. 23: 50. 1943) (D.W.Creelman).

EGGPLANT

BLIGHT (Phomopsis vexans) was sev., late in the season, in a 1-acre field at the Research Station, Harrow, Ont. (C.D.McK.).

WILT (Verticillium dahliae) occurred in most plantings in the Kelowna, Vernon and Kamloops districts of B.C. (G.E.W.). All plants were infected and yield reduction was estimated at 20% in a small planting nr. Hamilton, Ont. (J.F.B.). Infection was tr. at the Research Station, Kentville, N.S. (C.O.G.).

LETTUCE

GRAY MOLD (Botrytis cinerea) caused 10% loss in a field at Oromocto, N.B. (S.R.C.).

ROOT-KNOT NEMATODE (Meloidogyne sp.). One flat of lettuce transplanted in a garden at Kentville, N.S. was 100% infected and the plants were a complete loss. Evidence points to the presence of the nematodes surviving in the garden soil since the commercial grower from whom the flat was obtained had no infection in his fields (K.A.H.).

BOTTOM ROT (Rhizoctonia solani). Three/7 fields at Oromocto, N.B. were affected. The average damage was 5%. In one of the fields it caused a soft rot affecting 30% of the plants (S.R.C.).

DROP (Sclerotinia sclerotiorum) was tr. in a large field at Grand Pre, N.S. in June (K.A.H.).

ASTER YELLOWS (aster yellows virus). Incidence in an unsprayed experimental plot nr. Winnipeg, Man. was 65% (C.C.G.). It was tr. in a large commercial planting nr. St. Catharines, Ont. (T.R.D.) and in the Ste. Clotilde region, Que. (R.C.). Infections ranged from tr.-7% in 3/7 fields

visited at Oromocto, N.B. (S.R.C.). Aster yellows in head lettuce was not as sev. in P.E.I. as in 1963. Losses, however, in unsprayed fields ranged from 40-60% (L.S.T., G.W.A.).

ONION

NECK ROT (Botrytis allii) had begun to appear in Nov. on stored onions grown in the Okanagan Valley, B.C. (G.E.W.). There was a trace in onions at the Research Station, Kentville, N.S. (C.O.G.) and it caused about 20% loss in harvested onions from a home garden at Charlottetown, P.E.I. (J.E.C.).

LEAF BLIGHT (Botrytis cinerea) was widespread on the Thedford Marsh, Ont. following hail damage in late June. A thorough and tightly-scheduled spray program prevented major losses (L.F.M.). A light, general infection occurred in late Aug. and early Sept. at Kentville, N.S. Sclerotia were present on necks and outer scales of harvested onions (K.A.H.).

GRAY MOLD ROT (Botrytis cinerea) caused a 25% loss at Ste. Foy, Que. Infection began in the field but developed mainly between harvest and storage (D.L.).

SMUDGE (Colletotrichum circinans) affected 50-60% of the plants in low areas in a planting of several acres nr. St. Catharines, Ont. (J.F.B.).

STEM AND BULB NEMATODE (Ditylenchus dipsaci). There were isolated outbreaks on several farms on the Leamington Marsh, Ont., probably accentuated by above-normal rainfall. Infestation was sev. in spots. The nematode was identified by Dr. R.M. Sayre, Research Station, Harrow (J.R.C.).

BULB ROT (Fusarium oxysporum f. cepae) occurred in nearly all commercial onion fields in the Okanagan Valley, B.C. (G.E.W.). Incidence was light in the Thedford Marsh, Ont. (L.F.M.).

PINK ROOT (Fusarium solani) was general in onion fields in the Okanagan Valley, B.C. (G.E.W.).

DOWNY MILDEW (Peronospora destructor). Infection was generally sev. in varietal plots at Cloverdale, B.C. by mid.-Aug. (H.N.W.T.). It was general in the Kelowna, B.C. area following above-normal summer rains. Tops of unsprayed or poorly-sprayed plants were killed but proper spraying kept it in check in other fields. It developed too late in the season to significantly affect bulb size (G.E.W.).

PINK ROOT (Pyrenochaeta terrestris) was widely distributed in commercial onion fields in the Okanagan Valley, B.C. (G.E.W.).

WHITE ROT (Sclerotium cepivorum) was found on 17 farms in the Okanagan Valley, B.C. at Oliver, Kelowna and Vernon. With one exception, the disease occurred on fall-planted, Spanish type onions that had been imported in the spring from Walla Walla, Wash., U.S.A. where the disease has been causing trouble for several years. In the excepted field, the disease occurred in a portion of a field of spring-planted onions where fall-planted onion plants, also imported from Walla Walla, had been grown in 1963 (J.A.M., G.E.W.). This is the first report of white rot on onions from B.C. although it was reported on garlic from Steveson, B.C. in 1952 (C.P.D.S. Ann. Rep't. 31: 50). Isolated outbreaks on onion have been reported from Man. (C.P.D.S. Ann. Rep't. 39: 50. 1960) and Que.(C.P.D.S. 43: 90. 1963) (D.W.Creelman).

SMUT (Urocystis magica Pass.= U. cepulae Frost) appeared on the foliage of bunching onions in a market garden at West Point Grey, B.C. It has not been previously encountered in the coastal areas of the province (H.N.W.T.). It was widespread in nearly all fields in the Kelowna, B.C. area with rates of infection varying from sl.-sev. (G.E.W.). It was not well controlled by treatments at the recommended rates on some seeding dates on the Holland and Bradford Marshes, Ont. Weather conditions after seeding seemed to influence the amount of smut (C.C.F.).

PARSNIP

CROWN ROT (Cylindrocarpon radicicola). Isolations from a tan-colored crown infection on roots from Aylesford, N.S. yielded only C. radicicola (C.O.G.).

SCLEROTINIA ROT (S. sclerotiorum) was observed at Colinton, Alta. (A.W.H., D.S.).

BLACK ROT (Stemphylium radicinum) caused extensive crown infections on parsnips grown on a peat bog at Aylesford, N.S. (C.O.G.). Neither S. radicinum nor C. radicicola (see above) have previously been reported to the Survey as pathogens of parsnip. (D.W.Creelman).

STORAGE ROT (bacteria and yeasts) occurred on sample lots of parsnips stored in plastic bags at Brooks, Alta. (A.W.H., D.S.).

PEA

FOOT ROT (Ascochyta pinodella). Infections of 10-20% occurred at Edmonton and Westlock and of 50% at Ponoka and Strathmore, Alta. (A.W.H., D.S.).

GRAY MOLD (Botrytis cinerea). Practically all pea fields in Kings Co., N.S. developed a rotting of the lower foliage after 2 weeks of showery weather in July (K.A.H.).

POWDERY MILDEW (Erysiphe polygoni) was sev. at Ponoka, Alta. (A.W.H., D.S.). It was the most important pea disease in the Ottawa, Ont. area. All fields examined had sl.-mod. infections which intensified as the crop matured. The variety 'Arthur' seemed more susceptible than 'Century' or 'Chancellor' (V.R.W.). It was widespread in home gardens in N.B. (S.R.C.).

ROOT ROT (Fusarium oxysporum f. pisi) affected 15% of the plants in a small planting at Kentville, N.S. (K.A.H.).

MYCOSPHAERELLA BLIGHT (M. pinodes) affected a few plants of 'Arthur', 'Chancellor' and 'Century' in the Ottawa, Ont. district (V.R.W.). It caused complete destruction of a 20-acre field at Florenceville, N.B. (S.R.C.).

SEEDLING BLIGHT. (Pythium spp.) caused practically no damage from seedling blight in 8 fields of canning peas examined in s. Alta. in early June. Cool weather and widespread use of captan as a seed protectant were probably the limiting factors (F.R.H.).

ROOT ROT (Pythium spp., Fusarium spp., Rhizoctonia spp.) was rated 4-tr. 1-sl. 3-mod./8 fields surveyed in s. Alta. in early June. Cool weather during the remainder of the season checked further development and all 8 fields yielded well (F.R.H.). It caused 50% damage in a field at Fredericton, N.B. (S.R.C.).

RUST (Uromyces fabae). Infection was sl. on a few plants of 'Arthur' in 1 field in the Ottawa, Ont. district (V.R.W.).

ENATION MOSAIC (pea enation mosaic virus) was seen on a few plants of 'Chancellor' and 'Century' in the Ottawa, Ont. district (V.R.W.).

MOSAIC (pea mosaic virus) was observed on 2 plants of 'Arthur' in experimental plots at Ottawa, Ont. (V.R.W.).

STREAK (virus) was tr. in a field of 'Arthur' in the Ottawa, Ont. district (V.R.W.).

PEPPER

STEM CANKER (Botrytis cinerea) affected a few plants at Sheffield Mills, N.S. (C.O.G.).

WILT (Verticillium dahliae) affected at least a few plants in most commercial pepper fields at Kelowna and Vernon, B.C. All varieties were affected (G.E.W.). Five/9 fields surveyed in Carleton, Peel, Norfolk and Essex Counties, Ont. were infected. Estimated rates of infection ranged from 3% in Essex and Norfolk to 6% in Peel (A.T.B.).

BACTERIAL SPOT (Xanthomonas vesicatoria). Moderate infections were seen in starter houses in Essex Co., Ont. and resulted in slight losses. The disease was checked when the plants were transplanted to the field (J.R.R.). Trace infections were seen at Sheffield Mills, N.S. (C.O.G.).

CHEMICAL INJURY. Peppers following corn in a field where the herbicide Atrazine had been used were badly stunted. The estimated loss on the small acreage involved was 50% (J.R.R.). Drift from an aerial application of 2,4-5-T at Florenceville, N.B. caused damage ranging from tr.-100% in 12 pepper fields (S.R.C.).

POTATO

EARLY BLIGHT (Alternaria solani) occurred in all seed-producing areas in the Interior of B.C. (N.M.). It was widespread in c. Alta. (A.W.H., D.S.) and was rated sl.-mod. in 40 and sev. in 4 fields of early varieties in s. Alta. (R.P.S.); was prevalent in n. and n.e. Sask though less sev. than in 1963 (A.C.); and was sl.-mod. in many fields of early varieties in Man. and n.w. Ont. (D.J.P.). It was not serious in w. and s.w. Ont. (L.F.M., G.T.A.F.). Early blight was reported in 22% of the seed fields in Que., being most prevalent and showing a 100% increase over 1963 in the Chicoutimi and Lake St. John districts (G.E.). It was general in N.B. but caused little loss (S.R.C.) and sl. infections were seen in N.S. (C.O.G.).

GRAY MOLD (Botrytis cinerea) attacked foliage in scattered loci in 2 fields at Grand Falls, N.B. and caused some defoliation (S.R.C.).

BLACK DOT (Colletotrichum coccodes). Infection was mod. and damage slight on 'Green Mountain' at La Pocatière, Que. Dry weather in Sept. favored the development of symptoms on foliage as well as stems and tubers. The plants were killed at an earlier date than usual (H.G.).

BACTERIAL RING ROT (Corynebacterium sepedonicum). Incidence in seed fields in Canada decreased in 1964 although it remained the principal cause of rejection in Que. and N.B. It was not found in seed fields in N.S., Sask. and B.C. The decreased incidence was particularly marked in P.E.I. where there were only 7 positive cases diagnosed as compared with 22 in 1963 (D.S.MacL.). The remaining reports in this

paragraph refer primarily to table stock fields (D.W.C.). Ring rot was found on 5 farms in the Interior of B.C. but none was found at the coast (W.R.F.). In Alta. positive identification was made in 46 samples from Lethbridge, 16 from Edmonton, 11 from Brooks and 2 from Calgary (A.W.H., D.S.). Specimens were received from Yorkton and Montmarte, Sask. (R.J.L.). A sharp increase in the number of positive samples of diseased potatoes received from table and seed stock sources in 1964 suggests an increase in the incidence of ring rot in Man. (W.A.F.H.). There were 11 positive cases on the Bradford Marsh, Ont. (C.C.F.) and a specimen was received from Trinity Bay, Saguenay Co., Que. (D.L.).

SLIMY SOFT ROT (Erwinia aroideae) was prevalent on tubers of 'Norland' at harvest or shortly afterwards in a packing house at Vernon, B.C. (G.E.W.).

BLACK LEG (Erwinia atroseptica) was the principl cause of rejection of seed fields in 1964. The disease was undoubtedly favored by the cool, damp spring. Emergence in many areas was poor and, in some cases, was below 50% (D.S.MacL.). Black leg was fairly common in c. Alta. (A.W.H., D.S.). It was sl. in mid.-June in a field of early potatoes in Middlesex Co. (L.F.M.); ranged from 0.5-5% in seed fields in s.w. Ont. (G.T.A.F.) and a few seed fields of 'Sebago' were badly infected in the Guelph, Ont. district (J.W.G.). Black leg was the most commonly encountered disease in the 1964 seed crop in N.S. showing a definite increase over 1963 (R.C.L.). It was widespread in P.E.I. in the variety 'Sebago' with infection rates varying from tr.-10% (J.E.C.). Infections were widespread and mod.-sev. in e. Nfld. with most fields having 2-8% of the plants affected. Heavier infections of 15-20% were seen at Pleasantview in the Notre Dame Bay area and at St. John's. Treatment of seed with Semesan Bel in 1 field at Pleasantview reduced infection to 2% (O.A.O.).

SOFT ROT (Erwinia carotovora) developed on harvested tubers of 'Norland' at Vernon and Kelowna, B.C. The tubers had been washed at harvest; sacked, while still wet, and placed in temporary storage in the packing house. Economic losses were sustained (G.E.W.). Specimens, exhibiting a spotted, lenticel rot, were received from St. Pierre, Ile Orleans, Que. (D.L.).

DRY ROT (Fusarium spp.) was reported from Calgary and Sunnybrook, Alta. (A.W.H., D.S.). Specimens were received from Rockhaven and Kindersley, Sask. (R.J.L.) and at Guelph, Ont. during the winter and spring seasons. 'Sebago' seemed the most susceptible variety (L.V.B.). It was sl. on damaged tubers in a few bins in e. Ont. (G.E.B.F.) and was seen, mostly on 'Keswick', in a few bins in Que. (G.E.). F. sambucinum f. 6 caused mod. losses in 'Sebago' in storage at O'Leary, P.E.I. Only isolated cases were seen in the 1964 crop in P.E.I. (G.W.A.). Dry rot was sev. on 'Warba' at Brown's Arm in the Grand Falls area of Nfld. (O.A.O.).

SEED PIECE DECAY (Fusarium spp.) resulted in poor plant stands and up to 10-15% misses in some fields in the Thedford and Grand Bend Marshes, Ont. Replanting was necessary in some cases (L.F.M.). It was sev. in 'Sebago' and 'Kennebec' in Essex Co., Ont. causing losses in 2 fields of 50%. Potatoes planted in early May seemed more seriously affected than those planted earlier or later (J.R.R.).

SILVER SCURF (Helminthosporium atrovirens). There were a few infections on harvested tubers early in the season in the Barrie, Ont. district (H.W.W.). Silver scurf was sl. on 'Green Mountain' at La Pocatière, Que. (H.G.).

RHIZOCTONIA (Pellicularia filamentosa) occurred in all regions of B.C. causing losses in the Interior and on Vancouver Island (N.M.) and in all parts of n. Alta. where it was not as serious as in 1963 (R.P.B.). It was found in most of the 73 fields examined in Sask. but was sev. only in one (A.C.). Rhizoctonia was by far the most serious disease in seed potatoes in the Barrie, Ont. district (H.W.W.). It was mod.-sev. at Ste. Clotilde and Deschambault and sl. at Ste. Foy and Normandin, Que. (H.G.). Damage averaged 5% in 3/5 fields at Keswick and St. Quentin, N.B. (S.R.C.). It was sev. on 15-20% of the tubers of a crop grown on virgin peat bog soil in N.S. (R.C.L.) and was widespread in P.E.I. with tr.-5% infections in most 'Sebago' fields (J.E.C.). Some stem cankers were seen in most potato fields in e. Nfld. though incidence was generally lower than in most years (O.A.O.).

LATE BLIGHT (Phytophthora infestans) occurred, but was not serious, on the Lower Mainland and Vancouver Island, B.C. There was some tuber rot in storage. It was recorded, for the first time in many years, in the B.C. Interior (N.M., H.N.W.T.). Infection was sl. in a few fields at Portage la Prairie, Man. (D.J.P., W.A.F.H.). It caused some damage in Brant Co. (J.W.G.) and tuber rot was seen in 2/28 bin lots in e. Ont. (G.E.B.F.). In Que. it was first reported on 30 July from Matane Co. and it was general in the province by mid.-Aug. although its intensity was not sev. Dry weather, frost

and top-killing checked the disease in Sept. and little tuber rot developed. The greatest losses from tuber rot, up to 15%, were in the Quebec City region (H.G.). Late blight was at a very low level in N.B. in 1964 (S.R.C.) and was general, but only sl., in N.S. by 15 Aug. Some losses were reported in non-commercial crops (R.C.L.). About 70 acres in the Truro, N.S. area had the tops completely killed by late blight by 17 Aug. (C.O.G.).

LEAK (Pythium ultimum) caused some losses in bin storage in B.C. These losses were compounded by the presence of Erwinia carotovora (H.N.W.T.). It was reported from Vegreville, Alta. (A.W.H., D.S.). Traces were observed on 'Teton' at digging time at La Pocatière and it was reported sl. in 5 bin lots inspected in Que. (H.G., G.E.). Infection was heavy on several varieties at Bay Roberts, Nfld. (O.A.O.).

POWDERY SCAB (Spongospora subterranea) was sl. in a few bins in the Lower St. Lawrence, Que. district (G.E.). It was abundant on 'Green Mountain' in a 10-acre field on sandy loam at La Pocatière, Que. Cool weather conditions in July and Aug. favored disease development (H.G.).

COMMON SCAB (Streptomyces scabies). Most fields in the Lacombe, Alta. wrea were affected. It was sev. in 1 field of 'Red Pontiac' (R.P.B.) and most plantings of smooth-skinned varieties in s. Alta. had slight infections (R.P.S.). Specimens were received from Pierceland, Sask. (R.J.L.). Scab was sl.-mod. in many fields in Lambton, Huron and Middlesex Counties, Ont. (L.F.M.) and it averaged 3% in 7/28 bins inspected in e. Ont. (G.E.B.F.). It was found, mostly as slight infections, in 64.5% of the bins inspected in Que., mostly in the Chicoutimi, Lake St. John and Lower St. Lawrence areas (G.E.). Two extremely heavy infections, 30-50% in a field of 'Hunter' and 50-60% in a field of 'Kennebec' occurred on old orchard land nr. Port Williams, N.S. (R.C.L.). Infection was relatively light at the Exp. Farm, St. John's West, Nfld. (O.A.O.).

WART (Synchytrium endobioticum). Infections were widespread and sev. in e. and c. Nfld. in 1964. In some instances crop losses were as high as 50% but, in general, were in the range of 10-15% (O.A.O.).

PINK EYE (Verticillium spp.) was very prevalent and is increasing in importance in Ont. All cases seen were associated with verticillium wilt. Both V. albo-atrum and V. dahliae were isolated from affected tubers of 'Kennebec', 'Cherokee' and 'Irish Cobbler' (L.V.B.). It occurred in high proportions in some table stock fields in N.S. (R.C.L.).

WILTS (Verticillium spp., Fusarium spp.) were observed in 13 fields of 'Kennebec' on Lulu Island and incidence was high in 1 field of 'Norland' at Grand Forks, B.C. (N.M.). Wilts were seen in 50/114 fields in s. Alta. (R.P.S.) and were tr.-1% in 11/73 fields in Sask. (A.C.). Seventy/104 fields surveyed for verticillium wilt in s. Ont. were infected; V. albo-atrum was found in 41, V. dahliae in 26 and V. nigrescens in 3. The last-named species was found at Leamington, nr. Strathroy and nr. Mono Mills (L.V.B.). Wilt was sev. in 2 large fields of 'Sebago' nr. St. Catharines. V. dahliae was isolated from another field with 20% wilted plants in the same area (J.F.B.). Infections were sl.-mod. in 'Kennebec' in Joliette Co., Que. (H.G.). Wilts were not serious in seed crops in N.S. but infections in 'Kennebec' in table-stock fields were as high as 50% where that variety had been planted for a number of years (R.C.L.)

CALICO (alfalfa mosaic virus) was tr. in a field of 'Norland' and 1 of 'Netted Gem' in s. Alta. (R.P.S.).

LEAF ROLL (potato virus M) appeared for the first time in the Cariboo district of B.C. in 1964 (N.M.). Its incidence in n. Alta. increased over 1963 levels, probably due to the long, warm growing season in 1963. It was seen in 54/60 fields inspected (R.P.B.). Leaf roll occurred in 48/73 fields in Sask. (A.C.). A specimen was received from Bellechasse Co. and the disease was sev. on 'Sebago' at Ste. Foy, Que. (D.L.). It was tr. in nearly every field of 'Hunter' in P.E.I. (J.E.C.).

MOSAICS (virus) were the most important virus diseases in seed fields in Canada in 1964. Undoubtedly, most of the disease was caused by strains of potato virus X. (D.S.MacL.).

PURPLE TOP (aster yellows virus). Traces were seen in 4 fields in s. Alta. (R.P.S.) and it was more prevalent in Sask. than in recent years (A.C.). It was seen in 1 seed field in e. Ont. (G.E.B.F.) and was tr. in a number of fields in N.S. (R.C.L.) and P.E.I. (G.C.R.).

SPINDLE TUBER (virus) caused the rejection of a number of seed fields in N.B. and P.E.I. (D.S.MacL.). It was sl. in 4 fields of 'Netted Gem' in s. Alta. (R.P.S.); tr. in 3/73 fields in Sask. (A.C.); 1-5% in 14% of the seed fields in Man. (D.J.P.); and occurred in 3/54 fields in e. Ont. (G.E.B.F.).

WITCHES' BROOM (virus). Trace amounts occurred in all areas of B.C. except in the Lower Mainland and the Pemberton areas (N.M.). It was tr. in 12/60 fields in n. Alta. and in 1 field of 'Warba' in s. Alta. (R.P.B., R.P.S.).

CHEMICAL INJURY. The herbicide Stam F-34 applied at low pressure to fields in Essex Co., Ont. resulted in mod.-sev. injury to foliage and caused blossom drop. Decrease in yield was estimated to be 25% in one field (J.R.R.).

FROST. Damage was heavy in all areas in the Guelph, Ont. district with as much as 40% grade-out. About 20% of the late crops were affected (J.W.G.). Injury was found in 12/28 bins inspected in e. Ont. with the amount of damage ranging from 1-23% and averaging 6.5% (G.E.B.F.). Frost damage was reported in 63% of the bins inspected in Que. Losses in some lots were from 20-30% (G.E.).

GIANT HILL (genetic) was sl. in 5 fields of 'Netted Gem' in s. Alta. (R.P.S.) and it was seen in a number of varieties in N.S., particularly in 'Green Mountain', 'Netted Gem', 'Irish Cobbler', 'Keswick' and 'Red Pontiac' (R.C.L.).

HOLLOW HEART (physiological) was sl. in 'Irish Cobbler' and 'Kennebec' in 2/28 bin lots in e. Ont. (G.E.B.F.). It was recorded in seedling lines under trial in Que. as follows: Deschambault, 22 sl. 12 sev./93 seedlings; L'Assomption, 5-sev./13 seedlings; Les Buissons, 11-sl. 5-sev./51 seedlings and, at Ste. Clotilde, traces only (H.G.).

BLACKHEART (physiological). Specimens were received from Penhold and Strathmore, Alta. (A.W.H., D.S.).

PUMPKIN

POWDERY MILDEW (Erysiphe cichoracearum) developed, late in the season, on pumpkins in the Okanagan Valley, B.C. (G.E.W.).

SCLEROTINIA ROT (S. sclerotiorum). Some fruits in a field at Summerland, B.C. were affected at harvest in late Oct. (G.E.W.).

MOSAIC (virus). A yellow type mosaic was sev. in a planting at Ste. Foy, Que. (D.L.).

RADISH

DOWNY MILDEW (Peronospora parasitica). Several rows of radishes grown to seed at Ste. Clotilde, Que. showed mod.-sev. infections (R.C.).

RHUBARB

LEAF SPOT (Ascochyta rhei) was sl. on 5-10% of the plants in a planting at Woodbridge and mod. on 25% of the plants in trial plots at Vineland, Ont. (J.F.B.). Slight infections were seen at Kentville, N.S. (C.O.G.).

GRAY MOLD (Botrytis cinerea). Specimens with large, angular leaf spots on which the fungus was fruiting on the lower side were received from Levis, Que. The infection seemed to have induced leaf reddining (D.L.).

SPINACH

WHITE RUST (Albugo occidentalis G.W. Wils.) was found in the canned product of the 1963 crop in B.C. (J.A.M.). This is the first report, to the Survey, of this disease in Canada although Toms (C.P.D.S. 44: 181. 1964) lists it in Plant Diseases of Southern British Columbia (D.W.Creelman).

SUGAR BEET NEMATODE (Heterodera schachtii) affected 10% of the plants in a 4-acre field at Woodbridge, Ont. (J.L.T.).

SQUASH

LEAF BLIGHT (Alternaria cucumerina) was very slight in a planting at Kentville, N.S. (C.O.G.).

POWDERY MILDEW (Erysiphe cichoracearum) was seen on squash, late in the season, in the Okanagan Valley, B.C. (G.E.W.) and was sev. and prevalent on older leaves in Sept. at St. Catharines, Ont. (J.F.B.).

SWEDE TURNIP

LEAF AND POD SPOT (Alternaria brassicae). Infection was rated at 10% on the variety 'Chignecto' at Nappan, N.S. (C.O.G.).

DOWNY MILDEW (Peronospora parasitica) was recorded in Nfld. only as a slight infection at Cupid's in the Conception Bay area (O.A.O.).

BLACK LEG (Phoma lingam). Specimens were received from St. Laurent, Ile Orleans, Que. on 1963 roots in storage (D.L.).

CLUB ROOT (Plasmodiophora brassicae). Six fields in the Sherbrooke, Que. region were generally and severely affected. The soil had apparently been contaminated through the use of manure from animals fed on diseased roots. Similar cases were observed in the Montreal region (E.L.). Slight infections were seen on secondary roots of swedes collected in L'Islet Co., Que. (H.G.). Two/5 fields visited in the Fredericton, N.B. area were affected. One 3-acre field was a complete loss (S.R.C.). Moderate infections were seen on early plantings of 'Laurentian' at Riverdale, P.E.I. but later plantings were unaffected (G.W.A.). Reports from Bonavista to Ferryland in e. Nfld. indicate that club root caused considerable

losses to a number of growers (O.A.O.).

SKIN SPOT (Rhizoctonia solani) was observed at Edmonton, Alta. It was present in most swede turnip fields in P.E.I. It appears to be aggravated by certain insecticides used to control the root maggot (J.E.C.).

SCLEROTINIA ROT (S. sclerotiorum) occurred at Fort Saskatchewan, Alta. (A.W.H., D.S.). A specimen, presumably from storage, was received from Matheson, Ont. in Jan. (W.L.S.).

CHEMICAL INJURY. A root received from East Haldimand, Gaspe Co., Que. had roughened bands on the surface suggesting contact with unmixed lime or fertilizer in the soil (D.W.C.). Drift from an aerial application of 2,4-5-T caused a sev. cracking of roots in 2 fields at Burton, N.B. (S.R.C.).

HOLLOW HEART (physiological) was mod. in July at St. Anselme, Dorchester Co. and sev. in Oct. at Ste. Foy, Que. At St. Anselme the condition was followed by soft rot (Erwinia carotovora) and at Ste. Foy by Rhizoctonia solani (D.L.).

OEDEMA (excess water) was mod. in 1 field at St. Anselme, Que. (D.L.).

PHOSPHORUS DEFICIENCY caused a sev. purpling of foliage in a field at Ste. Foy, Que. (D.L.).

SCORCH (virus complex). This disease, first reported in 1963, again appeared throughout the swede-producing areas of s. and s.w. Ont. but distribution was not uniform within the area. Infection ranged from tr.-100% with losses of marketable roots frequently in excess of 50%. An investigation into the source of the virus, its vectors and its physical and chemical properties is being carried out at the University of Guelph (B.H.MacN.).

SWEET CORN

ROOT ROT AND WILT (Fusarium spp.) caused mod. Damage in a planting at Ste. Foy, Que. (D.L.).

SMUT (Ustilago maydis). Specimens were received from Weekes and Shellbrook, Sask. (B.J.S., R.J.L.). It was tr. in 2 plantings at Sussex, N.B. (S.R.C.).

MAGNESIUM DEFICIENCY. Several fields at Waterville and Greenwich, Kings Co., N.S. showed mod.-sev. symptoms early in July (K.A.H.).

PHOSPHORUS DEFICIENCY affected a half-acre planting at Morristown, N.S. Growth was poor and leaves showed the typical purplish coloration (K.A.H.).

SWISS CHARD

LEAF SPOT (Alternaria tenuis) was tr. on the variety 'Wisconsin Bloomsdale' at the Research Station, Kentville, N.S. (C.O.G.).

TOMATO

EARLY BLIGHT (Alternaria solani) was very prevalent in the north portion of the Okanagan Valley and in the Thompson Valley, B.C. A high proportion of the leaves became affected (G.E.W.). It was widespread and sev. in improperly-sprayed fields in the Niagara Peninsula, Ont. Severe defoliation was observed in fields nr. Dunnville and nr. Milton despite a reported full spray schedule (J.F.B.). Early blight presented the most serious disease problem for tomato growers in N.B. In the Oromocto-Gagetown area 26/27 fields were affected and as much as 100% defoliation and 20% fruit infection was seen. Fertility problems on soils with low pH values seemed to aggravate the disease (S.R.C.). Fruit rot caused a 2% loss in Kings Co., N.S. (C.O.G.).

FRUIT ROT (Alternaria tenuis) was quite general in the Okanagan and Thompson Valleys, B.C., especially in unsprayed fields. It was more prevalent on fruit that matured in Sept. than on earlier-maturing crops (G.E.W.).

GRAY MOLD (Botrytis cinerea) caused an average loss of 12% of the fruit in 16/27 fields surveyed at Oromocto, N.B. (S.R.C.). Losses from fruit rot in Kings Co., N.S. were from 6-10%. In fungicide trials at Kentville, two of the newer materials under trial allowed 44% infected fruit. It also caused stem cankers in all greenhouses visited in Kings and Hants Counties but was most troublesome at Falmouth where 10% of the plants were infected. Treatment of cankers with ferbam or Thylate checked the disease (K.A.H.).

LEAF MOLD (Cladosporium fulvum). Moderate infections occurred in greenhouses in Essex Co., Ont. in the fall on "WR-7" and other susceptible varieties (J.R.R.). It was generally not a problem in N.S. greenhouses though a very sev. infection was seen in an improperly-ventilated greenhouse at Truro and a light general infection in one at Grand Pre (K.A.H.).

ANTHRACNOSE (Colletotrichum phomoides) became prevalent late in the season, and caused losses, especially on unsprayed fruit, in the Okanagan and Thompson Valleys, B.C. (G.E.W.). Moderate infections caused a 10% loss of fruit, including harvested fruit, at Ste. Foy, Que. (D.L.).

STEM CANKER (Corynebacterium michiganense). Moderate infections caused sl. losses in 1 field of canning tomatoes and in a number of greenhouse crops in Essex Co., Ont. It was more prevalent where the hot-water treatment was not used (J.R.R.).

ROOT KNOT NEMATODE (Meloidogyne javanica) was found on roots of tomato plants from the Windsor, Ont. area (M.O.T.).

DAMPING-OFF (Pellicularia filamentosa) was sev. at Drumheller, Alta. (A.W.H., D.S.). It occurred in mod.-sev. amounts on light, sandy soils in Essex Co., Ont. Damage was greater than in other years (J.R.R.). Damage averaged 7% in 2/7 fields at Lakeville Corner, N.B. (S.R.C.).

LATE BLIGHT (Phytophthora infestans). About 25% of the fruits were badly infected in the fall at La Pocatière, Que. (H.G.). It was tr. in 1/27 fields at Oromocto, N.B. (S.R.C.). Fruit losses of up to 100% occurred on unsprayed plots at Kentville, N.S. Maneb and Thylate each gave excellent control both in plots and in commercial fields in Kings Co. (K.A.H.). Late blight did not become serious until late in the season in P.E.I. Losses were generally light (G.W.A., J.E.C.).

BACTERIAL SPECK (Pseudomonas tomato) was found at 3 locations in commercial fields in the Vernon, B.C. area (G.E.W.). Light infections occurred on all fruits of 200 plants at Athol, N.S. (C.O.G.)

STEM ROT (Sclerotinia sclerotiorum) was seen on several plants in a commercial field at Vernon, B.C. (G.E.W.). It was tr. in 2 fields examined at Waterboro, N.B. (S.R.C.) and tr. on 'Stokesdale' in Oct. at Kentville, N.S. (K.A.H.).

WILT (Verticillium dahliae) was seen in the Okanagan Valley, B.C. only in fields planted to susceptible varieties and strains (G.E.W.). Infection was mod.-sev. in most tomato fields in s. Essex Co., Ont. It was also seen in some greenhouses where sterilization had been inadequate (J.R.R.). Twenty-one/29 fields were found infected in 9 Ont. counties. Estimates of infection ranged from 5% in Essex Co. to 22% in Carleton Co. (A.T.B.).

MOSAIC (virus) occurred in field crops in all sections of the Okanagan Valley, B.C. and in some greenhouses. Infection varied from sl. to sev. The variety 'Summerdawn' has proven to be quite susceptible (G.E.W.). This and other viruses were seen occasionally in greenhouse and field crops in Essex Co., Ont. (J.R.R.). All plants in 2 large fields nr. Dunnville and in a 20-acre planting nr. Milton, Ont. were infected. Losses were heavy in both locations due to lateness, stunting and low yield (J.F.B.). Severe foliar symptoms were prevalent in Kings and Hants Counties, N.S. Plants were dwarfed but set seemed unaffected (K.A.H.).

SHOESTRING (virus) occurred in occasional fields and greenhouses in Essex Co., Ont. (J.R.R.).

SPOTTED WILT (virus). Foliage symptoms appeared early and were quite sev. on a large number of plants at Kentville, N.S. Fruit symptoms did not appear until late in Sept. (K.A.H.).

STREAK (virus) was more sev. in Essex Co., Ont. in fall greenhouse crops than in the spring or field crops (J.R.R.). Some streak, probably double virus streak, was seen in 2 large fields nr. Dunnville, Ont. (J.E.B.).

BLOSSOM-END ROT (physiological) was sev. at Drumheller, Vermilion and Red Deer and was also observed at Edmonton and Thorhild, Alta. (A.W.H., D.S.). It occurred on the first and second trusses during very hot, dry weather in late July and early Aug. in Essex Co., Ont. Moderate losses were sustained (J.R.R.). About 5% damage occurred in all 27 fields surveyed in the Oromocto-Gagetown area of N.B. (S.R.C.). Traces were seen in greenhouses in Kings, Hants and Cape Breton Counties, N.S. (K.A.H.).

CAT FACE (physiological) was seen in tr. amts. in all fields at Oromocto and Gagetown, N.B. (S.R.C.).

CHEMICAL INJURY (herbicides). Severe damage from 2,4-D was seen at Leader, Sask. (B.J.S.) and sl. injury was seen in several home gardens at Ottawa, Ont. (D.W.C.). Drift from an aerial application of 2,4-5-T caused about 20% damage in all fields at Oromocto, N.B. The first set of fruit was largely unaffected. Later sets were stunted, malformed and delayed (S.R.C.).

CHEMICAL INJURY (captan). Some damage to tips of leaves of seedlings was seen at Oromocto, N.B. The plants later recovered (S.R.C.).

CHEMICAL INJURY (Vorlex). A number of cases of Vorlex injury were observed in greenhouses in Essex Co., Ont. Plants were initially stunted but recovered and produced near-normal crops (J.R.R.). One greenhouse crop of about one-fifth of an acre was severely injured through planting before the Vorlex fumes had escaped from the soil. The extensive injury was expressed by hormone imbalance in the plants. The first 2 to 4 trusses per plant set twice to 4 times the number of fruits which failed to size normally (C.D. McK.).

CHEMICAL INJURY (toxic fumes). Moderate damage, involving blossom drop, occurred in

Essex Co., Ont. where CO_2 generators using natural or propane gases apparently released toxic fumes (J.R.R.).

CHEMICAL INJURY (soil toxins). Sudden and sev. wilting resulted in a greenhouse in Essex Co., Ont. where corn cobs were worked into soil low in organic matter. The plants recovered after about 3 weeks but yields were reduced by about 25% (J.R.R.).

GROWTH CRACKS. Hot, dry weather followed by cool, wet weather resulted in sev. cracking of fruits of processing tomatoes in Essex Co., Ont. Even varieties normally resistant to cracking were affected. It resulted in poor keeping quality and high mold counts (J.R.R.). Growth cracks were observed in all fields surveyed at Oromocto and Hampstead, N.B. (S.R.C.).

MAGNESIUM DEFICIENCY was mod.-sev. in a field at Waterboro, N.B. (S.R.C.).

MANGANESE TOXICITY caused a sev. necrosis in new growth in some greenhouses in Essex Co., Ont. Tissue analyses showed manganese levels as high as 2000 ppm as compared to the normal level of 50 ppm. Sodium chelate sprays at 1.5 lb./acre seemed to correct the disorder. The high levels of manganese may have resulted from soil steaming (J.R.R.).

NECROSIS (cause undetermined). Necrosis of new growth was sev. and caused substantial losses in some fields of the variety '1350' in Essex Co., Ont. after an extended period of hot, dry weather. The injury may have been caused by the application of maneb or solely by the extreme weather conditions (J.R.R.).

DISEASES OF FRUIT CROPS

A. Pome Fruits

APPLE

CROWN GALL (Agrobacterium tumefaciens). The incidence of crown gall on apple nursery stock was the lowest in years in the Okanagan Valley, B.C. (L.E.L.).

CANKER (Botryosphaeria obtusa (Schw.) Shoem.) was sev. on a single tree at Winnipeg, Man. (J.A.H.).

FIRE BLIGHT (Erwinia amylovora) was less serious in the s. Okanagan Valley than in 1963 but was more serious in the n. Okanagan (M.F.W.). Specimens were received from Edmonton, Millet, Wetaskiwin, Camrose, Calgary and Leduc, Alta. (A.W.H., D.S.). It was virtually absent in s. Alta. with only one specimen being received for diagnosis (P.E.B.). Fire blight spread rapidly in June and caused sev. injury in some orchards in Essex Co., Ont. (J.R.C.). A slight infection continues to persist in a nursery at Strathroy, Ont. (A.E.S.). Specimens were received from Berthier, Megantic and Charlesbourg, Que. (D.L., J.R.).

SOOTY BLOTCH (Gloeodes pomigena). Infection was heavy on 'McIntosh' at Windsor, N.S., seriously affecting the appearance of the fruit. It was also reported on the same variety at Blomidon (R.G.R.).

STORAGE ROT (Gloeosporium album). 'Golden Russett' apples packed in polyethylene sleeves at several points in the Annapolis Valley, N.S. in Dec. 1963 developed gloeosporium rot late in Jan. and had to be diverted to processing plants. Losses in 4 cold storage plants were: Middleton, 11.1%; Coldbrook, 4.2%; Wolfville, 3.3%; Canning, 1.1%. The rot was most serious from areas most affected by early fall frosts (C.L.L.).

BULL'S-EYE ROT (Gloeosporium perennans) was generally light on 'Newtown' in the Okanagan Valley, B.C. Some rot developed on 'McIntosh' from CA storage at Kelowna. Most of the rot was centered around the stem and in most cases was difficult to detect. Bull's-eye rot in 'McIntosh' held in common storage is rare and presents no problem (L.E.L.).

RUST (Gymnosporangium clavipes). Aecia were observed in the La Pocatière, Que. area on up to 10% of the fruits of 'Fameuse', 'Cortland', 'Delicious', 'Lobo', and crabapple. Infection was also noted on 'Lawfam', 'McIntosh', 'Sandow', '0-294', '0-297', 'Hume', 'Rouge Hâtive', 'Linton', 'Shiawassee', 'Milton', 'Secor' and 'Fireside' (J.B.J.).

BROWN ROT (Monilinia fructicola). A specimen was received from Charlesbourg, Que. (D.L.).

CORAL CANKER (Nectria cinnabarina) was seen in 11/33 orchards visited in the Gagetown, N.B. area. Average damage to trees was 5%. The affected trees had suffered previous winter injury (S.R.C.).

EUROPEAN CANKER (Nectria galligena). Trace amounts were seen in 23/67 orchards surveyed in N.B. (S.R.C.).

POWDERY MILDEW (Podosphaera leucotricha) was sev. on foliage of susceptible varieties in the Okanagan Valley, B.C. and spot infections could be found on leaves of more resistant varieties (D.L.McI.). Infection was fairly prevalent on 'Idared', 'Cortland' and 'Jonathan' in Essex Co., Ont. Slight damage was incurred in some orchards but it was generally well controlled by karathane or sulphur sprays (J.R.C.).

CALYX-END ROT (Sclerotinia sclerotiorum) was tr. in some orchards in the Annapolis Valley, N.S. (R.G.R.).

CANKER (Valsa ambiens, Valsa leucostoma). Affected branches and twigs were received from Charlesbourg, Que. (D.L.).

SCAB (Venturia inaequalis) was mod.-sev. in home gardens at Vancouver, B.C. (H.N.W.T.). No infections occurred in the s. Okanagan Valley, B.C. but one infection period in the n. Okanagan at full bloom resulted in some infection on early leaves. There was no subsequent spread in well-sprayed orchards despite numerous later infection periods (M.F.W.). It was well controlled in all commercial orchards in Lambton, Huron and Middlesex Counties, Ont. until 15 June when a few light infections were seen in Middlesex Co. Many orchards had light infections by harvest and a few were sev. affected. Pin-point scab was present in most orchards that failed to receive a spray application about 25 Aug. when the district experienced a heavy and prolonged rainfall (L.F.M.). Scab was well controlled in Essex Co., Ont. (J.R.C.). An early sepal infection of 'Golden Delicious' nr. Fonthill, Ont. prior to the first fungicide application resulted the complete loss of the crop despite a full fungicide program following the early infection (R.W.). Conditions were only moderately favorable for scab development in s.w. Que. in 1964. Of 5 infection periods in the Farnham district, only 1 could be classed as sev. Some growers, however, did not have adequate protection during the prolonged bloom period and in these orchards rather sev. scab developed on the fruits (R.D.). The disease was well controlled in N.B. and only traces of scab were seen in 6/67 orchards visited (S.R.C.). The first ascospore discharge in the Annapolis Valley, N.S. was on 10 May and the first infection period 11-12 May. First scab lesions appeared 4 June. There were 15 infection periods up to 30 July and there was considerable late or pin-point scab in poorly-sprayed orchards at harvest (R.G.R.). Infection was sev. at Glovertown and sl. at Bay Roberts, Nfld. (O.A.O.).

CHAT FRUIT (virus). The recurrence of symptoms in the same 5 'Lord Lambourne' trees in successive seasons at Summerland, B.C. increases the probability that the source of infection was in the shipment of clonal rootstocks on which these trees were propagated (M.F.W.).

CHLOROTIC LEAF SPOT (virus). A Russian crabapple, Malus atrosanguinea, and 'R12740-7A', M. floribunda, topworked on old 'McIntosh' trees at the Smithfield Exp. Farm, Ont. showed symptoms of chlorotic leaf spot (M.F.W.).

LEAF PUCKER (virus). Symptom severity was mod. on 'McIntosh' in the Okanagan and Similkameen Valleys, B.C. Heat units in the 2 weeks following bloom were slightly below average. This maintains the previously observed negative correlation between heat units and symptom severity. Symptoms on 1 tree at Ottawa, Ont. were suggestive of the disease as it occurs in B.C. (M.F.W.).

RING RUSSETING (virus). Symptom severity on 'Newtown' was mod.-sev. adding to the accumulated evidence of a negative correlation between heat units and severity of symptoms (M.F.W.).

STEM PITTING (virus) was sev. in Smithfield and Ottawa, Ont. plantings on most topworked 'Virginia' crab and 'O-524' examined. Unworked 'O-524' was not affected, suggesting that stem pitting virus occurs commonly in variety clones in Ont. At Franklin and Frelighsburg, Que. the crab varieties 'Virginia', 'Hyslop' and 'Garnet' used as frameworks commonly showed stem pitting symptoms, 'Garnet' less severely than the other two. Moderate-sev. symptoms were also seen on 'Golden Delicious'. 'Robusta V' stock showed no symptoms in either Que. or Ont. (M.F.W.).

BLISTER BARK (suspected virus). Spur-type 'Delicious' trees in 3 young orchards in Essex Co., Ont. showed blisters on the bark of twigs, scaffold limbs and trunks (C.D.McK.).

COARSE RING RUSSET (suspected virus) affected one 40-year-old 'McIntosh' tree at Penticton, B.C. All fruits were culls and there was sev. leaf flecking. This is a new syndrome with symptoms quite distinct from those of McIntosh leaf pucker but almost certainly with virus etiology (M.F.W.).

FRUIT DEFORMITY AND RUSSETING (suspected virus) affected 7 'Delicious' trees in an orchard at Summerland, B.C. Fruit of entire trees or certain main limbs was unmarketable. This appears to be a new disease causing fruit symptoms only (M.F.W.).

HIBERNAL DECLINE (suspected virus). 'Delicious' trees on 'Hibernal' frameworks in a several-acre planting at Gilford, Ont. were dead or in varying stages of decline.

There was a sev. bark necrosis on the 'Hibernal' framework but none on the 'Delicious' tops. 'McIntosh' and 'Melba' trees on the same frameworks were healthy and vigorous. 'Delicious' on 'Robusta V' frameworks were normal. It would appear that the 'Delicious' stocks carried a virus that affected 'Hibernal' (M.F.W.).

CHEMICAL INJURY. Spray drift from an aerial application of 2,4-5-T had a hormonal effect in 3 orchards at Burton, N.B. preventing the normal June drop and causing the fruit of early varieties to remain on the trees beyong maturity. Damage to next year's fruit buds is suspected (S.R.C.).

DEEP SCALD was seen on 'Laxton's Fortune' in a storage trial at Kentville, N.S. (R.G.R.).

FROST CANKER. Trunk cankers were encountered on 45 young 'McIntosh' trees at Rougemont, Que. Cankering seemed to be a residual effect of applications of manure. 'Bancroft' and 'Cortland' were not affected (R.D.).

FROST INJURY. Frost at or near bloom caused a reduction in yield in all areas of w. Que. except in Deux-Montagnes Co. At Farnham, the temperature registered 26.5°F for 4 hours at the calyx stage. Several growers at Dunham and Frelighsburg, Missisquoi Co. and at Hemmingford, Huntingdon Co. experienced total crop losses; others at St. Paul, Rouville Co. and at Havelock and Franklin Center suffered a 50% loss. The 1964 crop in Missisquoi was 70% less than in 1963; 75% less for 'McIntosh'. In Rouville and Huntingdon Counties it was 20% less; 45% less for 'McIntosh' in Rouville Co. The crop in the Sherbrooke district was reduced 80% (R.D.).

HOLLOW FRUIT (caused undetermined). Deformed apples, with accumulated water in the core and only 1 or 2 seeds were commonly found in the varieties 'McIntosh' and 'Cortland' at harvest in w. Que. (R.D.).

MAGNESIUM DEFICIENCY. Leaf and fruit drop caused by magnesium deficiency was seen in 3/67 N.B. orchards visited (S.R.C.).

RUSSETING was heavy in most orchards in s.w. Que. Counts on 'McIntosh' showed 7% of the apples with 25% or more of the surface affected. Frost banding was seen on 'Delicious' and 'Melba' (R.D.).

WATER CORE (physiological) was prevalent in early varieties in the Gagetown, N.B. area. Traces were seen in the late crop but symptoms disappeared in storage (S.R.C.).

WIND INJURY. Heavy winds in the Farnham, Que. district caused sev. damage to foliage and some damage to fruits through rubbing (R.D.).

PEAR

CROWN GALL (Agrobacterium tumefaciens). Infection averaged between 5-10% on pear seedlings in nursery stock at Kelowna, B.C. (L.E.L.).

FIRE BLIGHT (Erwinia amylovora) was very light s. of Summerland, B.C. To the n., it was sl.-mod. in the Kelowna area, epidemic at Winfield on 'Bartlett' and 'Anjou', epidemic at Okanagan Center, absent at Oyama and prevalent around Vernon (L.E.L.). It was reported from Spruce Valley, Alta. (A.W.H., D.S.). Infection was sev. in 4 or 5 orchards of 'Bartlett', 'Bosc' and 'Kieffer' and tr. in many other orchards in Essex Co., Ont. Streptomycin sprays applied at the proper time were effective in checking blossom infection but the best control was obtained by thorough and regular pruning-out of diseased wood.(J.R.C.). Observations would indicate that hold-over cankers in 1-and 2-year old wood constitute the main source of inoculum in current year infections in orchards. There is a high degree of correlation between high fertilization, extensive sucker growth and susceptibility to fire blight (C.D.McK.). Fire blight was more prevalent in Lambton, Huron and Middlesex Counties, Ont. than in 1963. It was first observed as a sl. infection on 19 May nr. London and continued to develop throughout the 3 counties, especially in the Arkona area (L.F.M.). It was a major disease of pears in the Niagara Peninsula, Ont. in 1964. The disease spread rapidly from shortly after bloom until the last week of July when its progress slowed. Oozing cankers were commonly seen at bloom and by late summer many trees had several hundred infections that caused killing-back of 6-8 inches on twigs. It was most commonly seen on 'Clapp's Favorite', 'Bartlett' and 'Bosc' (R.W.). All trees in a 5-acre block of 'Bartlett' interplanted with 'Bosc' and 'Anjou' in Wentworth Co., Ont. were severely infected with up to 80% of the twigs involved. The numbers and virulence of fire blight outbreaks in s. Ont. have increased to alarming proportions (J.A.C.).

STORAGE ROT (Gloeosporium album). One lot of 'Clapp's Favorite' pears received at a cold storage plant at Canning, N.S. in ripe condition in mid.-Sept. was 100% affected with typical gloeosporium lesions by the end of Nov. In addition, black, tough, solid lesions yielding Cladosporium ?herbarum were present. Pears were re-infected with Cladosporium only with difficulty (R.G.R.).

TRELLIS RUST (Gymnosporangium fuscum). The infestation at Chilliwack on the main-

land of B.C. has been virtually eliminated and only a trace of rust was found on 2 pear trees, close together, in 1964. Junipers in the district have been sprayed with Actidione BR in the spring and fall. The center of infestation on Vancouver Island has been reduced by some 90% since 1961 as evidenced by infection on pears. It is still, however, well established and will require painstaking work to eradicate (W.R.F.).

NEMATODES (Pratylenchus penetrans). Pear trees in a 1.5-acre block in Niagara Twp., Ont. were stunted and some were dying. P. penetrans was recovered at the rate of 5400/lb. of soil (J.L.T.).

SCAB (Venturia pirina). Trace infections were seen in 1 orchard at Keswick Ridge, N.B. (S.R.C.).

FRECKLE PIT (virus). Symptoms on 'Anjou' in the Okanagan Valley, B.C. were unusually mild in 1964 and confined mostly to fruit in the upper half of the trees. Most of the flesh discoloration disappeared after a month or more in storage (J.M.W.).

STONY PIT (virus) was widely distributed though mod. on 'Bosc' and 'Anjou' in the Okanagan Valley, B.C., less commonly on 'Anjou'. Most of the fruit on affected trees is unmarketable every year. A longitudinal wood pitting has been associated with this disease, the severity of which increases as the tree grows older (J.M.W.).

ANJOU PIT (cause unknown) was found occasionally in the Okanagan Valley, B.C. on young trees and on trees with a light crop (J.M.W.).

PINK END (cause unknown). Premature softening and breakdown at the calyx end in 'Bartlett' occurs in occasional years in the Okanagan Valley, B.C., usually when the summer has been cool and wet as was the case in 1964 (M.F.W.).

SCALD (physiological). A scald-type injury developed on 'Bartlett' pears held in cold storage for processing in Kings Co., N.S. Seven/17 growers surveyed averaged 12.5% loss. The total loss equalled 10% of the 'Bartletts' processed (C.L.L.).

B. Stone Fruits

APRICOT

BROWN ROT (Monilinia fructicola). Infections occurred on both green and ripe fruit in the Okanagan Valley, B.C. (M.F.W.).

WILT (Verticillium dahliae) was observed on bearing trees in several orchards in the Okanagan Valley, B.C. (G.E.W.).

RING POX (virus) is still spreading slowly in the Okanagan and Similkameen Valleys, B.C. (T.B.L.).

CHERRY

LEAF SPOT (Higginsia hiemalis). Incidence on sour cherries in the Niagara Peninsula, Ont. was more sev. than it has been for a number of years. Above-normal rainfall in July and Aug. prevented a build-up of residual fungicides. Dodine, as in most years, appeared to be the most effective fungicide (R.W.). A 20% infection was seen in an orchard at Moncton, N.B. (S.R.C.). The variety 'Napoleon' was 50% infected with 10% defoliation at Acaciaville, N.S. Severe infection occasionally occurs in the province where protective measures are inadequate or neglected (C.O.G.). A 30% infection was recorded at St. John's, Nfld. (O.A.O.).

BROWN ROT (Monilinia fructicola) was sev. in some orchards at Kelowna, B.C. where fruit was slow to ripen. This was particularly true where early infection had been present on apricots in adjacent trees (L.E.L.). It presented a serious problem in the Niagara Peninsula, Ont., particularly after heavy rains on 11 and 12 July caused fruit splitting, providing many infection courts (R.W.).

POWDERY MILDEW (Podosphaera clandestina). Infection was sev. on fruit and foliage in several plantings in the B.C. Interior (D.L.McI.). A specimen was received from Levis, Que. (D.L.).

NEMATODES (Pratylenchus penetrans). Soil samples from 3 orchards in the Niagara Peninsula, Ont. where sour cherry trees showed uneven growth, stunting or unthriftiness yielded 774, 918 and 2080 P. penetrans per pound of root respectively (J.L.T.).

WILT (Verticillium dahliae) occurred on bearing trees of both sweet and sour cherries at Summerland and Kelowna, B.C. (G.E.W.).

LAMBERT MOTTLE (virus) has disappeared from some of the Okanagan Valley, B.C. orchards where it formerly caused serious losses (T.B.L.).

LITTLE CHERRY (virus) caused severe damage to both 'Bing' and 'Lambert' sweet

cherries in the Kootenay region of B.C. The Kootenay Bay strain of 'Lambert' is still the most promising resistant variety (J.M.W.).

NECROTIC RING SPOT (virus). Etch symptoms, which indicate the presence of this virus in sour cherries, were very prevalent and tended to be more sev. than usual in the Niagara Peninsula, Ont. This virus spreads very rapidly in orchards over 5 years old and which have 10% or more of the trees already diseased. Since the NRS virus is carried from tree to tree by pollen, no control measures are possible in fruiting orchards. The use of virus-free stock and isolation offer the best protection (T.R.D.).

SOUR CHERRY YELLOWS (virus). Symptoms, in the Niagara Peninsula, Ont., were less sev. than usual in 1964. The most striking symptom of this disease is a bright yellow mottling of leaves which drop readily in late fall. This disease spreads less rapidly than necrotic ring spot but causes considerably more damage in affected trees by causing a gradually increasing reduction in fruit set (T.R.D.).

SWEET CHERRY VIRUSES. Surveys conducted in 1963 and 1964 in the Niagara Peninsula, Ont. have shown various types of leaf mottling and tatter leaf symptoms to be prevalent in sweet cherry trees. Tests have shown that these symptoms are caused by two or more viruses. Affected trees carry necrotic ring spot and/or sour cherry yellows and probably one or more other viruses that have been isolated but not yet fully identified (T.R.D.).

TWISTED LEAF (virus) of sweet cherry is still spreading slowly in the Okanagan and Similkameen Valleys, B.C. The virus causing this and the ring pox disease in apricots has been demonstrated in wild cherry throughout the interior dry belt of B.C. (T.B.L.).

DIMPLE (cause unknown). Cherry dimple is a descriptive name applied to a surface blemish that developed on stored sweet cherries. No breakdown of underlying tissue was involved but the appearance of the fruit was poor and it was downgraded to a considerable degree. The disorder occurred mainly at Kelowna but som was seen in all districts of the Okanagan Valley, B.C. A similar condition has been present for some years in cherries grown in Wash. but this is the first time it has been seen in B.C. (L.E.L.).

OFF-TASTE (cause unknown). One rail car of sweet cherries from Westbank, B.C. was rejected at Winnipeg because of a very powerful and persistent taste redolent of iodoform. The shipment included fruit from a number of growers throughout the Westbank area. The taint was within the fruit, not on the surface, and was not related to the use of any agricultural chemical (L.E.L.).

PEACH

CROWN GALL (Agrobacterium tumefaciens) was very light on peach nursery stock in the Okanagan Valley, B.C. in 1964. This was due in part to nurseries using new land where the wild rose was not present (L.E.L.).

BROWN ROT (Monilinia fructicola). Mummified fruit bearing many viable conidia were found on the ground at Naramata and Summerland, B.C. in mid.-May. No apothecia were seen and presumeably primary infections arise from such conidia in dry spring seasons such as the one in 1964. Infection was extremely heavy in Aug. at Summerland and Kelowna in orchards that had not been cleaned up following the previous year's infection and had received no protective sprays (L.E.L.). Slight infections were seen in 'Elberta' plantings in Essex Co., Ont. toward the end of the season (J.R.C.). It was well controlled in Lambton, Huron and Middlesex Counties, Ont. except in some late 'Elberta' plantings that did not receive a harvest spray in late Aug. (L.F.M.). Brown rot became serious in the Niagara Peninsula, Ont. in Aug. when frequent rains and cool temperatures prevailed (R.W.).

CORYNEUM BLIGHT (Stigmina carpophila) caused very severe injury to twigs, fruit and foliage in several widely-separated orchards at Armstrong and Keremeos, B.C. For many years, in the drier regions of B.C., this has been considered to be a disease of apricot only. In the last few years there have been increasing numbers of reports of damage to peach. The several orchards that came to notice in 1964 were the most severely affected seen as yet w. of the moister Kootenay districts (M.F.W.).

LEAF CURL (Taphrina deformans). Slight infections developed in several orchards in Essex Co., Ont. where growers were unable, because of rapid bud break, to apply a protective spray (J.R.C.).

CANKER (Valsa spp.). There was heavy infection in some young orchards planted in Essex Co., Ont. in the spring of 1963. This infection resulted from injury to trees in the nursery row. In older cankered orchards there was considerable limb breakage due to the heavy crop (J.R.C.).

WILT (Verticillium dahliae) was found in several orchards at Summerland, B.C. (G.E.W.).

BACTERIAL SPOT (Xanthomonas pruni). Infection in Essex Co., Ont. was widespread but generally lighter than in 1963 (J.R.C.).

PLUM

GRAY MOLD ROT (Botrytis cinerea) occurred at Boutellier's Point, N.S. In each case where Botrytis was found on the fruit or foliage, a dead petal was attached (C.O.G.).

SCAB (Cladosporium carpophilum). A specimen was received from St. Ursule, Que. (D.L.).

BLACK KNOT (Dibotryon morbosum). Specimens were received from St. Andre and St. Jean, Ile Orleans, Que. (D.L.). It was general on plums in home gardens and on wild Prunus spp. in N.B. (S.R.C.).

BROWN ROT (Monilinia fructicola). Infections developed on ripe fruit in the Okanagan Valley, B.C. (M.F.W.) and was 10% on the variety 'Mount Royal' at Charlottetown, P.E.I. (G.W.A.).

FRUIT ROT (Phomopsis pernicosa Grove) was found on all fruits of a sample received from Boutellier's Cove, N.S. (C.O.G.). This is the first report, to the Survey, of this organism on Prunus (D.W.Creelman).

PLUM POCKETS (Taphrina communis). Cultivated plums and native cherries were affected in a garden at Edgeley, Sask. (B.J.S.). A trace infection was seen at Moncton, N.B. (S.R.C.).

BACTERIAL SPOT (Xanthomonas pruni) caused severe shot-holing of foliage and numerous small cankers on twigs at Falmouth, N.S. About 5% of the fruit was affected. The pathogen was isolated from twigs and fruit (C.O.G.).

IRON DEFICIENCY CHLOROSIS occurred at Wakaw, Sask. (R.J.L.).

PRUNE

LEAF CURL, FADING AND DROPPING. This syndrome, which was most sev. on Italian prune at Oliver, B.C. in 1962, has not appeared in 1963 and 1964. It is characterized by reduced terminal growth and cropping, leaf curling, fading of the green color, and premature dropping. The cause is unknown but an imbalance of essential mineral elements is suspected (D.L.McI.).

STEM-END WITHERING (cause unknown) occurred in much of the Italian prune crop in Lambton, Huron and Middlesex Counties, Ont. (L.F.M.).

C. Ribes Fruits

CURRANT

BLISTER RUST (Cronartium ribicola). Light infections were seen on several varieties of black currants at St. John's West, Nfld. (O.A.O.).

POWDERY MILDEW (Sphaerotheca mors-uvae). Specimens were received from Camrose and Wainwright, Alta. (A.W.H., D.S.).

GOOSEBERRY

LEAF SPOT (Mycosphaerella ribis). Infection was heavy at the Exp. Farm, St. John's West, Nfld. (G.A.N.).

POWDERY MILDEW (Sphaerotheca mors-uvae). A specimen was received from Notre Dame du Lac, Que. (D.L.) and infection was heavy at Botwood, Nfld. (O.A.O.).

D. Rubus Fruits

LOGANBERRY

CANE SPOT (Mycosphaerella rubi) was sev. and widespread throughout the Saanich Peninsula, B.C. Abnormally cool, wet summer weather was undoubtedly responsible (R.G.A.).

RASPBERRY

CROWN GALL (Agrobacterium tumefaciens). About 20% of the canes in a planting at Chester, N.S. were affected (C.O.G.).

GRAY MOLD WILT (Botrytis cinerea). Specimens were received from Drummondville and L'Islet, Que. (D.L.). A slight infection was seen at Moncton, N.B. (S.R.C.).

SPUR BLIGHT (Didymella applanata). Specimens were received from Beaverlodge, Alta. (A.W.H., D.S.), Shellbrook, Sask. (R.J.L.), Drummondville, Levis, St. Crsimir and La Tuque, Que. (D.L.). Canes of 'Newburg' were 100% infected and defoliation was 50% in nursery stock plantings at Melvern Square and Berwick. Infection was 90% in a planting at Chester, N.S. (C.O.G.).

ANTHRACNOSE (Elsinoë veneta). Damage ranged from tr.-5% in 8/11 fields examined in N.B. (S.R.C.). It was sl. on 'Viking' and 'Carnival' at Melvern Square and Berwick and sev. on an unknown variety at Chester, N.S. where yields were greatly reduced (C.O.G.). 'Viking', which is not usually severely affected by anthracnose, was heavily infected at Scotch Village, N.S. (K.A.H.).

LEAF SPOT (Mycosphaerella rubi). The variety 'Trent' was 100% infected at Melvern Square, N.S. (C.O.G.).

YELLOW RUST (Phragmidium rubi-idaei) was sev. at St. Casimir (D.L.) and at Ste. Helene, Que. (A.E.S.).

LEAF BLIGHT (Pseudomonas sp.). A leaf blight affected the foliage of young shoots of several plants in a large planting at Aberdeen, B.C. A species of Pseudomonas was isolated and successfully inoculated into the variety 'Willamette'. A second inoculation failed, presumably because the pathogenicity of the culture had lessened (H.S.P.).

POWDERY MILDEW (Sphaerotheca macularis) was sl. on 'Canby' at Melvern Square, N.S. (C.O.G.).

LEAF CURL (virus). Specimens were received from Kamsack, Yorkton and Assiniboia, Sask. (R.J.L.). Four/11 plantings in N.B. had up to 80% damage (S.R.C.).

MOSAIC (virus). A specimen was received from Levis, Que. (D.L.). Eight/11 N.B. plantings were up to 50% infected (S.R.C.).

E. Other Fruits

BLUEBERRY

CROWN GALL (Agrobacterium tumefaciens). Trace amounts occurred in 65 acres of highbush blueberries at Sheffield Mills, N.S. (C.L.L.).

RED LEAF (Exobasidium vaccinii) was tr. on lowbush species in the Lake St. John district of Que. A gall-like symptom caused by E. vaccinii was observed at St. Method, Que. There was no reddening of the foliage and the galls were overgrown by a species of Cladosporium (C.L.L., I.V.H.). Infection was light on native species at Avondale in the Conception Bay district of Nfld. (O.A.O.).

CANKER (Fusicoccum putrefaciens). In plantings totalling 65 acres at Sheffield Mills, N.S. the highbush variety 'Jersey' was about 20% infected with 'Coville' and 'Burlington' carrying 5% infection. Cankers were showing up on the oldest plants and infected plants generally had 5 or more cankers per stem. At Aylesford, N.S. 30% of the 1- and 2-year-old stems were cankered at the bases. Here, the perfect state was present as well as a species of Phomopsis. 'Blueray' and 'Earliblue' had trace infections at Somerset and an unidentified variety at Barss Corner was similarly affected (C.L.L.).

POWDERY MILDEW (Microsphaera penicillata var. vaccinii) was tr. or lowbush blueberries in the Lake St. John district of Que. and on the highbush variety 'Jersey' at Somerset, N.S. (C.L.L., I.V.H.).

BLOSSOM AND SHOOT BLIGHT (Monilinia vaccinii-corymbosi) was recorded on the highbush varieties 'Weymouth' and 'Rancocas' at Pitt Meadows, B.C. This is the first report of this organism from B.C. (H.N.W.Toms).

MUMMY BERRY (Monilinia vaccinii-corymbosi) was found on lowbush fruit at Dolbeau and in one field in the Lake St. John, Que. area. Infection was 10% at Rose and tr. at Thunder Bay, Cumberland Co., N.S. (C.L.L., I.V.H.).

WITCHES' BROOM (Pucciniastrum goeppertianum). Light infections occurred on native lowbush species in Nfld. (O.A.O.).

LEAF RUST (Pucciniastrum vaccinii). Infection was tr. on the highbush variety 'Jersey' at Sheffield Mills, N.S. (C.L.L.).

MOSAIC (virus) affected 1 plant of the variety 'Coville' in plots at the Research Station, Kentville, N.S. (C.L.L.).

FROST INJURY. Fall frosts were reported to have caused a 25% loss of crop in highbush blueberries in B.C. (H.N.W.T.).

WINTER INJURY. The highbush variety 'Bluecrop' was seriously killed back with 'Berkeley' and 'Earliblue' less seriously affected during the 1963-64 winter at Digby, N.S. 'Blueray' was the least affected (C.L.L.).

CRANBERRY

STORAGE ROT (Fusicoccum putrefaciens) caused 12% loss in 1 lot grown at Cumberland Bay, N.B. (S.R.C.).

GRAPE

DEAD ARM (Cryptosporella viticola). Some of the plantings of 'Seibel 10878' set out in 1946 in the Niagara Peninsula, Ont. are suffering badly from dead arm despite extensive use of fungicides and rigorous pruning of diseased vines. The French hybrids seem particularly susceptible (R.W.).

BLACK ROT (Guignardia bidwellii) was tr. on leaves of 2-year-old vines in experimental plantings at Gaspereaux and Digby, N.S. (C.O.G.).

ROOT LESION NEMATODE (Pratylenchus penetrans). The variety 'Fredonia' produces a very uneven crop. The loss in 1964 was almost 100% and was probably aggravated by P. penetrans which was recovered at the rate of 3,915 per lb. of soil in Niagara Twp., Ont. (J.L.T.).

POWDERY MILDEW (Uncinula necator) was prevalent, particularly on some of the new French hybrid varieties, in the Niagara Peninsula, Ont. (R.W.).

STRAWBERRY

GRAY MOLD (Botrytis cinerea). Fruit rot caused considerable losses where control measures were not followed in coastal B.C. (H.N.W.T.). Ten-20% of the fruit in a planting at Summerland, B.C. was affected (G.E.W.). Gray mold rot was prevalent in N.B. and was seen in 35/40 fields visited. Damage ranged from tr.-85%. It was most sev. in dense plantings (S.R.C.).

LEAF SCORCH (Diplocarpon earliana) was tr.-sl. in 29/40 fields surveyed in N.B. (S.R.C.).

LEAF BLOTCH (Gnomonia fructicola). Trace infections were seen on 'Sparkle', 'Catskill' and 'Cavalier' at Melvern Square and Berwick, N.S. (C.O.G.).

LEAF SPOT (Mycosphaerella fragariae). Infections in 40 N.B. fields ranged from tr.-40% depending on variety (S.R.C.). It was sev. on '59-30', 'Cavalier', 'Redcoat' and 'Sparkle' in that order of intensity at Melvern Square and Berwick, N.S. (C.O.G.). Infection was mod. on 'Sparkle' at St. John's West, Nfld. (O.A.O.).

RED STELE (Phytophthora fragariae). The cool, wet winter and spring resulted in red stele being more widespread than usual in the lower Fraser Valley, B.C. It was most evident in plantings in poorly drained soils (H.S.P.). A 50-ft. section of a row of 'Redcoat' was slightly affected in Queen's Co. P.E.I. (C.B.W.).

ROOT LESION NEMATODE (Pratylenchus penetrans), which is a factor in the strawberry root-rot complex and may also influence the severity of verticillium wilt, was found in varying concentrations in association with strawberry plantings in the Niagara Peninsula, Ont. In one field where 50% of the plants had been lost, the concentration of P. penetrans was 27,900/ lb. of soil (J.L.T.). It was found associated with strawberry roots from Yarmouth Co., N.S. (M.O.T.).

CROWN AND BUD ROT (Rhizoctonia solani) caused loss of plants in the lower Fraser Valley, B.C., by mid.-June. Abnormally low spring temperatures favored the disease (H.S.P.).

ROOT MOLD (Rhizoctonia sp.). Dormant plants in cold storage at Fredericton, N.B. developed a mold growth on roots resulting in up to 50% loss of the stored plants (S.R.C.).

FRUIT ROT (Rhizopus nigricans). Three lots of strawberries stored under unfavorable conditions at Oromocto, N.B. were a total loss (S.R.C.).

LEAF SPOT (Septoria aciculosa) was tr. on 'Catskill' and on an unnamed seedling at Kentville, N.S. (C.O.G.).

POWDERY MILDEW (Sphaerotheca macularis) was sev., producing conspicuous leaf rolling, at Ste. Foy, Que. (D.L.).

WILT (Verticillium dahliae) occurred in 24/39 fields surveyed in Carleton, Northumberland, Wellington, Lincoln, Norfolk and Elgin Counties, Ont. Estimated average infection ranged from 2% in Elgin Co. to 8% in Northumberland and Lincoln Counties (A.T.B.). It caused about 1% loss in a planting of 'Guardsman' at Berwick, N.S. (C.O.G.).

ROOT ROT (various organisms) was reported from Barrhead, Edmonton, Hardisty and Calgary, Alta. (A.W.H., D.S.). Root rot, combined with low-temperature injury, caused damage ranging from tr.-10% in 40/40 fields visited in N.B. (S.R.C.).

GREEN PETAL (virus). Amounts ranging from 1-5% were found in 22 newly-set fields in N.B. Roguing of new plantings leaves only a tr. in the fruiting year (S.R.C.). About 2% infection was seen in a small planting of 'Sparkle' at Kentville, N.S. (K.A.H.). Infections of up to 5% were seen in Queens Co., P.E.I. (C.B.W.).

WITCHES' BROOM (virus). Trace infections were seen at Hartland and Hampstead, N.B. (S.R.C.).

JUNE YELLOWS (genetic) was seen in tr. amounts at Jemseg, N.B. (S.R.C.).

CHEMICAL INJURY. Fertilizers applied at too high concentrations caused complete defoliation in a field at Keswick and 20% injury at Gagetown, N.B. (S.R.C.).

WINTER INJURY caused a trace of damage to 'Cavalier' and 'Surecrop' at Digby, N.S. (C.L.L.).

DISEASES OF TREES AND SHRUBS*

ABIES - Fir

WITCHES' BROOM (Melampsorella caryophyllacearum). Infections were frequently observed in the Cavendish-Rustico area of P.E.I. (D.W.C.)

ACER - Maple

ANTHRACNOSE (Gloeosporium apocryptum) was mod. on 200 trees of A. rubrum in a nursery at Galt, Ont. (A.E.S.) and an infected specimen of A. platanoides was received from Beaumont, Bellechasse Co., Que. (D.L.). It was common but light in intensity at many locations in N.B. and was observed at 4 places in P.E.I. The disease was widespread in P.E.I. and shade trees of A. saccharum were affected in many towns (L.P.M.).

CORAL CANKER (Nectria cinnabarina) caused sev. injury to maples at Corner Brook, Nfld. (J.H., W.C.P.).

WILT (Verticillium sp.). The pathogen was isolated from 3 wilted maple trees at Ottawa, Ont. (H.S.T.).

CHEMICAL INJURY. 2,4-D drift caused some injury to 100 maples in a nursery at Spencerville, Ont. (A.E.S.).

DETERIORATION (adverse environmental conditions) was again common on A. saccharum along roadsides in s. Ont. (B.W.D., D.F.L.). A street tree of A. saccharum at Ottawa showed considerably die-back on one side (H.S.T.).

FROST AND WIND INJURY was mod. on 75 trees of A. saccharum at Oxford Mills and wind injury was mod. on 200 trees of A. rubrum at Galt, Ont. (A.E.S.). Affected specimens were received from Sillery and Ste. Foy, Québec Co., Thetford Mines, Megantic Co., Notre Dame du Lac, Temiscuoata Co. and Ste. Perpetue, Nicolet Co., Que. (D.L.).

LEAF SCORCH (cause unknown) was prevalent on A. saccharum and other deciduous trees along roadsides throughout s. Ont. (B.W.D., D.F.L.). Leaf scorch and premature leaf fall were pronounced on roadside maple trees, particularly A. saccharum in Three Rivers and Québec City and from Montmagny to Rivière du Loup, Que. (G.B.O.).

AESCULUS - Horsechestnut

LEAF BLOTCH (Guignardia aesculi) was common throughout N.S. but its intensity was below 1963 levels (L.P.M.).

AMELANCHIER

RUST (Gymnosporangium sp.). Infection was sev. on leaves and fruit of native amelanchiers at St. John's West, Nfld. (O.A.O.).

BERBERIS - Barberry

ROOT-KNOT NEMATODE (Meloidogyne hapla) caused 5-10% loss in a planting of red barberries in Louth Twp., Ont. Larvae were recovered at the rate of 3600/lb. of soil (J.L.T.).

RUST (Puccinia graminis) was mod. on 200 plants nr. Kingston, on 50 at Clarkson, on 2 at Galt and 1 at Ottawa, Ont. It was sev. on 20 plants at Campbell's Bay, Que. (A.E.S.). Berberis vulgaris and its variety atropurpurea were examined at 15 locations in Que. Its incidence was recorded as follows: tr. at Ste. Foy, sl. at Courville, Giffard and Charlesbourg, Québec Co., mod. at Ste. Petronille, Montmorency Co. and St. Nicholas, Levis Co., sev. at Ancienne Lorette and Beauport, Québec Co. No rust was found at 7 locations in Québec City (D.L., M.F.).

WILT (Verticillium dahliae) was sl. at Charlesbourg and mod. at Ste. Foy, Que. on B. thunbergii (D.L., J.R.).

CARAGANA - Pea Tree

SHOOT AND LEAF BLIGHT (Phyllosticta sp.) was observed at Wetaskiwin, Alta. (A.W.H., D.S.).

CHEMICAL INJURY, from drift of herbicides, was recorded on a hedge at Wakaw, Sask. (B.J.S.).

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* Diseases referred to in this section are mainly those of shade trees and ornamental shrubs, although occasional reference is made to diseases of native forest trees. For a more comprehensive report of tree diseases in Canada the reader is referred to the Annual Reports of the Forest Insect and Disease Survey, published by the Forest Entomology and Pathology Branch, Canada Department of Forestry, Ottawa, Ont.

CHAMAECYPARIS

ROOT ROT (Phytophthora spp.). Phytophthora root rot of ornamental evergreens, particularly of Lawson's cypress, C. lawsoniana continues to be a serious disease in some large nurseries in the Lower Fraser Valley, B.C. In recent years P. lateralis has been isolated more frequently from C. lawsoniana than has P. cinnamomi. A third, as yet unidentified, species of Phytophthora has been infrequently isolated from C. lawsoniana from 3 widely-separated nurseries in the Lower Fraser Valley, but it has not as yet been encountered on Vancouver Island. P. cinnamomi has been isolated as well from Taxus baccata from one mainland nursery and from T. baccata and T. cuspidata from a nursery in the Victoria area (R.G.A.).

CORNUS - Dogwood

CROWN CANKER (Phytophthora cactorum) caused the killing of many branches of a large tree of C. nuttalli in Butchart's Gardens, Victoria, B.C. The cambium was darkened to about 18" above soil level. The fungus was isolated by the green apple technique and produced typical paragynous antheridia in 2 days at 20°C (R.G.A.).

CORYLUS-Filbert

POWDERY MILDEW (Phyllactinia guttata) was sev. on the foliage of filberts at Sunshine Bay, B.C. Cleistothecia were abundant (D.L.McI.).

COTONEASTER

LEAF SPOT (Phyllosticta ?contoneastri Allesch.) was mod. on 500 shrubs in a nursery at Rougemont, Que. (A.E.S.).

FASCIATION (cause undetermined) has occurred for some years on C. microphylla in plantings on the University Campus, Point Gray, B.C. The condition has likely been perpetuated unwittingly by rooted cuttings (H.N.W.T.).

CRATAEGUS - Hawthorn

RUST (Gymnosporangium spp.). Leaves of C. columbiana were infected at Vernon and those of C. brevispina bore 1-20% infection at Vernon and Summerland, B.C. (G.E.W.). Rust was tr. on 50 shrubs in a nursery at St. Hilaire, Que. Pycnia only were observed (A.E.S.).

ELEAGNUS - Russian Olive

RUST (Puccinia caricis-shepherdiae) was observed on E. angustifolia at Yorkton, Sask. (B.J.S.).

WILT (Verticillium albo-atrum) severely affected an ornamental specimen tree of E. angustifolia at Summerland, B.C. (G.E.W.).

EUONYMOUS - Spindletree

CROWN GALL (Agrobacterium tumefaciens) was found on most plants in a planting of 12 in an Ottawa, Ont. nursery (A.E.S.).

FAGUS - Beech

BARK CANKER (Libertella faginea Desm.). The fungus, identifed by R.A.Shoemaker, was found fruiting profusely on dead or dying beech trees in a new housing sub-division at St. Catharines, Ont. (R.S.W.).

FORSYTHIA - Golden Bells

BACTERIAL BLIGHT (Pseudomonas syringae) was observed in a number of gardens on s. Vancouver Island (W.R.F.) and occurred on 1 bush in a garden also containing infected lilac and Japanese flowering cherry at Capilano, B.C. (H.N.W.T.).

FRAXINUS - Ash

ANTHRACNOSE (Gloeosporium aridum). Infections were common but generally light in N.B. and N.S. One tree at Upper Musquodoboit, N.S. suffered sev. defoliation (L.P.M.).

RUST (Puccinia sparganioides) was sev. in the Round Hill - Mochelle area of Annapolis Co., N.S. where many trees were apparently dying. Severe damage was also reported from Lansdowne (L.P.M.) and Wolfville, N.S. (L.P.M., R.G.R.).

HYDRANGEA

CORAL CANKER (Nectria cinnabarina) caused a trace of damage to 125 shrubs in a nursery at Ste. Rose, Que. (A.E.S.).

JUGLANS - Walnut

LEAF SPOT (Gnomonia leptostyla, stat. conid. Marssonina juglandis) was sev., causing a premature defoliation, on walnut at Charlesbourg, Que. (D.L.).

DIE-BACK (Melanconis juglandis) caused mod. damage to a tree at Kingston, Ont. The pathogen was identified by R.M.Arnold (H.S.T.).

BACTERIAL BLIGHT (Xanthomonas juglandis). Specimens showing the typical pits and breakdown of shells were received from Chilliwack, B.C. (H.N.W.T.).

JUNIPERUS - Juniper

RUST (Gymnosporangium spp.). A survey for the presence of gymnosporangium rusts on Juniperus spp. in nurseries in w. Ont. was carried out by the following inspectors of the London office of the Plant Protection Division, C.D.A.: G.T.A.Fenney, C.Ashton, F.Strubin and J.Kimpinski. The survey was conducted in June and collections were identified at Ottawa by J.A.Parmelee and A.E.Straby. They report as follows:

G. clavipes: on J. virginiana: tr. in 1 nursery each at St. Thomas, Brantford and Beamsville; mod. in 1 at St. Thomas; tr.-sev. in 1 at Port Dover; sev. in 1 at Simcoe; on J. v. var. glauca: tr. in 1 nursery at London and sev. in 1 at Simcoe: on J. v. var. canaerti: tr. in 1 nursery at London.

G. globosum: on J. virginiana: tr. in 1 nursery each at St. Thomas, Sarnia and Brantford; mod. in 1 nursery at St. Thomas and tr.-sev. in 1 at Port Dover: on J. v. var. glauca: mod. in 1 nursery at St. Thomas, Sarnia, Brantford and Petrolia: on J. sp.: tr.-sev. in 1 nursery at Galt.

G. juniperi-virginianae: on J. virginiana: tr. in 1 nursery each at Sarnia and Simcoe: on J. v. var. glauca: sev. in 1 nursery at Simcoe: on J. v. var. canaerti: tr. in 1 nursery each at Port Dover, Strathroy and Petrolia.

No rust was found on J. v. var. sabina, tamariscifolia, communis suecica or communis depressa at Simcoe.

TWIG BLIGHT (Phomopsis juniperovora) caused mod. killing of twigs of J. sabina at Haney, B.C. Specimens of J. sabina tamariscifolia with about half the foliage dead were also received from Pitt Meadows. Pycnia bore alpha spores only. Nurserymen reported this disease to be widespread in lower Fraser Valley nurseries in 1964. Above-average rainfall and cloudy weather may have contributed to its prevalence (R.G.A.).

LIGUSTRUM - Privet

ANTHRACNOSE (Glomerella cingulata) killed plants in a part of a hedge of the supposedly-resistant L. amurense at Lynwood Village, Ont. It apparently followed winter injury (H.S.T.).

LONICERA - Honeysuckle

LEAF BLIGHT (Herpobasidium deformans) was sev. on L. tatarica at Charlesbourg, Que. (D.L.).

POWDERY MILDEW (Microsphaera penicillata var. lonicerae). Affected specimens of L. tatarica were received from Duberger, Québec Co., Que. (D.L.).

MAHONIA - Oregon Grape

LEAF SPOT (Phyllosticta sp.) was sl. on 6 shrubs in a nursery nr. Ottawa, Ont. (A.E.S.).

MALUS - Flowering Crab

FIRE BLIGHT (Erwinia amylovora) occurred on Malus sp. at Peace River, Alta. (J.A.B.) and affected ornamental Malus spp. at St. Romuald, Levis Co., and Québec City, Que. (G.B.O.).

CORAL CANKER (Nectria cinnabarina) was observed on Malus sp. at Dimsdale, Alta. (J.A.B.).

POWDERY MILDEW (Podosphaera leucotricha). Affected leaves of crab were received from Champigny, Que. (D.L.)

SCAB (Venturia inaequalis) was common on ornamental Malus spp. in Québec City, Que. and vicinity (G.B.O.).

PARTHENOCISSUS - Virginia Creeper

CHEMICAL INJURY (2,4-D drift) was sl. on 2 young vines at Ottawa, Ont. (D.W.C.).

PEPEROMIA

ROOT ROT (Pythium spp.) affected nearly all the rooted cuttings of Peperomia in a Toronto, Ont. greenhouse (A.E.S.).

PHILADELPHUS

WILT (Verticillium albo-atrum). The pathogen was isolated from diseased plants from Pointe Claire, Que. This appears to be a new host record for North America (W.E.S.).

PICEA - Spruce

RUST (Chrysomyxa ledicola) affected all the trees of P. pungens in a planting at Sydney, N.S. (C.O.G.). Some rust was seen on most native spruce trees examined at St. John's, Foxtrap and Bay Roberts, Nfld. (O.A.O.).

TWIG CANKER (Cytospora kunzei Sacc.). Five trees of P. pungens were infected in a nursery at Abbotsford, Que. (A.E.S.).

DAMPING-OFF (Pythium sp.) affected seedlings in artificial culture in a nursery at Oliver, Alta. (A.W.H., D.S.).

DIE-BACK (Sphaeropsis ellisii Sacc. = Diplodia pinea (Desm.) Kickx = Macrophoma pinea (Desm.) Petr. & Syd.) caused slight injury on 100 shrubs of P. pungens kosteriana in a nursery at Rougemont, Que. The perfect state of the fungus is probably Botryosphaeria ribis Gross. & Dug. (A.E.S., R.A.S.).

FROST INJURY killed early-emerging shoots and caused slight injury to 100 small trees of P. pungens in a Spencerville, Ont. nursery (A.E.S.).

PINUS - Pine

RUST (Cronartium coleosporioides) affected a young planting of P. sylvestris on Lulu Island, B.C. Nearby P. contorta, a native species, was infected (H.N.W.T.).

GALL RUST (Cronartium quercuum). A large, sporulating canker was collected from a small tree of P. banksiana at Westmeath, Ont. (H.G.C., D.W.C.).

BLISTER RUST (Cronartium ribicola). Infection was sev. in a 60-tree planting of 10-year-old P. strobus at Laval, Montmorency Co., Que. Damage was estimated at 15-20%. Ribes gladulosum, an alternate host growing in the vicinity, bore scattered uredinial pustules (D.L., M.F.). A specimen bearing a large fruiting canker was received from Sutton, Que. (D.W.C.).

TWIG CANKER (Cytospora kunzei) was tr. on 100 P. strobus trees on a nursery at St. Hilaire, Que. (A.E.S.).

PLATANUS - Sycamore

ANTHRACNOSE (Gnomonia veneta) was widespread in coastal B.C. in the spring (W.R.F.).

POPULUS - Poplar

CANKER (Cytospora sp.) occurred at Acme and Leduc, Alta. (A.W.H., D.S.).

CANKER (Dothiciza populea) caused sev. damage to a tree of P. nigra var. italica at Dartmouth, N.S. (C.L.L.).

CANKER (Septoria musiva) was prevalent in a shelter belt at Millet, Alta. (A.W.H., D.S.). It was sev. on 3000 trees of 'Griffin' poplar (petrovskyana x deltoides) in a nursery at Esteven, Sask. An export certificate was denied (A.E.S., H.Z.).

LEAF SPOT (Septoria musiva). A specimen of affected P. balsamifera wes received from Charlesbourg, Que. (D.L.).

YELLOW LEAF BLISTER (Taphrina populina) was mod. on 500 trees of P. nigra var. italica at Ocean Falls, B.C. (A.E.S.) and was sev. on the same species at St. John's, Nfld. (O.A.O., H.S.T.).

CANKER (Valsa sordida). Moderate infection was seen on a tree of P. deltoides at Quebec City, Que. (D.L.).

SHOOT BLIGHT (Venturia ?tremulae). Specimens were received from Mannville, Penhold and Three Hills, Alta. (A.W.H., D.S.).

PRUNUS - Native and Flowering Cherry

BLACK KNOT (Dibotryon morbosum) was reported on P. padus at Camrose and Calgary, Alta. (A.W.H., D.S.). It was common and caused sev. injury to P. pensylvanica in all areas of Nfld. (J.H., W.C.P.). A number of first-year tumors were observed in 1964 (O.A.O.).

LEAF BLIGHT (Monilina seaveri) affected 50% of the leaves of P. serotina nr. Carp, Ont. on 25 May. Apothecia had been collected on 4 May. This fungus was first collected in the area in 1963 (M.E.E.).

BLADDER PLUM (Taphrina cerasi). Heavy infections were observed on P. pensylvanica at Cavendish, P.E.I. (D.W.C.).

PYRUS - Mountain Ash

CANKER (Cytospora sp.) was observed at Edmonton, Alta. (A.W.H., D.S.).

FIRE BLIGHT (Erwinia amylovora) occurred on mountain ash at Alix, Alta. (A.W.H., D.S.) and at St. Romuald, Levis Co., Québec City and Grondines, Portneuf Co., Que. (D.L., G.B.O.).

RUST (Gymnosporangium sp.) was sl. on native mountain ash at St. John's West, Nfld. (O.A.O.).

MINERAL DEFICIENCY. Specimens received from 5 locations in Alta. were affected by a marginal leaf necrosis, possibly caused by a mineral deficiency (A.W.H., D.S.). A lime-induced mineral deficiency caused pronounced marginal necrosis at Winnipeg, Man. (W.A.F.H.).

QUERCUS - Oak

FROST INJURY caused heavy damage to leaves of 200 trees of Q. borealis in a nursery at Spencerville, Ont. (A.E.S.).

RHAMNUS - Buckthorn

RUST (Puccinia coronata f. sp. agrostidis) was extremely light on R. frangula at Ottawa, Ont. (D.W.C.)

RHODODENDRON - Rhododendron, Azalea

GRAY MOLD (Botrytis cinerea) caused a 1% loss of rhododendron seedlings at Kentville, N.S. (C.O.G.).

LEAF SPOT (Cercospora handelii) affected some of the leaves on 75% of a planting of azaleas, R. indicum, at Falmouth, N.S. in July. Maneb sprays effectively controlled the disease and the plants were in excellent condition in Oct. (K.A.H.). This is the first report, to the Survey, of this disease (D.W.Creelman).

LEAF SPOT (Diplodina eurhododendri). Infection was sev. on R. smirnowii at Kentville and Truro, N.S. All infected plants at Kentville were removed (C.O.G., R.A.S.). The only previous report of this disease from Canada is from B.C. (C.P.D.S. 19: 107. 1940) (D.W.Creelman).

SHOOT GALL (Exobasidium vaccinii) was observed on azaleas in a number of gardens in the s. portion of Vancouver Island, B.C. (W.R.F.).

RIBES - Flowering Currant

ANTHRACNOSE (Drepanopeziza variable) occurred on a number of hedges in the Ottawa, Ont. area. Infection ranged from sl.-sev. (H.S.T., D.W.C.). It was mod. on 20,000 shrubs in a nursery at Ste. Rose (A.E.S.) and specimens were received from Charlesbourg, Que. (D.L.). Heavy infection on a hedge at Billtown, N.S. resulted in 75% defoliation (C.O.G.).

ROSA - Rose

GRAY MOLD BUD ROT (Botrytis cinerea). Specimens were received from Ste. Foy and Levis, Que. (D.L., J.R.).

BLACK SPOT (Diplocarpon rosae) was seen in several Vancouver, B.C. gardens (H.N.W.T.). Specimens were received from Riceton, Sask. and it was seen in an Ottawa, Ont. garden (H.S.T.). It was mod. at Charlesbourg, sev. at St. Nicolas and specimens were received from Ste. Foy, Que. (D.L.). Black spot was sev. on florabunda roses at Charlottetown, P.E.I. The variety 'Masquerade' suffered complete defoliation (G.W.A.).

SLIME MOLD (Mucilago spongiosa (Leyss) Morg. affin var. solida (Sturgis) Lister) was found enveloping stems and associated with unthrifty, or dying plants in 500 bushes of the variety 'Grootendorst' in a nursery at Strathroy, Ont. The organism was identified by G.D.Darker (A.E.S.).

RUST (Phragmidium sp.). A heavily-infected specimen was received from Kenora, Ont. No telia were present (D.W.C.).

NEMATODES (Pratylenchus penetrans, Meloidogyne hapla) were found at the rates of 300/10 gm of root and 144/10 gm of root on roses in Louth Twp., Ont. (J.L.T.).

POWDERY MILDEW (Sphaerotheca pannosa). Specimens were received from St. Raphael, Bellechasse Co., Que. (D.L.).

NEMATODES (Xiphinema diversicaudatum). Soil samples received from 12 benches in 4 greenhouses in Richmond, Ont. yielded 9-864 nematodes/lb. of soil. It was estimated from past experience that the grower would lose up to 25% of his crop (J.L.T.).

MOSAIC (virus). One plant of the variety 'Peace' was affected in a home garden in Ottawa, Ont. (H.S.T.).

CHEMICAL INJURY (2,4-D) was sl. in an Ottawa, Ont. garden (D.W.C.).

SALIX - Willow

CANKER (Cytospora sp.) caused sev. damage in a shelterbelt at Leduc and was reported from Edmonton, New Sarepta and Vulcan, Alta. (A.W.H., D.S.).

BLIGHT (Pollacia saliciperda). Infection was sev. on ornamental willows at Chapleau (G.B.O.) and a specimen of infected S. laurifolia was received from Sillery, Que. (D.L.). Salix vitellina was 100% infected at Grand Pre and other points in Kings Co., N.S. A few native willows were also severely infected. Fungicidal sprays, where coverage was adequate, gave excellent control (K.A.H.).

CANKER (Valsa leucostoma). An infected specimen of S. laurifolia was received from Montmagny, Que. (D.L.).

SAMBUCUS - Elder

CROWN ROT (pathogen undetermined), observed in the Edmonton, Alta. area for several seasons, occurred again in 1964. A similar disease was also reported from Camrose, Innisfail, Rocky Mountain House and Wernerville. A phycomycete has been consistently isolated but pathogenicity trials have not been completed (A.W.H., D.S.).

SPIRAEA

LEAF SPOT (Helminthosporium ?spiraeae Syd.) was sl. on 500 bushes of S. arguta in a nursery at Actonvale, Que. (A.E.S.).

SYRINGA - Lilac

LEAF SPOT (Cladosporium ?herbarum) was observed on an ornamental lilac at Kelowna, B.C. (D.L.McI.).

POWDERY MILDEW (Microsphaera penicillata) was sl. on French lilacs in a home planting at Ottawa, Ont. (D.W.C.) and was sev. at Sussex, N.B. (S.R.C.).

BACTERIAL BLIGHT (Pseudomonas syringae) was observed in a number of localities in coastal B.C. (W.R.F.).

WIND INJURY. Specimens were received from Cutknife and Rockhaven, Sask. (R.J.L.).

ULMUS - Elm

DUTCH ELM DISEASE (Ceratocystis ulmi). A northward range extension of about 30 miles, from Callendar to Sturgeon Falls, was recorded in e. Ont. (B.W.D., D.F.L.). It continued to spread in N.B. and was found in 1964 at Sevogle representing a northeasterly extension of about 40 miles down the Miramichi valley (L.P.M.).

LEAF SPOT (Gnomonia ulmea). Infected leaves of U. pumila were received from Yorkton, Sask. (R.J.L.).

CORAL CANKER (Tubercularia ulmi) was found on U. pumila at Beaverlodge, Alta. (J.A.B.). Specimens on the same host were received from Québec City, Que. (D.L.) and sev. injury was observed on elms at Corner Brook, Nfld. (J.H., W.C.P.).

FROST INJURY caused sl. injury to leaves of 100 trees of U. pumila in a nursery at Spencerville, Ont. (A.E.S.).

VIBURNUM

ROOT-KNOT NEMATODE (Meloidogyne hapla) was found on roots of Viburnum sp. at St. Hilaire, Que. (M.O.T.)

POWDERY MILDEW (Microsphaera penicillata). Infection was sev. on Viburnum tinus, laurestinus, in Victoria, B.C. (W.R.F.).

DISEASES OF HERBACEOUS ORNAMENTALS

ALTHAEA - Hollyhock

RUST (Puccinia malvacearum) was commonly seen in the Okanagan Valley, B.C. (G.E.W.) and was sev. at St. Casimir, Portneuf Co., Que. (D.L.).

STEM AND CROWN ROT (Sclerotinia sclerotiorum). A severely-rotted specimen was received from Victoria, B.C. Sclerotia were abundant in affected tissues (M.E.E.).

AQUILEGIA - Columbine

POWDERY MILDEW (Erysiphe polygoni) occurred frequently, late in the season, in the Okanagan Valley, B.C. (G.E.W.) and was reported from Edmonton, Alta. (A.W.H., D.S.).

BEGONIA

GRAY MOLD (Botrytis cinerea) caused a leaf blotch on begonias at Edmonton, Alta. (A.W.H., D.S.). Infection was sl.-mod. on 500 tuberous begonias in a greenhouse at Champigny, Que. (A.E.S.).

POWDERY MILDEW (Erysiphe cichoracearum). Infected specimens were received from Quebec City in Aug. and Sept. (D.L.).

CALENDULA

SMUT (Entyloma polysporum). Volunteer plants growing in a bed at Kentville, N.S. where calendulas were infected in 1963 became severely infected and finally defoliated. The organism apparently overwintered on leaf debris (K.A.H.).

CALLISTEPHUS - China aster

ASTER YELLOWS (aster yellows virus). The variety 'Queen of the Market' was 100% infected in a small planting at Kentville, N.S. by the first of Oct. (K.A.H.).

CHRYSANTHEMUM

POWDERY MILDEW (Erysiphe cichoracearum). Specimens were received from Calmar and Westlock, Alta. (A.W.H., D.S.). Heavily-infected leaves were received from Yarm, Que. (D.W.C.).

WILT (Verticillium albo-atrum). Incidence in the coastal areas of B.C. was the highest in memory. Colder than normal spring temperatures favored the disease (W.R.F.).

DAHLIA

BUD ROT (Botrytis cinerea). A specimen was received from Levis, Que. (D.L.).

TUBER ROT (Sclerotinia sclerotiorum) affected one to several tubers from about 50% of the plants of the variety 'Unwin' at Summerland, B.C. Infection sometimes developed on the basal parts of old stems. Rot became evident soon after the plants were lifted in late Oct. (G.E.W.).

LOW-TEMPERATURE INJURY. Damaged tubers were received from Saskatoon, Sask. (R.J.L.).

DELPHINIUM - Larkspur

POWDERY MILDEW (Erysiphe polygoni) was observed at Edmonton, Alta. (A.W.H., D.S.).

DICENTRA - Bleeding heart

GRAY MOLD BLIGHT (Botrytis cinerea) affected plants at Edmonton, Alta. (A.W.H., D.S.).

EUPHORBIA - Poinsettia

ROOT ROT (Thielaviopsis basicola). Plants of 2 varieties received from an Ottawa, Ont. nursery were severely affected (H.S.T.).

FICUS - Rubber plant

ANTHRACNOSE (Glomerella cingulata). Affected specimens were received from Falker and Red Deer, Alta. (A.W.H., D.S.).

GLADIOLUS

LEAF AND FLOWER SPOT (Botryotinia draytoni) was sev. in a commercial planting for late flower production at Charlesbourg, Que. Varieties affected and extent of infection were: 'Spic and Span', 90% infection in 12,000 plants; 'General Eisenhower', 60% infection in 3,000; 'Leeuwenhorst', 50% infection in 3,000 (A.E.S.). Trace infections were seen at Kentville, N.S. (C.O.G.).

GRAY MOLD (Botrytis cinerea) was reported from Edmonton and St. Paul, Alta. (A.W.H., D.S.). Dull, rainy weather in late Sept. and early Oct. in the Annapolis Valley, N.S. resulted in very severe infection of petals of late-flowering gladiolus varieties (K.A.H.).

CORM LESIONS (Curvularia trifolii f. sp. gladioli). A lot of 300,000 corms of 'Spic and Span', grown at Leamington, Ont. and destined for export, was found to be heavily infected by this organism and was refused certification (A.E.S.).

CORM ROT (Fusarium oxysporium f. gladioli) was reported from Leduc, Alta. (A.W.H., D.S.). Twenty per cent of 10,000 corms from a Guelph, Ont. grower were found affected at Fort William, Ont. A trace of infection was seen in a smaller shipment from the same Guelph grower at Montreal, Que. (A.E.S.). The variety 'Life Flame', apparently highly susceptible, was 90% infected at Kentville, N.S. An adjacent row of 'Snow Princess' was unaffected (K.A.H.).

SCAB (Pseudomonas marginata) was seen at Wetaskiwin, Alta. (A.W.H., D.S.). It was sl. in lot of mixed varieties at Kentville, N.S. (K.A.H.).

NECK ROT (Stromatinia gladioli) was sev. on the more susceptible varieties in most plantings in Kings Co., N.S. The usually-resistant variety 'Spotlight' showed 8% infection in an isolated planting that had been free of the disease for 2 years (K.A.H.).

MOSAIC (virus). In a planting at Kentville, N.S., 35% of the plants of a lot of 'Spotlight' were rogued because of virus symptoms. The same lot was 77% rogued in 1962 and 56% rogued in 1961. It is apparent that rogueing is not an effective means of eliminating mosaic from severely-infected gladiolus stocks (K.A.H.).

WHITE STREAK (virus) was sev. in a planting at Ste. Foy, Que. (D.L.).

IRIS

LEAF SPOT (Didymellina macrospora) caused slight damage in a planting of 'Wedgewood' iris set out for field bloom on Vancouver Island, B.C. None was seen in 3 plantings entered for inspection (R.P.M.). It was mod. on 50 rhizomatous iris plants in a nursery nr. Kingston, (A.E.S.) and ranged from sl.-sev. in Ottawa, Ont gardens (H.S.T.). Infection was 50% at Kentville, N.S. (C.O.G.)

RUST (Puccinia iridis) occurred on Iris versicolor at Kentville, N.S. (C.O.G.)

NARCISSUS - Daffodil

SMOULDER (Botryotinia narcissicola) occurred in tr. amounts on Vancouver Island (R.P.M.) and was seen in 10/20 fields on the Lower Mainland, B.C. (B.M.L.).

BULB AND STEM NEMATODE (Ditylenchus dipsaci) caused some losses on Vancouver Island in the fields of one large grower who neglected to treat his bulbs with the recommended hot water treatment (R.P.M.). A 3-acre field on the Lower Mainland, B.C., which produced 20 tons of the variety 'Flower Carpet', was badly infested. The harvested bulbs were all given the prescribed hot water-formalin treatment (B.M.L.).

MEADOW NEMATODES (Pratylenchus spp.) were found in 2/20 fields in the Lower Mainland, B.C. Those portions of the fields shown to be infested were fumigated (B.M.L.).

SCORCH (Stagonospora curtisii), which was found in tr. amounts only on Vancouver Island, occurred as slight-moderate infections in all 20 fields inspected on the Lower Mainland, B.C. Yield losses up to 10% were recorded (R.P.M., B.M.L.).

MOSAIC (virus). A major planting of 'King Alfred' on Vancouver Island had 1.3% infection. Favorable weather conditions allowed its complete eradication by rogueing (R.P.M.). It was found in 5/20 fields inspected on the Lower Mainland of B.C. (B.M.L.).

WHITE STREAK (virus) was prevalent in most narcissus stocks in the Lower Mainland, B.C. late in the season. The disease is causing noticeable yield reductions in many narcissus stocks in the Fraser Valley (B.M.L.).

PAEONIA - Peony

BOTRYTIS BLIGHT (Botrytis paeoniae). Diseased specimens were received from Acme, Calgary, Vilna and Vulcan, Alta. (A.W.H., D.S.). Infection was mod. at Ste. Foy, Que. (D.L.) and sev. on one plant at St. John's, Nfld. where peonies are not commonly grown (O.A.O.).

ROOT-KNOT NEMATODE (Meloidogyne hapla) was found on peony roots from the Toronto, Ont. area (M.O.T.).

PELARGONIUM - Geranium

GRAY MOLD (Botrytis cinerea) caused a severe leaf spot and blossom blight on a large number of plants in an Ottawa, Ont. garden (H.S.T.).

BACTERIAL LEAF SPOT (Xanthomonas pelargoni) caused considerable damage in a greenhouse at Victoria, B.C. The pathogen was isolated and its pathogenicity demonstrated by inoculation into healthy plants (W.R.F., G.E.W.).

DAMPING-OFF (various soil organisms) was reported from Edmonton, Alta. (A.W.H., D.S.).

PETUNIA

STEM ROT (Sclerotinia sclerotiorum) affected a number of varieties, particularly 'Coral Satin', at Regina, Sask. (H.S.T.).

PHLOX

STEM AND LEAF BLIGHT (Colletotrichum dematium) was mod. on 500 plants in a nursery at St. Laurent, Que. (A.E.S.).

POWDERY MILDEW (Erysiphe cichoracearum). Heavy infection was seen on P. paniculata in 2 Ottawa, Ont. gardens (D.W.C.).

LEAF SPOT (Septoria phlogis). Infection on P. paniculata was sl. at Deschambault, mod. at Cap Rouge and St. Joachim and sev. at Champigny, Que. (D.L.).

TAGETES - Marigold

ASTER YELLOWS (aster yellows virus) was seen on 9/75 plants examined at St. Catharines, Ont. It was observed on Plantago, Taraxacum and Aster pillosa in the same area (T.R.D.).

TULIPA - Tulip

FIRE (Botrytis tulipae) was seen only as traces in 3 plantings on Vancouver Island. Less secondary fire was seen than for many years (R.P.M.). Considerable fire developed on the Lower Mainland of B.C. in areas where air drainage was poor. Reductions in yield were as high as 15% (B.M.L.). A specimen was received from Levis, Que. (D.L.) and damage was sl. after bloom at Kentville, N.S. (K.A.H.).

SOFT ROT (Erwinia carotovora) was observed at Brooks, Alta. (A.W.H., D.S.).

BREAK (virus) affected the variety 'Sweet Harmony' and others in a garden at Toronto, Ont. (H.S.T.).

ZINNIA

POWDERY MILDEW (Erysiphe cichoracearum) was prevalent in a number of gardens at Ottawa, Ont. (H.S.T.) and at St. Jean, Que. (R.C.).

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APPENDIX 'A'

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