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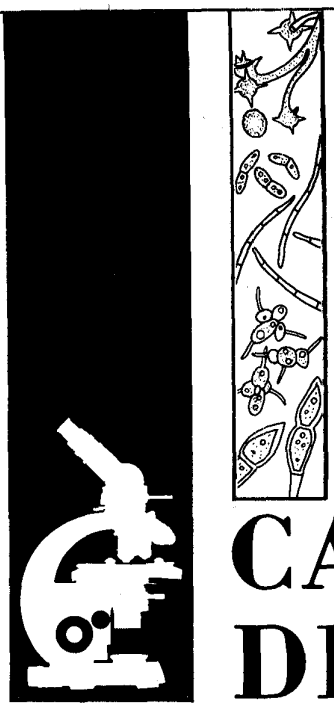

CANADIAN PLANT DISEASE SURVEY

EDITOR W.L. SEAMAN

RESEARCH BRANCH CANADA DEPARTMENT OF AGRICULTURE

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CONTENTS

"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."

SUMMARY OF THE PREVALENCE OF PLANT DISEASES IN CANADA IN 1967

W. L. Seaman[1]

The information presented here on the occurrence of plant diseases has been compiled from reports to the Canadian Plant Disease Survey by plant pathologists, crop specialists, and representatives of regulatory agencies in various regions of Canada. These contributors are identified by their initials following each report, and their names and locations are listed in the Index of Contributors.

This summary is published to provide a continuing record of the prevalence and severity of plant diseases in Canada that will be readily available to pathologists and regulatory specialists throughout the country. Some of the reports are based on chance encounters and on diseased specimens submitted for diagnosis and do not always reflect the results of intensive or widespread surveys. However, the recording of these reports should be helpful in attracting attention to newly recognized diseases and to changes in the level or distribution of pathogen populations. Hopefully a continually updated inventory of existing diseases will assist pathologists in recognizing the new and the unusual.

Noteworthy diseases and weather conditions

British Columbia

Lower Fraser Valley.--The 1966-67 winter was exceptionally mild and, although temperatures were lower in outlying agricultural districts, frosts were rare in the Vancouver area and such tender plants as fuchsias, marguerites and geraniums survived. The spring was cooler than normal but was favorable to grass and pasture production.

During the five months April to August, sunshine was much above and rainfall much below average. Mean temperatures were well above normal in June and August. The CDA Research Station at Agassiz reported a 6.48 inch rain deficiency and a total of 174.8 hours extra sunshine (the equivalent of a whole month) for the above five month period. After the dry summer months rainfall returned to normal in September, but temperatures remained above normal and pastures recovered from the summer drought. In October, however, Agassiz recorded 14.33 inches of rain, better than double the long term average. The first killing frost occurred in November. Some 3 to 5 inches of snow fell immediately before Christmas but lasted no more than a few days.

The warm, dry summer prevented much of the usually prevalent damage to berry fruits from gray mold caused by Botrytis cinerea. The incidence of foliar diseases on all crops was of minor importance, as it had been in 1966. Late blight of potatoes did not occur generally in August, as is usual, but where growers neglected the routine spray schedule and were careless about irrigation, some foliar damage resulted. Irrigation was also blamed for a few severe cases of tuber rot in the field; Phytophthora infestans, P. erythroseptica, and Pythium spp. were all contributory. Where irrigation was used, rough potato tubers were present, especially in 'Netted gem.'

Xanthomonas pelargonii (N.A. Brown) Starr & Burkh. was detected in Pelargonium cuttings imported from California, and losses of up to 20% were sustained in some shipments.

Puccinia pygmaea Erikss. was identified on Mahonia aquifolium for the first time in Canada at a nursery near Vancouver, B.C., but its alternate grass hosts were not found.

Southern interior valleys.--For the second successive year, weather conditions were very favorable for growth of crops, and unfavorable for development of many diseases. The 1966-67 winter was mild, with temperatures below 20F recorded at Summerland on only 3 days, the lowest being 18F. There was snow on the ground for only a few days in December 1966 and during the first half of January 1967. All months from February to September, except May, had unusually low rainfall. Summerland recorded approximately 1 inch in the 3 months February-April, 1 inch in May, and 1 inch in the 4 months June-September. The higher rainfall in May provided two apple scab infection periods; and the Kootenays had an additional heavy rainfall in late June, providing a third infection period. However, no serious commercial losses from apple scab were reported. There were mild and scattered occurrences of peach leaf curl. The blossom blight phase of brown rot was absent on all stone fruits, even in orchards with abundant overwintering inoculum. Brown rot on fruits was reported in a few scattered orchards but losses were negligible. Rhizopus rot of peaches reached normal levels in fruit lots that were not treated, demonstrating that its incidence is less dependent on weather conditions. Pear fire blight incidence was reduced to a few late season infections in several orchards.

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Early spring temperatures were high, inducing unusually early breaking of tree dormancy. Cool weather in April and May delayed full bloom to the normal season. This cool period coincided with seeding and transplanting times of many vegetables, so that these crops started slowly. Spring-seeded onions gave very low percentage germination in many fields, apparently because of prolonged exposure of the germinating seeds to chemicals applied as seed treatments. From late May until the end of September temperatures were consistently above normal, with the result that all fruit crops and most vegetable crops grew and matured well. Foliar and fruit diseases of field tomatoes remained at a low level throughout the season.

Pythium aphanidermatum (Edson) Fitzp. was reported on table beets (Beta vulgaris L.) for the first time in Canada near Armstrong, B.C. Damping-off, yellowing, and stunting were associated with this soil-borne disease (See Till, CPDS 48:37). P. aphanidermatum has been reported previously on sugar beets in Ontario.

As is usual in hot summers in the Kootenays, the surviving sweet cherry trees infected with little cherry virus produced very small unmarketable fruits.

In some Okanagan orchards serious levels of Anjou pit (cork spot) of pear occurred for the first time since 1962. This is believed to be a physiological disorder that characteristically appears in hot summers.

Powdery mildew was also unusually severe on apples and on sweet cherry in the interior of British Columbia.

In the Okanagan Valley, a "golden discoloration" disease of Sambucus nigra var. aurea was found to be caused by a virus that was also transmissible to seedlings of peach and cherry.

The association of Stemphylium spp. with a fruit rot of apples in controlled atmosphere storage following possible low temperature injury is apparently a new record for Canada.

The B.C. grape harvest increased an additional 50% in 1967, reflecting not only the increased acreage, but the full recovery of vines from the 1964 winter. The crop was free from all diseases except powdery mildew, which was adequately controlled by sulphur sprays.

The most serious foliar diseases in this area in 1967 were the powdery mildews on fruit plants and many ornamentals. This is attributed partly to the favorable 1967 summer weather, but at least on pome fruits it can be largely attributed to a succession of mild winters through which overwintering of the fungus has been uninterrupted. Losses in the sweet cherry crop due to powdery mildew infection of the fruit were more widespread than in any previous year and reached substantial proportions for the first time.

Caribou and Central B.C.--A very dry spring was followed by a dry hot summer, and yields of all potato varieties were reduced by drought. Although many leafhoppers were present, symptoms of aster yellows were not as widespread as in previous years.

Rhizoctonia canker occurred in almost all potato fields on Vancouver Island and in the Cariboo and central areas of British Columbia. Plants weakened by drought were severely damaged and 'Netted Gem' plants appeared to be most seriously affected. Witches' broom continued to be a problem in seed produced in the Cariboo area of B.C.

The Fusarium solani that has been associated with a dry rot of potato tubers in B.C. was identified as F. solani var. eumartii.

Alberta

Southern Alberta.--During late April and early May, southern Alberta received record-breaking snowfalls, totalling 60-70 inches, that greatly enhanced damage from psychrophilic pathogens.

Pink snow mold incited by Fusarium nivale, which has been thought to be indigenous to southern areas of the temperate zone and relatively unimportant in the Canadian prairies, caused extensive damage to winter wheat, Kentucky bluegrass and creeping bent in southern Alberta following the unusually heavy snowfall (See Lebeau, CPDS 48:130-131.).

F. nivale and Typhula spp. have been associated with snow mold damage of turfgrasses in Ontario and southwestern Quebec, but our records on the etiology of snow mold in most parts of Canada are fragmentary.

In addition to the late snowfall, most parts of the district also received up to 2 inches of rain in late May so that most plantings were delayed by 2-6 weeks by the unseasonably cold, wet weather. During the remainder of the growing season, however, extremely arid conditions were experienced, with practically no rainfall in July and August. As a result little damage was found from foliage diseases.

Central and Northern Alberta.--Below-normal temperatures and precipitation were experienced during April and May; April was the coldest since 1954, resulting in slow melting of snow from fields. During the rest of the summer, temperatures were normal or above normal; but precipitation was below average and wind velocities were above normal. In many areas these factors resulted

in drought conditions, which affected potato yields considerably.

In Alberta Stemphylium loti was reported for the first time in Western Canada on birdsfoot trefoil. S. loti was first reported in Canada on Lotus corniculatus in Quebec in 1966.

At Lacombe, Alta., root rot of barley was more prevalent than in the previous 2 years. Observations indicated that the disease was less severe in fertilized than in nonfertilized land, and the cultivar 'Jubilee' appeared to be somewhat more resistant than 'Gateway'. Contrary to expectations, disease indices were higher in rotations in which barley followed fallow than when barley followed barley. Undersowing barley with bromegrass also appeared to increase the severity of root rot (See Piening et al., CPDS 47:108-109).

Saskatchewan

Late spring seeding resulted from the slow disappearance of snow, but moisture was generally adequate for prompt germination and emergence. Except for a period after mid-July, temperatures were not high and nights were cool throughout most of the season. Rainfall was generally low throughout the growing season and in many parts of the province it was the lowest on record. Except for a few areas, foliage diseases were of minor importance.

It is notable that common root rot was rated light throughout the wheat-growing area although this disease is usually favored by less than adequate rainfall. Possibly moisture at the seed level was too low to promote activity of the fungus until late in crop development. Light rains occurred generally in early August, and yields of grain were slightly above average.

In Saskatchewan, leaf spot diseases of bromegrass appeared 2-3 weeks later than in 1966. Damage was light in the brown and dark brown soil zones and on drought-affected areas of the thin black soil zones. However, Pyrenophora bromi caused slight to moderate damage to hay and seed crops in late July and August in some northern areas on black and gray soils. As had previously been noted in Saskatchewan, P. bromi was the predominant leaf spot pathogen of brome on black and gray soils in Alberta and in the Peace River region of British Columbia. Selenophoma bromigena was found to be widely distributed over all soil zones in the bromegrass-growing area, and Rhynchosporium secalis occurred sporadically in all areas surveyed (See Smith, CPDS 47:112-115).

Yields of timothy seed were reduced by 50% from 1966 levels by a leaf spot incited by Heterosporium phlei Gregory.

Despite low rainfall during the growing season, yields of rape in the Prairie Provinces almost equalled those of 1966. The unexpectedly high yields were attributed, in part, to the unusually low incidence of leaf and stem diseases, such as alternaria spot. Of the chief pathogens of rape, only Leptosphaeria maculans caused more damage in 1967 than it had in previous years. In Saskatchewan the brassica strain of the fungus extended its range from the Saskatoon-Humboldt-Naicam region north to the Melfort area.

New records for Saskatchewan include Mycosphaerella brassicicola on Brassica kaber var. pinnatifida at Brooksby; Plenodomus lingam on B. kaber var. pinnatifida, and Gliocladium roseum on rape, near Saskatoon. Ascocarps of Leptosphaeria maculans, the perfect state of P. lingam, were collected in the Saskatoon, Sask., area on Thlaspi arvense. This is believed to be the first report of the perfect state of the blackleg fungus on crucifers in Canada (See Petrie & Vanterpool, CPDS 48:25-27).

Manitoba

As elsewhere in the Prairie Provinces, unusually dry weather during the growing season was probably the major factor limiting development of rust on cereal crops in Manitoba in 1967. Precipitation in Manitoba from April 1 to September 11 was 8.97 inches compared to the average 12.25 inches. Rust development on winter wheat in the United States was also limited by drought and by an extended period of low temperatures. Consequently relatively few urediospores of the leaf and the stem rust fungi were carried into Western Canada. Wheat yields, therefore, were not affected by rust. Indeed, stem rust was not found on any resistant variety of wheat grown in the rust area throughout the growing season. Similarly, stem rust of oats was less prevalent than in any other year since 1961; and losses to oats from stem rust and from crown rust in Western Canada were negligible.

Spore trapping activities showed that insignificant numbers of spores of leaf rust were produced in Western Canada before mid-July and of stem rust before early August. The occasional incidence of high spore counts both early and later in the growing season was positively correlated by meteorological studies with air movements originating in the winter wheat producing areas of Kansas and Nebraska. During these periods unstable homogenous air masses were present from Kansas and Nebraska to Manitoba and eastern Saskatchewan and air from the south moved into Western Canada. In these masses convection currents were also present that could carry spores to high altitudes and return them to earth. Upper air currents of 40-60 nautical mph were present that could

carry spores rapidly and fairly uniformly over large areas. For further information on the distribution of rusts on cereal crops in Canada in 1967, see articles by Green, Samborski, Martens, and Fleischmann in CPDS 48:1-19.

Following the worst outbreak of aster yellows on record in 1966, incidence of the disease on barley was very low in the Canadian prairies in 1967. The prevalence of aster yellows in stinkweed (Thlaspi arvense L.) indicated that the causal agent had successfully overwintered in this weed host. However a lower than usual population of the leafhopper vector, Macrosteles fascifrons was noted; few, if any, eggs of the insect survived the winter in Manitoba, and the spring migration from the south was lighter and occurred later than usual. For further information on virus diseases of cereals and populations of vectors, see Gill & Westdal, CPDS 47:101-103.

Verticillium dahliae Kleb. was reported for the first time in Manitoba from an elm tree showing symptoms of wilt.

Ontario

Temperatures in most areas of Ontario were normal during June and July but were somewhat below normal in May and August. In most counties seeding was delayed because of frosts and heavy rainfall. Damage to winter wheat crops from winter killing was slight, but high water levels in the spring caused widespread damage, and total losses in this crop from winter kill and water damage were estimated at 11%.

Wet spring weather delayed the planting of spring grains and potatoes, and in the Western and Central regions heavy rainfall continued into July. Record yields of tame hay, clover, and alfalfa were recorded (cuttings averaged 2.6 tons/acre), but the quality was poor. Similarly the yields of spring grains were above average but the quality was generally only fair. In the Southern region dry weather early in September hastened the maturity of soybeans, resulting in lowered yields. However wet weather later in the season caused difficulties in harvesting dry beans, soybeans, corn, and potatoes. In Simcoe County alone, flooding and water damage accounted for a loss of about 29% of the potato crop; 3100 acres were lost early in the season and another 500 acres were abandoned at harvest. In the Niagara District, however, heavy rains just before harvest resulted in an increase of 12% in grape production.

Crown rust caused by Puccinia coronata f. sp. avenae was very prevalent and severe in parts of eastern Ontario, where yield losses of up to 20% were reported (See Clark, CPDS 48:134-135).

In southwestern Ontario Sclerotinia sclerotiorum caused considerable losses in seed bean (Phaseolus vulgaris L.) crops growing on low-lying or wet land. The disease appeared late in the season and caused up to 50% yield losses in some 'Sanilac' and 'Seaway' fields due to pod rot (See Wallen & Sutton, CPDS 47:116).

Fusarium yellows of cabbage incited by Fusarium oxysporum f. conglutinans was particularly troublesome in the Burlington, Ont., area and was noted in several other locations in Ontario (See Reyes & Warner, CPDS 47:116-117).

Southern bacterial wilt of tomato incited by Pseudomonas solanacearum was reported for the first time since 1949 in southwestern Ontario. Transplants in all affected fields and most tomato seedlings used as transplants in this area were imported from the southern United States (See Layne & McKeen, CPDS 47:94-98).

Alternaria dauci (Kuhn) Groves & Skolko on celery and Phoma destructiva Plowr. on pepper were reported for the first time in Canada from Ontario. For results of an extensive survey of vegetable diseases in Ontario in 1967, see Reyes et al., CPDS 48:20-24, 53-55, and 95-96.

Horse-nettle (Solanum carolinense L.) was found to be a weed host of tobacco mosaic virus in the Ontario tobacco growing area.

In Ontario root lesion nematodes (Pratylenchus spp.) continued to cause decline and replant failure in orchards and caused severe stunting of Juniperus and Taxus. Almost all soil samples tested from Ontario tobacco fields yielded root lesion nematodes, and fumigation has become necessary in most fields. Meloidogyne hapla, the northern root knot nematode, was found in many crops and it is apparently becoming more prevalent in tobacco soils. It was also found in ginseng (Panax quinquefolius L.) (See Olthof et al., CPDS 47:110-111).

Unusually large numbers of plant-parasitic nematodes (19 genera, 34 species) were identified in 1967; most were from soil and plant material intercepted at ports of entry (See Hadland, CPDS 48:43-46).

A new western extension of the distribution range of Dutch elm disease was indicated by the detection of infected trees at Sault Ste. Marie, Ontario.

In southwestern Ontario, three of the four usual symptoms of bacterial spot caused by Xanthomonas pruni were found in peach orchards. Spring cankers were observed from late April until June and are important sources of primary inoculum; defoliation from leaf spot occurred during July-September, but fruit spots were less common on most varieties. The summer canker phase was not

found, even in severely affected trees, during the 3 years of the study, 1965-67 (See Dhanvantari, CPDS 48:32-33).

Quebec

Cool weather in May delayed planting and hot weather in June and July had some influence on the sporadic occurrence of potato late blight. Heavy rains in August favored development of foliage diseases, and late blight became severe in several counties. An early frost in September and top killing reduced the spread of the disease somewhat, but tuber rot was moderate to severe in some areas. Dry conditions checked the disease on the North Shore.

Verticillium wilt of eggplant is destructive in Canada wherever eggplant is grown extensively; in 1967 its distribution was extended to Quebec.

Powdery mildew was reported on adult apple trees for the first time in Quebec.

New Brunswick

The weather in New Brunswick during the growing period of May 1 to September 30, 1967 was most favorable for the development of many plant diseases. In summary, May was cold and wet with late snowfalls covering most areas of the province. Planting of the main crops was considerably delayed, resulting in an overall reduction in yield and a very high incidence of root- and seed rots.

The early part of June was very wet and cold, and was followed by a dry period during which most of the crops were planted. July and August were not extremely wet, but frequent showers and high humidity gave desirable conditions for the spread of many plant diseases. September was extremely wet throughout the province, and the late crops suffered extensively from plant diseases. In fact, only the absence of frost permitted the harvesting of the potato crop. Had normal freeze-up occurred, a high percentage of the crop would have suffered extensive damage.

Dutch elm disease made small gains in New Brunswick in 1967.

Most areas of N.B. received above-average amounts of rainfall for the period July 1 to September 30. Rainfall data for selected stations in the province as a percentage of the 10-year average are Fredericton, 109.9%; Gagetown, 143.2%; Grand Falls, 116.7%; Moncton, 158.3%; Sussex, 160.5%; Woodstock, 220.5%; and Chatham, 136.9%.

Excessive losses due to the relationship of weather to plant diseases were recorded with the following crops.

Botrytis diseases of strawberries, raspberries, beans, blueberries, tomatoes, and potato foliage caused serious losses.

Scab disease of cucumber was troublesome both in commercial plantings and in home gardens. Leaf spot was more prevalent than usual.

Apple scab, though not serious in the overall picture, was found in most orchards due to primary spread in May and early June.

Root rot disease of grains, especially of barley, was serious in the province this year. It would appear that humidity and soil moisture were ideal since 60% of the crop was lost.

Bacterial soft rots in potatoes, turnips, and carrots were more prevalent than in previous experience.

The finding of clover yellow vein mosaic virus in New Brunswick, P.E.I., and Quebec represents the first positive identification of this virus in North America. It was distinguished serologically from bean yellow mosaic virus and pea mosaic virus; all three of these viruses have somewhat similar host reactions and have similar particle lengths. It has been suggested that CYVV may have been collected before in North America but reported as BYMV or PMV (See Pratt, CPDS 48:87-92). Pea streak virus was widespread in red clover in the St. John Valley of N.B. and in the Ottawa Valley in Ontario but was less common elsewhere in eastern Canada and was not present in P.E.I.

Nova Scotia

Sub-zero temperatures reaching -11F accompanied by winds of 30 mph during February 1967 severely damaged peach buds and caused some injury to plum and cherry flower buds. Bark splitting on sweet cherry was attributed to this cold spell, which may also have caused rather severe losses of young apple trees.

The spring was very backward, and the mean temperatures for April and May were 5F below the 50-year averages. Apple buds were up to 2 weeks late in opening and trees were late in coming into full bloom. The first discharge of apple scab ascospores was on May 10, with a light infection period on May 20. A moderate to heavy infection period occurred on May 25-27, at which time many orchards were unsprayed, mainly because of soft ground. Conditions throughout the remainder of the growing season were favorable for the development and spread of apple and pear scab, and the disease was more prevalent in commercial orchards than for several years. Conditions were also favorable for late or pinpoint scab. Rainfall from May to

September was about 3 inches above the 50-year average of 15.4 inches.

In Nova Scotia powdery mildew increased in importance on fruit crops in 1966 and 1967. In 1967 commercial control measures were again required in one apple orchard, and mildew was also found in several others. Similarly, powdery mildew appeared in several sour cherry orchards, following a first report of the disease in the province in 1966. In 1967 powdery mildew was found for the first time in N.S. on sweet cherry, and a severe infection was reported on highbush blueberry.

Little or no spread of fire blight of pear and apple occurred in Nova Scotia during the bloom period in 1967. However, active twig infections were found and infection was seen to extend from established fire blight cankers in several pear orchards during July and August.

In Nova Scotia Botryosphaeria obtusa (Schw.) Shoem. was reported for the first time in Canada on pear (Pyrus communis). However, this fungus has been reported on other hosts under other combinations; e.g. as Physalospora obtusa in N.S. on Amelianchier intermedia; as Sphaeropsis malorum in Ont. on Crataegus pinnatiloba, Ribes nigrum, Sorbus spp., Malus pumila, and Vitis hybrid, and in Sask. on Malus baccata; and as Sphaeropsis juglandis in Ont. on Juglans cinerea. It has been variously reported on Malus pumila as Physalospora cydoniae (Ont.), P. malorum (Ont., Que.), Sphaeropsis malorum (Ont., Que.), S. mali (Ont.), and Botryosphaeria quercuum (Ont.). According to Shoemaker (Can. J. Bot. 42:1297-1301. 1964), Canadian specimens examined on Quercus spp. were either B. quercuum (N.S., Que., Ont.) or B. melanops (Ont.); and specimens associated with dead arm of grape (Vitis spp.) were either B. obtusa or B. stevensii (see also Chamberlain et al., Can. J. Bot. 42:351-355. 1964). Also in Nova Scotia, Nectria cinnabarina Tode ex Fr. was reported for the first time on pear in Canada.

Sphaeronema pomorum Shear was reported for the first time in Canada; it was associated with rot of cranberry fruit in storage in Nova Scotia.

Bipolaris sorokiniana (=Helminthosporium sativum) was associated with a severe lesioning of pods, stems, and leaves of snap bean (Phaseolus vulgaris). Although considered an unusual host for B. sorokiniana, beans were similarly affected in New Brunswick in 1964. On both occasions the probable source of inoculum was traced to a nearby infected oat crop (See Gourley, CPDS 48:34-36).

Losses of 6% to 26% occurred among strawberry plants in cold storage facilities in N.S. during the winter and spring of 1966-67. Typhula sp. was largely responsible, and losses were greatest in storages that were filled rapidly and in which inadequate spacing of crates prevented rapid cooling. In these storages periods of 53 to 75 days were required to lower plant temperatures to -1.1C.

Prince Edward Island

The mean temperature for March-May 1967 was 8.2F below that for 1966 and 6.8F below the 58-year average. The months June to October all had above-average mean temperatures. June was the only month with above-average hours of sunshine, whereas May and July were much below average. Rainfall for the 6-month period May-October was more than 8 inches above normal.

Planting of all crops was delayed 3-4 weeks by unusually cool, wet conditions in the spring of 1967. Few potatoes were planted before June 1. However, emergence was very rapid and growth was favored by high day and night temperatures. High humidities occurring through most of the growing season, together with very succulent growth, favored the development of foliage diseases, particularly in grain.

Both septoria blight of oats and leaf blotch of barley caused by Cochliobolus sativus were very severe and caused a great deal of damage. Serious yield losses in barley were accompanied by high percentages of seed infection by C. sativus, and growers were concerned about the consequences of planting heavily infected seed the following year. Field experiments at Ottawa using infected seed from P.E.I. showed that seedling emergence was reduced considerably in samples of infected seed. At the usual planting rate, however, yield was not affected unless the number of plants per row was reduced by at least 50%. Treatment of the seed with a mercury fungicide increased emergence but did not improve seed yield (See Clark & Wallen, CPDS 49:60-64).

Because of a low level of carry-over inoculum, potato late blight was not found as early as in most wet seasons; but it became severe late in the season. Blight was first reported on July 28. Some unsprayed fields were defoliated rapidly, thus preventing extensive tuber rot, whereas a number of inadequately sprayed fields showed more tuber rot than those that received no protection. Tuber rot was a problem in the variety Kennebec.

Heavy rains provided periods of high soil moisture which favored the development of root diseases. Clubroot of crucifers was more severe than usual; and helminthosporium root rot of barley was very damaging, especially in the variety Herta.

Little or no frost occurred in most parts of the province until November 7, and harvesting conditions were generally good despite a rainfall of 4.77 inches at

Charlottetown on October 9-10. A few cases of potato tuber breakdown from flooding were reported. Hollow heart was a common complaint in large potato tubers over 12 ounces and was more severe in some varieties than in others. Fusarium storage rot (Fusarium sambucinum F. 6) was not a problem in the 1967 crop; apparently the high soil moisture helped to prevent a buildup of inoculum during the season and also provided conditions less conducive to bruising during harvest.

Strawberry green petal caused considerable losses in P.E.I. and northern Nova Scotia and was also found in southern New Brunswick and in areas south of the St. Lawrence River in Quebec. See Stultz & McNab, CPDS, this issue.

Similarly, clover phyllody was widespread in clovers in P.E.I., where it was considered to be a limiting factor in stand maintenance in some fields of red clover. Phyllody was also present in most clover fields examined in northern Nova Scotia and southern New Brunswick but appeared to be less severe; it was seldom found in fields in Quebec and was not found in Ontario (See Pratt, CPDS 48:87-92).

Newfoundland

The unusually wet growing season promoted the development of soft rot in rutabagas in the Maritime Provinces and in Newfoundland, where Erwinia carotovora developed in growth cracks and caused losses of epidemic proportions in some areas.

Acknowledgments

The cooperation of those who contributed information used in this compilation is gratefully acknowledged. Thanks are also extended to Mrs. Janet Cumming and Miss Judy Hunter for their assistance in compiling the reports.

DISEASES OF CEREAL CROPS[2]

WHEAT

LEAF SPOT (Ascochyta sorghi). In Alta. mod.-sev. leaf spot was found in 2 fields of spring wheat and in 1 of winter wheat (J.S.H., T.G.A.).

SMUDGE (Alternaria sp.) was troublesome in a few districts n. and w. of Saskatoon, Sask., where samples contained up to 20% discolored kernels (R.J.L.).

ERGOT (Claviceps purpurea). Trace amounts were found in 1/232 fields examined in Saskatchewan (R.D.T.) and in 2/24 fields in Man. (W.A.F.H.).

COMMON ROOT ROT (Cochliobolus sativus, Fusarium spp.) was less sev. in Sask. in 1967 than in the previous few years; the average disease rating for the province was 8.1. For crop districts 1 to 9 in Sask., disease ratings were 8.2, 5.9, 11.3, 6.4, 9.7, 7.9, 6.5, 8.7, and 8.9, respectively. The average disease rating for 172 stubble crops examined was 7.71; for 58 fallow crops, 8.27 (R.D.T.). In Alta. 9 fields of spring wheat were rated 2-tr. 7-sl. and 8 fields of winter wheat, 1-tr. 3-sl. 4-mod. (J.S.H., T.G.A.).

SPOT BLOTCH (Cochliobolus sativus) was rated sl. in 1 field in n.e. Sask. (R.D.T.).

ANTHRACNOSE (Colletotrichum graminicola) was rated sl. in 1 field of winter wheat in Alta. (J.S.H., T.G.A.).

POWDERY MILDEW (Erysiphe graminis). In the Lethbridge, Alta., area, mildew was rated tr.-sl. in winter wheat but was mod.-sev. in 4 fields of spring wheat (J.S.H.) and was also reported near Calgary (A.W.H.). Tr.-sl. infection was noted in 2/17 fields in Niagara and South Townships in s.w. Ont. (T.R.D.) and was similarly present on winter wheat in the Ottawa area (R.V.C.). Mildew was mod. on all varieties of spring wheat throughout P.E.I. (G.W.A.).

HEAD BLIGHT (Fusarium spp., Gibberella zeae) was present in tr.-light amounts in winter wheat at Ottawa, Ont. (R.V.C.) and was mod. on all varieties of spring wheat in P.E.I., where infection was favored by high temperatures and high humidity (G.W.A.). In Nova Scotia head blight was found in all fields examined near Clarence and Grand Pre; incidence ranged from tr. on 'Selkirk', 1-2% on 'Pembina', 'Tuffy', and 'Justin', 1-5% on 'Manitou' and 'Opal', to over 50% on 'Kloka' (C.O.G.).

PINK SNOW MOLD (Fusarium nivale) was reported in tr.-sl. amounts in 7/9 fields examined in the Lethbridge, Alta., area (J.B.L., J.S.H., T.G.A.).

TAKE-ALL (Gaumannomyces graminis (Sacc.) Arx & Oliver = Ophiobolus graminis Sacc.) was found in 3/232 fields examined in Sask.; it was rated tr.-3% at Kelvington and 20% at Meath Park and was also reported from Turtleford (R.D.T.).

BASAL GLUME ROT (Pseudomonas atrofaciens) was found in tr. amounts in only 1/18 fields examined in Man. and was also found in experimental plots (W.A.F.H.).

STEM RUST (Puccinia graminis f. sp. tritici) was reported in tr. amounts from 4/232 spring wheat fields examined in s.e. Sask., where it appeared late in the season and caused negligible damage (R.D.T.). In Man. rust was first found on July 11 in winter wheat plots at Winnipeg but was not found on resistant varieties of spring wheat throughout the season (G.J.G.). In the rust nurseries, infection of susceptible varieties occurred only in Man., Ont., and Que. For information on races of P. graminis f. sp. tritici found in Canada in 1967, see CPDS 48:9-11, 1968. Tr.-sl. infection was reported in 6/17 fields in s. Ont. (T.R.D.) and rust ranged from tr.-sev. on varieties of winter wheat in experimental plots at Ottawa (R.V.C.).

LEAF RUST (Puccinia recondita = P. triticina Erikss.) was not generally observed in Sask. until Aug. when it became fairly widely distributed but occurred in only tr. amounts in 82/232 fields; s.w. Sask. appeared to be free from leaf rust (R.D.T.). In Alta. leaf rust was found in tr. amounts in 2 fields of winter wheat and 1 of spring wheat (J.S.H., T.G.A.). In Man. rust development was fairly extensive on 'Selkirk' wheat at maturity but infection developed too late to reduce yield (D.J.S.); by Aug. 10 leaf rust was light and scattered, ranging up to 50% in 12/18 fields examined (W.A.F.H.). Tr.-sl. infection was found in 2/17 fields in s. Ont. (T.R.D.) and rust was light-mod. in plots at Ottawa (R.V.C.). For distribution of physiologic races, see CPDS 48:6-8, 1968.

STRIPE RUST (Puccinia striiformis) in Alta. was rated 3-sl. 2-mod. 1-sev. in 6 fields (J.S.H., T.G.A.).

SPECKLED LEAF BLOTCH (Septoria spp.). Speckled leaf blotch caused by S. avenae f.

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[2]Abbreviations used in this section include the use of initials to identify the contributors listed in the Index of Contributors; others include tr. = trace, sl. = slight, mod. = moderate, sev. = severe, n. = north, e. = east, etc.; the names of the provinces are abbreviated, e.g., B.C. = British Columbia, Ont. = Ontario. Figures denoting prevalence of disease in fields or counties are sometimes presented as follows: 6/17, indicating that 6 units were affected out of 17 examined.

sp. triticea (stat perf., Leptosphaeria avenaria f. sp. triticea) was especially prevalent in the c., w., and n. crop districts of Sask.; of 232 fields examined 11 were rated tr. 28-sl. 20-mod. 1-sev. (R.D.T.). In Man. a Septoria sp. with pycnidiospores measuring 24-33u in length was reported causing speckled leaf blotch in 1/24 fields (W.A.F.H.). L. avenaria f. sp. triticea was reported as light on winter wheat at Ottawa and Ridgetown, Ont. (R.V.C.). S. tritici caused leaf blotching of winter wheat at Guelph, Ont. (R.V.C.).

GLUME BLOTCH (Septoria nodorum) was reported at High Level and Manning, Alta. (A.W.H.). In Sask. it occurred in the w., c., and n.w. crop districts where favorable moisture conditions prevailed; 11/232 spring wheat fields were rated 5-tr. 4-sl. 2-mod. (R.D.T.). S. nodorum was also noted in winter wheat plots at Ridgetown, Ont. (R.V.C.).

LOOSE SMUT (Ustilago tritici) was found in 6/12 fields of durum wheat in Man. and e. Sask.; incidence averaged 1%, with a maximum of 7%. Traces occurred in 11/73 fields of common wheat surveyed in n.e. Sask. and n.w. Man. (J.J.N.). Of 232 fields surveyed in Sask., traces were found in 3 fields of durum wheat in s. Sask. and in 5 of common wheat in n.w. Sask. Specimens were received from Naicam and Turtleford, Sask. (R.D.T.).

BACTERIAL BLACK CHAFF (Xanthomonas translucens). Specimens were received from Turtleford and Stenen, Sask. (R.D.T.). It was not observed in 24 fields examined in Man. (W.A.F.H.).

BARLEY YELLOW DWARF (barley yellow dwarf virus). Trace infections were found in 5 fields in Alta. (J.S.H., T.G.A.). Thirty fields surveyed in Man. and s. Alta. were rated tr.-11, 1%-4, 5%-2, 10%-1 (C.C.G., P.H.W.).

WHEAT STREAK MOSAIC (wheat streak mosiac virus) was found on winter wheat in experimental plots at Swift Current, Sask. (C.C.G., P.H.W.) and was suspected in 2 fields of spring wheat in s.c. Sask. (R.D.T.). It was reported in Alta. in 4 fields of winter wheat (3 tr., 1 sev.) and in tr. amounts in 4 fields of spring wheat (J.S.H., T.G.A.). Of 11 fields of spring wheat examined near Lethbridge, WSM was rated tr. in 1, 1% in 2, 5% in 1, 15% in 1, and 75% in 3. A tr. was found in 1 field of durum (C.C.G., P.H.W.). WSMV was found in a perennial grass Alopecurus aequalis Sobol collected in sloughs and ditches near wheat fields in s. Alta. in Sept. 1967. Although symptomless in the field 6/21 plants collected near Spring Coulee and 3/10 collected near Lethbridge carried the virus, which was transmitted manually to wheat and oats and which reacted with an antiserum specific for WSMV. None of 63 other A. aequalis plants from similar sites in other areas of s. Alta. were infected. Eriophyid mites (Aculodes sp.) found on A. aequalis did not survive when transferred to wheat, and Aceria tulipae, the vector of WSMV from wheat, did not survive on A. aequalis. Therefore the latter grass probably does not play a role as a reservoir of WSMV infecting wheat in the field (J.T.S.). In Ontario WSMV was transmitted manually from samples of scattered winter wheat plants with mosaic symptoms in 4 fields in Essex County in May 1967. The virus was similarly identified in plants collected by Dr. L.F. Gates in 6 other fields in the same county in Nov. 1967 (J.T.S.).

SOIL-BORNE WHEAT MOSAIC was found in 121/136 fields of winter wheat examined in s. Ont. in early May. The survey route included the Niagara Peninsula, Windsor, Goderich, Guelph, and New Market. In 87 of the fields bronze discoloration and unthrifty growth associated with severe mosaic symptoms were evident in large patches or scattered throughout the field. In 26 other fields, the disease was milder and occurred in limited patches; in 8 fields it affected only scattered plants or small patches of plants. Severity appeared to be correlated with frequency of cropping with winter wheat. The disease did not occur in fields in which winter wheat had not been grown for 8 or more years before the current crop. In the Ottawa Valley, where winter wheat is grown infrequently, soil-borne wheat mosaic was found only as a light infection at the Central Experimental Farm, Ottawa, in a field in which plots of winter wheat have been grown in a 3-year rotation. As in previous years wheat fields that appeared to be disastrously affected during the cool conditions of spring recovered remarkably during the warm weather of summer and produced acceptable yields (J.T.S.).

CHEMICAL INJURY. Damage attributed to herbicides was found in tr. amounts in c. Sask. Head distortion was apparent in 4 fields, but injury was much less prevalent than in 1966 (R.D.T.).

LOW TEMPERATURE INJURY. Chlorotic banding, probably due to low-temperature injury, was noted at 7 locations in Alta. (A.W.H.). Ice sheeting caused sl. damage in 1 field of winter wheat near Lethbridge (J.B.L.).

EAR AND LEAF TIP DRYING. Blighting of upper spikelets and leaf tips of plants in a number of fields in Sask. was attributed to peaks of intense solar radiation (R.D.T.).

SPLOTCH (physiological). In s. Sask. 9 fields of durum were rated 2-tr. 1-sl. 2-mod. (R.D.T.). Two fields of spring wheat in Alta. were affected, 1-tr. 1-sev. A tr. of leaf blotch was noted in 1 field of winter wheat in Alta. (J.S.H., T.G.A.).

CROP RESIDUE DAMAGE was found in 1 field of winter wheat in Alta. (J.S.H., T.G.A.).

OATS

ERGOT (Claviceps purpurea) was reported from 1 field in c. Alta. (W.B.B.).

LEAF BLOTCH (Drechslera avenacea) was observed in tr. amounts in Alta. (J.S.H., T.G.A.).

POWDERY MILDEW (Erysiphe graminis) affected all plants of 'Eagle' oats in experimental plots near Vancouver but damage was slight (H.N.W.T.).

ROOT ROT (Fusarium spp.) occurred in tr. amounts in 6 fields in Alta. (J.S.H., T.G.A.).

SPECKLED LEAF BLOTCH (Leptosphaeria avenaria f. sp. avenaria). Tr. was noted in 1 field in Alta. (J.S.H., T.G.A.) and in 3/36 fields in Sask. (R.D.T.). It was light-mod. in most fields examined in e. Ont. and adjoining N.Y. (R.V.C.). Severe damage occurred on all varieties throughout P.E.I. (G.W.A.).

HALO BLIGHT (Pseudomonas coronofaciens) was rated 2-tr. 3-sl. 1-mod. in 12 fields in s. Ont. (T.R.D.).

CROWN RUST (Puccinia coronata f. sp. avenae). Development of crown rust in w. Canada was the lightest in recent years and losses were negligible (G.F.). Rust was mod-sev. on all varieties in e. Ont. (R.V.C.). See CPDS 48:14-16, 1968 for distribution of races in Canada in 1967.

STEM RUST (Puccinia graminis f. sp. avenae) was found in Man. on July 17 and was less prevalent in w. Canada than in any other year since 1961. Few fields in Man. suffered significant losses in yield, and rust was not found in Alta. or Sask. (J.W.M.). In Ont. stem rust was light near barberry infestations only (R.V.C.), and was light in rust nurseries at La Pocatière and Macdonald College, Que.; none was reported from the Maritime Provinces (J.W.M.). In mid-August a tr. was found in 1 field in Ont. s. of the St. Lawrence R., but none was observed in 2 others in s.e. Ont. nor in 8 fields in adjoining N.Y. and 2 in Pa. (R.V.C.). The distribution of races in Canada was discussed in CPDS 48:17-19, 1968.

LOOSE SMUT (Ustilago avenae). None was found in 40 fields surveyed in Man. and e. Sask. (J.J.N.).

COVERED SMUT (Ustilago kolleri) was absent in 40 fields in Man. A tr. was found in 1 field in Alta. (J.S.H., T.G.A.) and in 4 fields in w.c. Sask.; in n.w. Sask. a tr.-2% were observed in 3 fields (R.D.T.).

RED LEAF (barley yellow dwarf virus) was observed in 5 Alta. fields (3-tr. 2-sev.) (J.S.H., T.G.A.). Of 39 fields examined in Man. and s. Alta., the disease was absent in 20 fields, 1% in 2, 5% in 2, 10% in 2, 12% in 1, 24% in 1. Observations on insect transmission in Man. were discussed in CPDS 48:101-103, 1968. It was rated tr.-light in e. Ont. (R.V.C.).

STREAK MOSAIC (wheat streak mosaic virus) was observed in 1 field in Alta. (J.S.H., T.G.A.).

BLUE DWARF (oat blue dwarf virus) was not observed in commercial fields, although a high percentage of the vector Macrosteles fascifrons collected from oats and carrots near Portage la Prairie, Man. were viruliferous (C.C.G., P.H.W.).

BLAST (physiological) was rated sl. in 3 fields in Alta. (J.S.H., T.G.A.) and was noted near Redwater, Alta. (A.W.H.). It was widely distributed in tr.-sl. amounts in 36 fields throughout Sask. (R.D.T.). In s. Ont. it was rated tr.-mod. in all 12 fields examined (T.R.D.).

CHLOROTIC BANDING (physiological) was noted near Evansburg, Alta., and was ascribed to low temperature injury (A.W.H.).

PREMATURITY BLIGHT of undetermined cause was found in tr. amounts in s.c. Sask. and 1% in a field in n.e. Sask. (R.D.T.).

LEAF SPOT (cause unknown) was observed in 5/36 fields in Sask. (3-tr. 2-mod.) (R.D.T.).

GRAY SPECK (Manganese deficiency) was reported from Thorhild and Redwater, Alta. (A.W.H.) and caused mod. infection on the varieties 'O.T. 427', 'O.T. 717', and 'Victory' in experimental plots at Glenlea, Man. (W.A.F.H.).

BARLEY

SPOT BLOTCH (Bipolaris sorokiniana, stat perf. Cochliobolus sativus) caused sl. damage in 2/43 fields examined in Sask. (R.D.T.) and a tr. was found in 1/4 fields at Sperling, Man. (W.A.F.H.). It was sev. on barley at Guelph, Ont., and on 'Herta' and other varieties in e. Ont. (R.V.C.). In P.E.I. up to 100% infection of 'Herta' and 'Charlottetown #80' barley were observed throughout P.E.I; damage was very severe with low yields of shrunken black kernels (C.B.W.).

COMMON ROOT ROT (Cochliobolus sativus, Fusarium spp.) was rated 4 fields tr. 6 sl. in Alta. (J.S.H., T.G.A.). The average disease rating for 42 fields in Sask. was 10.01 (R.D.T.). It was sev. at Guelph, Ont., where root rot was aggravated by delayed seeding and excess moisture, considerable straw breaking was evident (R.V.C.). Extensive losses were reported from throughout N.B., where yield reductions of at least 65% were experienced (S.R.C.). At Lacombe, Alta., root rot was more prevalent than in the preceding 2 years. 'Gateway'

barley grown on barley stubble had a lower incidence of root rot than when grown on fallow (L.P.). The effects of rotation and fertilizer on incidence of the disease was discussed in CPDS 47:108-109, 1967.

POWDERY MILDEW (Erysiphe graminis) caused sl. infection in 'Jubilee' barley at Saskatoon (R.D.T.). In s. Ont. 8/9 fields were affected (1-mod. 2-sev.) (T.R.D.), and in e. Ont. mildew appeared early and was widespread on susceptible varieties of both spring and winter barley (R.V.C.).

HEAD BLIGHT (Fusarium spp.) affected up to 5% of the heads of 'Herta' and 'Charlottetown #80' barley throughout P.E.I., but damage was very slight (C.B.W.).

STEM RUST (Puccinia graminis) was less prevalent than usual in Sask. and was observed in tr. amounts in 3/43 fields in s.e. Sask. (R.D.T.). In the rust nurseries stem rust was light on barley and rye, and rye was affected at only 10/36 locations in Canada. Wheat stem rust was believed to have caused most of the infections observed on 'Montcalm' barley (G.J.C.). In e. Ont. stem rust appeared late and was very light (R.V.C.).

LEAF RUST (Puccinia hordei) was found in 8/9 fields in s. Ont., where 2 were rated mod. or sev. (T.R.D.), and was very light in e. Ont. (R.V.C.).

NET BLOTCH (Pyrenophora teres, stat. imperf Drechslera teres) was rated tr. in 2 fields, sl. in 2, mod. in 1 in Alta. (J.S.H., T.G.A.); seedling infection was prevalent in s. Alta. following a wet spring (A.W.H.). In Sask. the incidence and severity of net blotch was lower than in the past few years; of 43 fields examined 2 were rated tr., 7-sl. 2-mod. chiefly in the w.c. and n.w. crop districts. It was sev. in barley at New Liskeard, Ont., particularly in plots that were heavily fertilized, and mod. at Kapuskasing, Ont. (R.V.C.).

BROWNING ROOT ROT (Pythium sp.) is rarely encountered in s. Alta., but in 1967 it affected 1 field severely at Lethbridge and 1 moderately at Granum, Alta. Soil analyses showed low levels of available P and adequate N at both locations (T.G.A., J.S.H., F.R.H.).

SCALD (Rhynchosporium secalis was observed at tr. and mod. levels in 2 fields in Alta. (J.S.H., T.G.A., A.W.H.). In w.c. and n.w. Sask. scald was reported from 10/43 fields examined (7-tr. 1-sl. 2-mod.) (R.D.T.). It was also found in 8/9 fields in s. Ont. (T.R.D.) and was light on susceptible varieties of winter barley in e. Ont. (R.V.C.).

SPECKLED LEAF BLOTCH (Septoria passerinii) was rated tr. in 2 fields and mod. in 1/43 examined in n.w. Sask. (R.D.T.).

COVERED SMUT (Ustilago hordei). Tr. amounts were observed in 2/43 fields in Sask. (R.D.T.), in 1 field in Man. (J.J.N.), and 1 in Alta. (J.S.H., T.G.A.).

FALSE LOOSE SMUT (Ustilago nigra) was found in 3/42 fields in Man. and e. Sask. (2-tr. 1-3%) (J.J.N.).

LOOSE SMUT (Ustilago nuda was reported from Drumheller, Alta. (A.W.H.) and traces were found in 2 other fields in Alta. (J.S.H., T.G.A.). It was identified on a sample of 'Galt' barley from St. Walburg, Sask. (R.M.). In a survey of 44 fields in Sask., loose smut was found chiefly in s.c. and n.w. areas of the province (4-tr. 1-1%, 3-2 to 3%, 1-10%) (R.D.T.). In Man. infection of up to 4% (av. 0.3%) was observed in 7/42 fields (J.J.N.). Up to 2% infection was observed in 6/9 fields in s. Ont. (T.R.D.); tr. amounts occurred in winter barley in e. Ont. (R.V.C.).

BACTERIAL BLIGHT (Xanthomonas translucens) occurred in tr. amounts in 2 fields in Alta. (J.S.H., T.G.A.) and was rated mod. in a field near Champion, Alta. (G.A.N.). Also in Alta. 'Conquest' barley was affected near Pincer Creek (1/12 fields, <1% plants affected), Grande Prairie (1/4 fields, up to 5% infection), and Spruce Grove (1/11 fields, <1% infection) (M.D.S.). In Sask. tr. amounts were found in 2/43 fields in s.e. Sask. (R.D.T.) and in plots at Swift Current (M.D.S.). Approximately 12% of the plants in 1/9 fields examined near Portage la Prairie, Man. and <1% of the plants in 1/6 fields near Brandon, Man. were affected (M.D.S.).

ASTER YELLOWS (aster yellows ?virus) occurred in tr. amounts in 2 fields near Swift Current and Bolney, Sask. It was not found in any other fields in Sask., Alta., and Man. Near Bolney AYV was found commonly on stinkweed (Thlaspi arvense) and was believed to have overwintered in this host. The low level of the disease occurred despite the highest level of AYV recorded in barley in 1966 and was attributed to the low population of the six-spotted leaf-hopper in 1967 (C.C.G., P.H.W.).

BARLEY STRIPE MOSAIC (barley stripe mosaic virus) was found in tr., 1%, 20%, 50% levels in 4/12 barley fields near Lethbridge, Alta. (C.C.G., P.H.W.). It was also recorded in tr. amounts in two other fields in Alta. (J.S.H., T.G.A.). Two fields containing 10% and 15% infection were observed in s. Man. but the disease was not found elsewhere in Sask. and Man. BSMV was found only in varieties of 2-row barley, which is the predominant type grown near Lethbridge (C.C.G., P.H.W.).

BARLEY YELLOW DWARF (barley yellow dwarf virus) incidence was low in Man. and s. Alta. and was negligible in other areas of the Canadian prairies (C.C.G., P.H.W., J.S.H., T.G.A.). Of 41 barley fields examined, infection was rated tr. in 11 fields, 1% in 1, 2% in 1, 5% in 2, 10% in 1 (C.C.G.,

P.H.W.). Insect transmission of BYDV in Man. in 1967 was discussed in CPDS 47:101-103, 1967. Tr.-light infections were found in e. Ont. (R.V.C.).

WHEAT STREAK MOSAIC (wheat streak mosaic virus) was found in tr. amounts in 1/10 fields of barley near Lethbridge, Alta. (C.C.G., P.H.W.).

CHLOROTIC BANDING (physiological), possibly due to low temperature injury, was noted at Barrhead, Athabasca, Millet, and Evansburg, Alta. (A.W.H.).

RYE

ERGOT (Claviceps purpurea). Trace amounts were reported in 1 commercial field and in plots at Saskatoon and in plots at Melfort, Sask. (R.D.T.). Sl.-mod. infections were found in 2 fields in s. Ont. (T.R.D.). and in a 2-acre field near La Pocatière, Que. (H.G.).

POWDERY MILDEW (Erysiphe graminis) occurred as a tr. in plots near Vancouver, B.C. (H.N.W.T.) and was reported from Fort Vermilion, Alta. (A.W.H.) and Saskatoon, Sask. (R.D.T.).

STEM RUST (Puccinia graminis). Trace infections occurred in plots near Vancouver (H.N.W.T.) and in all 3 fields examined in s. Ont. (T.R.D.). In the rust nurseries 'Prolific' rye was affected at only 10/36 nurseries across Canada (G.J.G.).

LEAF RUST (Puccinia recondita). Light infection was found in plots near Vancouver (H.N.W.T.) and in 3 fields in s. Ont. (T.R.D.). Puccinia sp. was reported on Russian wild rye at Fort Vermilion, Alta. (A.W.H.).

TRITICALE

ERGOT (Claviceps purpurea) was found on triticale (Secale X Triticum) in experimental plots at Lacombe, Alta. (W.B.B.).

LOOSE SMUT (Ustilago nuda) was found in specimens of triticale grown in central Alta. (B.B.).

DISEASES OF FORAGE AND FIELD CROPS

A. Forage Legumes

ALFALFA

BLACK STEM (Ascochyta medicaginis Pk. = Phoma medicaginis Malbr. & Roum. var. medicaginis Boerema). In c. Alta. 11/15 fields examined were affected (8-tr. 3-mod.) (W.B.B.). It was general in all areas of P.E.I. but damage was sl. (C.B.W.).

WINTER CROWN ROT (low-temperature basidiomycete). In the Lethbridge, Calgary, Edmonton areas of Alta. 16 fields were rated 1-tr. 7-sl. 4-mod. 4-sev. (J.B.L., J.E.M.).

BACTERIAL WILT (Corynebacterium insidiosum) was found in 3/15 fields in tr. amounts in c. Alta. (W.B.B.), and was found in all 16 fields examined in the Lethbridge, Calgary, and Edmonton areas (11-tr. 3-mod. 2-serv.) (J.B.L., J.E.M.). In s. Alta. 5/10 fields were rated tr.-sl. (E.J.H.).

BULB AND STEM NEMATODE (Ditylenchus dipsaci) was reported in tr.-mod. amounts in 6/10 in s. Alta. (E.J.H.).

CROWN BUD ROT (Fusarium spp., Rhizoctonia solani, Ascochyta medicaginis) was present in the 16 fields surveyed in c. Alta. (10-tr. 3-mod. 3-sev.) (J.B.L., J.E.M.). In s. Alta. tr.-sev. disease was found in the 10 fields examined (E.J.H.).

YELLOW LEAF BLOTCH (Leptotrochila medicaginis) was present in 8/15 fields (4-sl. 4-mod.) in c. Alta. (W.B.B.).

DOWNY MILDEW (Peronospora trifoliorum). A tr. of mildew affected 1/15 fields in c. Alta. (W.B.B.).

COMMON LEAF SPOT (Pseudopeziza trifoli f. sp. medicaginis-sativae) occurred generally in P.E.I., where up to 75% infection and mod. defoliation was observed (C.B.W.). In c. Alta. 7/15 fields had tr. infections (W.B.B.).

ROOT ROT (Fusarium spp., other fungi) caused mod. damage to alfalfa in P.E.I., where the disease was widespread and caused up to 60% infection (C.B.W.).

SCLEROTINIA CROWN ROT (Sclerotinia trifoliorum) caused sl. damage and 0-15% infection in May throughout P.E.I. (C.B.W.).

LEAF RUST (Uromyces straitus) was general throughout the Niagara Peninsula, Ont. (T.R.D.).

FOLIAGE BLIGHT. Second-growth alfalfa in the Niagara Peninsula, Ont., was severely affected by a combination of leaf spot (unidentified agent), black stem (Ascochyta medicaginis) and leaf rust (Uromyces striatus). In 6 fields examined, 50 to 100% of the top growth was killed or severely

damaged and affected fields were of little value for either seed or hay. Similar damage was reported by extension specialists in other areas of Ont. The unusually serious problem was brought about by climatic factors that provided ideal conditions for foliage diseases (T.R.D.).

BIRDSFOOT TREFOIL

LEAF SPOT (Stemphylium loti) was found in one field in c. Alta. (W.B.B.). This is a new record of the fungus on Lotus corniculatus in w. Canada; the first report for Canada was in Que. in 1966 (Ed.).

COMMON CLOVER

BLACK STEM (Ascochyta ? medicaginis) was reported from 9/21 red clover fields (3-mod. 3-sl. 3-tr.) in c. Alta. (W.B.B.).

SOOTY BLOTCH (Cymadothea trifolii). Trace infections were observed in 1/18 fields of alsike clover and 1/5 fields of red clover in c. Alta. (W.B.B.).

POWDERY MILDEW (Erysiphe polygoni) was rated 2-sl. 2-tr. in 18 fields of alsike clover and 5-tr. 1-mod. in 21 fields of red clover in c. Alta. (W.B.B.). Up to 20% infection of red clover was general in P.E.I. (C.B.W.).

ROOT ROT (Fusarium spp. and other fungi) affected up to 100% of the plants in red clover stands in P.E.I., and as many as 60% of the plants in some fields were killed between the spring and fall of 1967 (C.B.W.).

NORTHERN ANTHRACNOSE (Kabatiella caulivora) affected 14/21 red clover fields in c. Alta.; the fields were rated 8-tr. 4-sl, 2-mod. (W.B.B.). In P.E.I. it was widespread on red clover, affecting up to 25% of the plants and causing mod. damage, especially in older plantings (C.B.W.).

BLACK STEM (Phoma trifolii). Tr.-sl. infections were reported in 3/18 fields of alsike clover in c. Alta. (W.B.B.).

CROWN ROT (Sclerotinia trifoliorum) was general throughout P.E.I. in May and caused up to 60% infection and mod. damage in red clover (C.B.W.).

LEAF BURN (Leptosphaerulina trifolii (Rostr.) Petr. = Sphaerulina trifolii Rostr.) was found on senescent leaves of red clover and white and Ladino clovers in experimental plots and roadsides at Vancouver, B.C. in Oct. 1966; damage was sl. (M.J.P., H.S.P.).

RUST (Uromyces trifolii) was rated tr.-sl. in 4/18 fields of alsike clover in c. Alta. (B.B.). In P.E.I. infection was general on red clover but caused only sl. damage; older plantings were most often affected (C.B.W.).

PROLIFERATION (clover proliferation virus) was found in 2/18 fields of alsike clover in c. Alta. (W.B.B.).

BEAN YELLOW MOSAIC (bean yellow mosaic virus) was noted in 1/18 fields of alsike clover and in 2/21 fields of red clover examined in c. Alta. (W.B.B.).

VIRUS DISEASES IN EASTERN CANADA. The distribution of viruses affecting clover in eastern Canada was studied in 1967 (M.J.P.). Eight viruses were identified, some for the first time in this area, and were distributed on red, white, and alsike clovers as follows:

CLOVER PHYLLODY VIRUS - P.E.I. (red, white, alsike), N.S. (red, white), N.B. (red, white, alsike);

PEA STREAK VIRUS - N.S. (red), N.B. (red, white, alsike), Que. (red), Ont. (red, white);

RED CLOVER VEIN MOSAIC VIRUS - P.E.I. (red, white), N.S. (white), N.B. (red), Que. (red, white, alsike), Ont. (white);

BEAN YELLOW MOSAIC VIRUS - Que. (red), Ont. (red);

PEA MOSAIC VIRUS - N.S. (red), Ont. (red);

CLOVER YELLOW VEIN VIRUS - P.E.I. (white), N.B. (white, alsike), Que. (red, white, alsike);

ALFALFA MOSAIC VIRUS - P.E.I. (red, white), Que. (red, white);

WHITE CLOVER MOSAIC VIRUS - N.S. (white), Que. (white); Ont. (white).

SWEET CLOVER

DOWNY MILDEW (Peronospora sp.) was found as a tr. infection in experimental plots in c. Alta. (W.B.B.).

BROWN ROOT ROT (Plenodomus meliloti) caused 20% loss in test plots at Lacombe, Alta. (W.B.B.).

BEAN YELLOW MOSAIC (bean yellow mosaic virus). A tr. was found in experimental plots in c. Alta. (W.B.B.) and in 1 field in Ont. (M.J.P.).

VETCH

RUST (Uromyces sp.) was reported on Vicia sp. in 2 locations in c. Alta. (W.B.B.).

B. Oil-seed Crops

FLAX

ALTERNARIA BLIGHT (Alternaria linicola). A tr. was found in 1 field at Tisdale, Sask. in Sept. (G.A.P., T.C.V.).

ROOT ROT (Rhizoctonia sp.) was rated tr.-sl. in 5 fields in Alta. (J.S.H., T.G.A.) and wire-stem symptoms were found in a field at Tisdale, Sask. in July (G.A.P., T.C.V.).

MUSTARD

WHITE RUST (Albugo cruciferarum) was reported from Vulcan, Alta. (A.W.H.). The conidal stage was found at Saskatoon in June on Descurainia sp. and Capsella bursa-pastoris, and both conidia and oospores were observed in Aug. on Sisymbrium altissimum. The oospore stage was also found in pod lesions on Brassica kaber var. pinnatifida near Melfort, Sask., in Sept. (G.A.P., T.C.V.).

LEAF AND POD SPOT (Alternaria brassicae). Traces were found in 2 fields examined in c. Alta. (W.B.B.).

RAPE

WHITE RUST (Albugo cruciferarum). In c. Alta. a tr. infection was reported in 1/9 fields of Brassica napus (B.B.). Of 28 fields examined in Sask. in Aug.-Sept., white rust was found in 20 (15-tr. 4-sl. 1-mod.) (G.A.P., T.C.V.).

STAGHORN (Albugo cruciferarum, Peronospora parasitica) was reported from 4/6 fields in c. Alta., and from several other areas as far n. as Peace River, but infections were rated tr. (W.B.B., A.W.H.). Damage was less than usual, possibly because of the unusually dry season (W.B.B.).

GRAY LEAF SPOT (Alternaria brassicae). Trace infections were found in 2/5 fields in c. Alta. In 12/28 fields examined in Sask., alternaria black spot was rated 7-tr. 4-sl. 1-mod. (G.A.P., T.C.V.).

POWDERY MILDEW (Erysiphe polygoni) caused sl. damage at Saskatoon, Sask. (G.A.P., T.C.V.).

BASAL STEM ROT (Fusarium spp.). Damage was rated tr. at Saskatoon, Sask. (G.A.P., T.C.V.).

BASAL STEM ROT (Gliocladium roseum). A tr. of damage by this disease was reported for the first time in Sask. at Saskatoon (T.C.V.).

BLACKLEG (Leptosphaeria maculans (Desm) Ces. and DeNot; stat imperf. Plenodomus lingam (Tode ex Fr) Hohn.). The perfect state of the blackleg fungus was observed for the first time in Canada in May and June, 1967, when ascocarps were collected on the cruciferous weed Thlaspi arvense L. at 2 locations near Saskatoon, Sask. On rape (Brassica napus) blackleg was more prevalent than in 1966; 83% of the fields examined in e.c. Sask. were affected, with an av. severity rating of tr.+. In the Saskatoon area tr. infections were found in 4/28 fields (G.A.P., T.C.V.). The first collection of the Plenodomus state on Brassica kaber var. pinnatifida in Sask. was made at Melfort and Naicam areas (G.A.P., T.C.V.).

RINGSPOT (Mycosphaerella brassicicola) was much less severe than in previous years in Sask., although tr.-sl. amounts were found in 20/28 fields examined. M. brassicola was reported for the first time as an epiparasite on rape stem enlargements caused by Albugo cruciferarum at Brooksby and Delmas, Sask. (G.A.P., T.C.V.). The first collection on B. kaber var. pinnatifida in Sask. was made at Brooksby (G.A.P., T.C.V.).

SCLEROTINIA STEM ROT (Sclerotinia sclerotiorum). A trace of stem rot was observed at Brooksby, Sask. Of 28 fields examined in Sask., 7 showed tr.-sl. infection and 2-mod. (G.A.P., T.C.V.).

ASTER YELLOWS (aster yellows ? virus). In Sask. 4% of all fields examined showed only a tr. of infection; less sev. than in 1966 (G.A.P., T.C.V.).

CHEMICAL INJURY due to 2-4-D was observed at Rosthern, Sask. Damage was sl.-mod. with basal enlargement of the affected plants (G.A.P., T.C.V.).

SUNFLOWER

STEM ROT (Sclerotinia sclerotiorum) of sunflower (Helianthus annuus) was observed at Edmonton, Alta. (A.W.H.). A test plot for seed production at Woodstock N.B. was 100% damage (S.R.C.).

C. Root Crops

SUGAR BEET

BLACK ROOT (Aphanomyces cochlioides). In July in experimental plots at Acadie, Que., seedlings of cultivars Kuhn-R, Monogerme, H.C-11, and Cercopoly were severely infected. Infection of Polykuhn was mod. (L.J.C.).

ROOT ROT (Fusarium, Phoma, Pythium, Rhizoctonia, Rhizopus). In June, seedlings of Kuhn-R, Polykuhn, H.C-11, Monogerme and Cercopoly growing in experimental plots at Acadie, Que. were examined and found to be severely infected by Rhizoctonia solani (L.J.C.). At Taber, Alta. a sl. necrosis to the tap roots due to Rhizoctonia was observed in 1 field; a root rot affecting the tips of a few maturing beets caused by Pythium and Fusarium was observed in another; a wet rot (Rhizopus?) of the lower part of the tap root of young beets was found in a portion of 1 field where irrigation water had stood for several days; root rot, Fusarium, Pythium, Rhizoctonia and Phoma was sev. in low areas of several fields in the area. On the mature beets there was no evidence of rot, only the stand was reduced. Damage corresponded to the occurrence of flooding caused by heavy rains in the seedling stage (F.R.H.).

BORON DEFICIENCY was lt.-mod. in a 15 acre field at St. Edouard, Que. (R.C.).

CHEMICAL INJURY. A 15 acre field near Sherrington, Que, exhibited spray injury on the foliage (R.C.).

D. Miscellaneous Crops

FIELD CORN

ROOT AND STALK ROT (Fusarium graminearum) was prevalent in Essex Co., s.w. Ont. Drought after mid-July led to early dying of lower leaves and deterioration of stalks in Aug. and Sept. Heavy rains and winds in early Oct. resulted in much lodging and stalk rot. Throughout southwestern Ont. the delay in harvest caused by rain in Oct. and early Nov. increased problems from stalk breakage (C.G.M., L.F.G.).

SMUT (Ustilago maydis (D.C.) Cda., [U. zeae (Beckm.) Ung.]). Trace amounts of infection caused by U. zeae were found in Sask. where this disease is rare (R.S.). U. maydis was present in Oxford, Essex and Norfolk counties in s.w. Ont. (A.A.R.). and was observed also in the area of St. Jean, Que. (R.C.) .

STREAK MOSAIC (wheat streak mosaic virus). Individual corn plants and annual grass plants infected with WSMV were seen in several fields in the Harrow, Ont. area. The virus was found in occasional plants in many fields of winter wheat in the spring and again in the autumn (C.G.M., L.F.G.).

KERNEL RED STREAK (Red striped pericarp), observed in s.w. Ont. since 1964, developed in 14 var. of corn in experimental plots at Ottawa but affected only mature ears into which wheat curl mites (Aceria tulipae [K]) from wheat were introduced manually on Aug. 11th. The condition was induced by nonviruliferous mites as well as by mites carrying either wheat streak mosaic virus or wheat spot mosaic virus (J.T.S.). This condition, caused by the feeding of the wheat curl mite on the kernels, was common in s.w. Ont. and easterly to Port Hope, Ont. (L.F.G.).

TOBACCO

LEAF SPOTS (Alternaria spp.) in combination with physiological leaf spot increased significantly in Ont. due to the extremely wet weather. In individual farms with imperfectly drained soils losses were sev. (S.K.G.).

ANGULAR LEAF SPOT (Pseudomonas angulata) in Ont. was observed in numerous fields near Delhi and the Port Hope area. Wet weather stimulated 'water soaking' of the leaves and facilitated infection. Losses were not apprecialbe (S.K.G.).

DAMPING-OFF (Pythium spp., Rhizoctonia solani and Fusarium spp.) was common in flue-cured seed beds. Although the seedlings were adequate for supplying the field, choices in each pulling were limited. Longer periods for transplanting occurred in Ont. where sev. cases of damping-off were recorded (S.K.G.).

SORE-SHIN (Rhizoctonia solani) was sev. in s. Ont. due to wet conditions. Infection was up 10-15% in certain fields. No chemical control has been recommended (S.K.G.).

POLE ROT (Rhizopus spp. other fungi and bacteria) of leaves in Ont. during curing was less frequent than last year as the leaves were riper and smaller. Leaves of the 3rd and 4th primings showed sl. rotting (S.K.G.).

BLACK ROOT ROT (Thielaviopsis basicola). Prevailing weather conditions and improved sterilization of seedbeds in the greenhouses at Delhi, Ont. reduced the amount of infection that occurred in 1966. On heavy soils in the field losses were sev. and greater than in 1966 due to the wet cold weather prevalent after planting (S.K.G.). Two tobacco fields in N.S. were found to be

infested with black root rot (S.K.G.). In Kings Co., N.S. lt. infection caused root tips to rot off (C.L.L.). Roots contained in 399 samples of tobacco soil examined in Ontario were rated for black root rot as follows: no disease in 32 samples, trace in 128, light in 132, mod. in 58, sev. in 40, and very sev. in 9 (H.A.O.).

MOSAIC (tobacco mosaic virus). Overall losses in Ont. to TMV were negligible. Ten acres on an Oxford Co. farm were severely infected; this was attributed to a heavy infestation of horse nettles (Solanum carolinense L.) which were infected and acted as the source of the virus (S.K.G.).

OTHER VIRUS DISEASES. Ringspot, cucumber mosaic and etch virus were observed in the flue-cured tobacco crop in Ont. but their incidence was negligible (S.K.G.).

CHEMICAL INJURY. There were a few reports in Ontario of individual heavy losses due to improper application of agricultural chemicals either in the greenhouse or the field (S.K.G.).

WEATHER FLECK (atmospheric pollution) was more sev. in Ont. than in 1966. Favorable conditions for fleck were apparently prevalent at the susceptible stage of the tobacco plants (S.K.G.).

E. Cultivated and Other Grasses

AGROPYRON - Wheatgrass

HEAD SMUT (Ustilago bullata) was observed frequently on A. trachycaulum s. of Winnipeg, Man. (J.J.N.). At Saskatoon, Sask. in a replicate test of introductions of A. trachycaulum, head smut was observed on lines 1710 from the Kustaraj region of the U.S.S.R. (OT1270-70) with 1% infection and 1708 from Godollo, Hungary (1963), which had slightly less than 1% infection. The other lines tested, mostly from Canada, failed to show infection (J.D.S.).

BROMUS - Bromegrass

LEAF BLOTCH (Drechslera bromi) caused tr.-mod. damage in 4/4 fields examined in c. Alta. (B.B.).

SEEDLING BLIGHT (Podosphaeriella verticillata). In a seed sample of northern common brome (S-6610), obtained from the Unity district of Sask., 2% of the seeds surface-sterilized with 70% alcohol developed stromatic coremia and spores (J.D.S.).

LEAF SPOT (Pyrenophora bromi, Selenophoma [Sacc.] Sprague and Johnson, and Rhynchosporium secalis [Oud.] J.J. Davis). See article in C.P.D.S. 47(4):112-115, 1967 (J.D.S.). Moderate infection of Bromus inermis by P. bromi was observed in 68/98 fields examined in the Peace River area Alta. and 54/82 fields in Sask. (J.D.S.). Infection of B. inermis by S. bromigena was mod. at Champion, s. Alta. (G.A.N.); tr.-mod. in 2/2 fields in c. Alta. and mod. in 61/98 fields at the Peace River, Alta. (J.D.S.).

SCALD (Rhynchosporium secalis) caused sl. damage in 16/82 fields examined in Sask. and in 16/98 in Alta. See article in C.P.D.S. 47(4):112-115, 1967 (J.D.S.).

WHITEHEAD (?Thrips, Fusarium spp.). A tr. of damage was observed in 2/2 fields examined in c. Alta. (B.B.).

CALAMAGROSTIS - Bluejoint grass

ERGOT (Claviceps purpurea) occurred on C. canadensis at Rocky Mtn. House, Alta. (A.W.H.).

STRIPE SMUT (Ustilago striiformis). A tr. was observed at "The Narrows," Man. (J.J.N.).

ELYMUS - Wild rye

ERGOT (Claviceps purpurea) occurred on E. innovatus at Rocky Mtn. House, Alta. (A.W.H.).

LEAF SPOT (Pyrenophora tritici-repentis) on E. innovatus caused sl.-mod. damage at Sandy Lake and other wooded areas west of Piprell Lake, Sask. (J.D.S.).

FESTUCA - Fescue

SNOW MOLD. Low temperature basidiomycete caused mod. damage in the Edmonton, Alta. area (A.W.H.).

STEM EYESPOT. In July 1967 a stem eyespot was found in two fields of creeping red fescue (F. rubra L.) near Beaverlodge, Alta. A fungus was found associated with lesions on stems, sheaths, and inflorescences, but no spores or sporophores were detected (J.D.S.).

PHALARIS - Canarygrass

LEAF SPOT (Stagonospora foliicola) was observed in 1 field of P. arundinaceae at Sandy Lake near Candle Lake, Sask. Damage was sl. (J.D.S.).

PHLEUM - Timothy

LEAF SPOT (Heterosporium phlei) on P. pratense caused a tr. of damage in 6/9 fields examined in c. Alta. (B.B.). In the Nipawin/Tisdale area of Sask. 28/28 fields examined showed mod.-sev. damage. Second and

3rd crops of the 'Climax' cultivar were more severely affected than the 1st and 4th. A 1st seed crop of the 'Bounty' cultivar was about 10% infected. Seed yield estimated for Sask. for 1967 indicate a 50% reduction in yield per acre in comparison with the 1966 crops. Abundant straw from the heavy 1966 crop provided substrate for overwintering of the leaf spot fungus. In some cases, the death of large patches of plants in 1967 could be related to localized smothering from heavy litter. On parts of one field where heavy straw had been burned after the 1966 harvest, the stand of plants was greatly reduced; the burning of litter had not controlled the leaf spot (J.D.S.).

LAWNS AND TURF

SNOW MOLD (low temperature basidiomycete). In 20 turf areas examined in Lethbridge, Calgary, and Edmonton, Alta. damage was rated as 8-tr. 4-mod. 8-sev. (J.B.L., J.E.M.).

MELTING OUT (Drechslera poae) caused some damage to lawn grass at Daysland, Alta. (A.W.H.).

POWDERY MILDEW (Erysiphe graminis) occurred on lawns at Edmonton, Alta. (A.W.H.).

PINK SNOW MOLD (Fusarium nivale). Damage to lawns in the Lethbridge, Alta., area was rated 2-tr. 2-mod. 1-sev./5 examined. Kentucky bluegrass (Poa pratensis L. 'Merion') and creeping bent (Agrostis palustris Huds. 'Penncross') were affected (See CPDS 48:130-131. 1968) (J.B.L.). F. nivale caused heavy damage to Poa annua fairways at a golf course near Montreal, Que., where 85% of the damage was attributed to pink snow mold and 15% to gray snow mold incited by Typhula sp. (H.S.T.). Damage was also reported from Copetown, Ont. (H.S.T.).

LEAF SPOT (Leptosphaerulina australis), Curvularia lunata). These 2 weak parasites, identified by Dr. R.A. Shoemaker (DAOM No. 116550), caused browning in the turf of a bowling green at Kamloops, B.C. (H.S.P.).

FAIRY RINGS (Marasmius oreades) were observed at Lethbridge, Alta. Damage was rated 6-tr. 8-sl. 6-mod./20 areas examined (P.E.B.).

GRAY SNOW MOLD (Typhula spp.). Sl. damage to 3 lawns at Fredericton, N.B., was attributed to T. itoana (S.R.C.). In the Montreal, Que., area gray snow mold caused severe injury to 'Penncross' bent (Agrostis palustris Huds.) and comprised part of the snow mold complex on Poa annua (See PINK SNOW MOLD) (H.S.T.). Typhula was also reported on turfgrass at Copetown and Cooksville, Ont. (H.S.T.).

WINTER KILLING. Damage was rated 2-mod. 2-sev./30 areas examined at Lethbridge, Calgary and Edmonton, Alta. (J.B.L., J.E.F.).

DISEASES OF VEGETABLE CROPS

ASPARAGUS

ROOT ROT (Fusarium spp.) was observed in tr. amounts in Kent Co., Ont. In Northumberland and Prince Edward counties, Fusarium, Rhizoctonia, and Pythium were associated with root rot affected plants (A.A.R.).

BEAN

LEAF SPOT (Ascochyta sp.) one plant with leaf spot was observed in a garden at Kentville, N.S. (T.C.).

LEAF AND POD SPOT (Bipolaris sorokiniana). A sev. infection of leaves, pods, and stems caused by B. sorokiniana was found in 10 acres of snap beans (Phaseolus vulgaris) in N.S. Symptoms of the disease differed from those previously described (CPDS 44:113-117. 1964) for B. sorokiniana on beans in N.B. Lesions on leaves, petioles, and stems were similar to those described for B. victoriae on beans in North Carolina, but pod lesions were distinctive in the N.S. material. An adjacent field of infected oats (Avena sativa) was the probable source of inoculum (C.O.G.) (See CPDS 48:34-36. 1968).

GRAY MOLD (Botrytis cinerea). Infection of up to 2% of the pods was found in 9/11 fields examined at Florenceville, N.B. (S.R.C.). Light (1% of pods affected) infections were observed in Digby and Kings counties, N.S. (A.A.MacN.).

ANTHRACNOSE (Colletotrichum lindemuthianum). Tr. to 100% infection was common in all areas in N.B. except in processing crops (S.R.C.).

ROOT ROT (Fusarium spp.) was sl. in 1 field in the Bow Island area of Alta. (F.R.H.). Tr. infection occurred in 1/1 field in Lennox and Addington Co., and in Norfolk and Brant counties, Ont. (A.A.R.). Root rot was more prevalent than usual in s.w. Que. and caused mod. to sev. damage in several fields (R.C.).

HALO BLIGHT (Pseudomonas phaseolicola) was positively identified in 8/10 fields grown under irrigation in s. Alta. Damage was sl. in 7 and sev. in 1 field (F.R.H.). Sl. to mod. infections were reported in Sask., where bacterial blight can generally be found but less frequently (R.J.L.). In experimental plots at Morden, Man., several lines showed 100% incidence of halo blight on the foliage (M.D.S.). Light infection was observed in 20 acres of beans at Sherrington, Que. (R.C.). Blight was found in 3/11 fields and was prevalent in home gardens at Florenceville, N.B. (S.R.C.).

STEM CANKER (Rhizoctonia solani) caused damping-off and cankering in commercial fields in Northumberland and Norfolk counties, Ont. (A.A.R.). Sprout damage affected 60% of the seedlings in a field at Florenceville, N.B. (S.R.C.).

COTTONY SOFT ROT (Sclerotinia sclerotiorum) was found throughout the bean-growing area of w. Ont., particularly in pockets of low-lying land where up to 50% of the plants were affected by pod rot and yields were reduced (V.R.W., A.A.R.). (See also CPDS 47:116. 1967).

BACTERIAL BLIGHT (Xanthomonas phaseoli) was reported from Spruce Grove and Hanna, Alta. (A.W.H.), but was not found in 18 plantings examined throughout N.S. (A.A.MacN.). X. phaseoli var. fuscans was identified in an experimental plot at Lethbridge, (F.R.H.).

CHEMICAL INJURY. 2,4-D injury affected 80% of the plants in a field at Chatham, N.B. (S.R.C.).

SUN SCALD. About 10% damage occurred in a field at Florenceville, N.B. (S.R.C.).

BRONZING of lima beans was attributed to ozone damage in 2/3 fields in Kent County, Ont. (A.A.R.). [See also CPDS 47:44. 1967 - Ed.].

BEETS

ROOT ROT (Aphanomyces cochlioides) was observed at Acadie, Que. in experimental plots. Incidence ratings (diseased/healthy) among cultivars were 'Ruby Queen', 3.4; 'Improved Dark Red', 3.5; 'Royal Red', 3.9; and 'Detroit Dark Red', 6.3 (L.J.C.).

ROOT ROT (Botrytis cinerea, Fusarium sp.) was found in 1/3 fields in Kent Co., Ont. (A.A.R.).

LEAF SPOT (Cercospora beticola) was common in most commercial plantings and home gardens in N.S. In 13/18 fields damage ranged from tr. to sev.; it was more sev. in Cape Breton and in Antigonish, Cumberland, Digby, and Yarmouth counties than in Colchester, Kings, Lunenburg, and Halifax counties (A.A.MacN.).

LEAF SPOT (C. beticola, Alternaria tenuis) was rated sl. in 3/3 field in Kent Co., Ont. (A.A.R.).

PHOMA ROT (Phoma spp.) was reported from Lethbridge, Alta. (A.W.H.).

DAMPING-OFF (Pythium, Fusarium, Rhizoctonia). Phythium aphanidermatum reduced the stand of table beets in portions of a 30-acre field near Armstrong, B.C. Surviving plants in affected areas were

stunted and had chlorotic leaves and poorly developed roots with scurfy black lesions at the soil line (B.B.T.). (See also CPDS 48:37. 1968). Damping-off attributed to Pythium sp. and Fusarium spp. occurred in tr. amounts in 2/3 fields in Kent Co., Ont,; mod. losses associated with Pythium, Fusarium and Rhizoctonia solani were reported in 1/2 fields in York Co., Ont. (A.A.R.).

BLACK ROOT (Rhizoctonia solani). Incidence ratings (no. diseased/no. healthy) for seedlings of test cultivars at Acadie, Que. were: 'Detroit Dark Red', 0.82; 'Improved Dark Red', 1.0; 'Ruby Queen', 1.4; 'Royal Red', 2.4 (L.J.C.).

BRUSSELS SPROUTS

BLACK ROT (Xanthomonas campestris) caused sev. infection in 1/2 fields examined in York Co., Ont. (A.A.R.). In Kings Co., N.S., apparently all fields of Brussels sprouts were affected, and the disease caused sev. damage in 2 fields of about 10 acres. It was also observed to be sev. in P.E.I. Communication with Dr. A.F. Scherf, Cornell Univ., Ithaca, N.Y. revealed that black rot was common in all N.E. states and probably appeared in all areas because of seed contamination (A.A.MacN.). Approx. 2% infection was reported from Rogersville, N.B. (S.R.C.); and in the experimental plots at Charlottetown, P.E.I., ca. 2% infection was found on cv. 'Jade Cross' (C.B.W.).

CABBAGE

LEAF SPOT (Alternaria brassicae, A. brassicicola). Sev. infection occurred in 3/8 fields examined in York Co., Ont. (A.A.R.). A. brassicicola affected 100% of the plants and retarded head development of 25-50% of them at Colinet, Nfld. (O.A.O.).

BOTRYTIS ROT (Botrytis spp.) was reported from Calgary, Alta. (A.W.H.). Botrytis sp. and Sclerotinia sp. were associated with storage rot at Medford, N.S., where 5% damage occurred (T.C.).

SOFT ROT (Erwinia carotovora) was reported at Edmonton, Lethbridge and Ft. Saskatchewan, Alta. (A.W.H.). Incidence and damage was unusually high at Pleasantview and St. Davids, Nfld. following hot, wet weather in Aug. (O.A.O.).

YELLOWS (Fusarium oxysporum f. conglutinans) was observed in 5/24 fields examined in w. Ont. In most affected fields incidence ranged from 10 to 15%, but reached 95% in a field near Burlington (A.A.R.). (See also CPDS 47:116. 1967).

DAMPING-OFF (Fusarium spp.) caused little damage to seedlings in 1/2 fields in c. Ont. (A.A.R.).

DOWNY-MILDEW (Peronospora parasitica) caused light damage in a 5-acre field at St. Remi, Que. (R.C.).

CLUB ROOT (Plasmodiophora brassicae). In Ont. 31-60% incidence was observed in 1/7 fields in Halton Co. and lighter infections in 4/10 fields in York, Lambton, and Essex counties (A.A.R.). Up to 3% of the plants in 4/11 fields at Maugerville, N.B. were infected (S.R.C.). In N.S. club root was sev. in 3/36 fields in Antigonish and Colchester counties but was not observed elsewhere in the province (A.A.MacN.).

SHANK ROT (Rhizoctonia solani) killed 1-2% of the plants in 2 fields in Halifax Co. and one in Cape Breton Co., N.S. (A.A.MacN.).

SCLEROTINIA ROT (Sclerotinia sclerotiorum) was reported from Edmonton, Lethbridge, and Ponoka, Alta. (A.W.H.). Up to 10% loss was reported in 2/4 fields at Welland, Ont. (A.A.R.). At Oromocto, N.B. 60% damage occurred in 1 field (S.R.C.). About 5% of the mature heads in a one-acre field in Kings Co., N.S. were affected (A.A.MacN.).

BLACK ROT (Xanthomonas campestris). Sev. (>60% plants affected) infection was found in 4/8 fields in York Co., Ont. In Halton Co., Ont., 11-30% infection occurred in 1/7 fields (A.A.R.).

BLACK LEAF SPECK (Physiological) affected 100 bins (33 tons) of cabbage in storage at Cambridge, N.S. Low temperature changes may have caused the symptoms. Average damage was about 4% (T.C.).

OEDEMA (unbalanced water relations) affected 10% of the plants in a field at Norton, N.B. (S.R.C.).

CARROT

LEAF BLIGHT (Alternaria dauci). 11-30% infection was reported from York Co., Ont. (A.A.R.). In s.w. Que., 21/22 fields were affected (17 tr.-light, 4 mod.-sev.) (R.C., T.S., L.T.). Tr.-2% infections were seen in 9/11 fields examined in N.B. (S.R.C.).

BLACK ROT (Stemphylium radicinum) caused 60% damage to carrots in one field examined at Shediac, N.B. (S.R.C.).

GRAY MOLD ROT (Botrytis cinerea) was reported from Rocky Mountain House, Alta. (A.W.H.) and caused 5% damage to carrots in storage at Oromocto, N.B. (S.R.C.).

LEAF SPOT (Cercospora carotae). Infection was sev. in 1/2 fields in Dundas Co., Ont. (A.A.R.). Leaf spot (probably C. carotae) affected 7/23 fields in N.S. and was most prevalent in Kings Co., where all 5 (23 acres) fields examined were affected; in 2 fields the disease was rated heavy, with all plants showing coalescing lesions

(A.A.MacN.). Incidence of C. carotae infected plants was also very high on several cultivars at Colinet, Nfld. (O.A.O.).

SOFT ROT (Erwinia carotovora) caused minor damage to stored carrots at Onoway and Red Deer, Alta. (A.W.H.). At Oromocto, N.B., 30% loss was reported in Nov. at retail outlets following washing of cold-stored carrots (S.R.C.).

ROOT ROT. Geotrichum candidum was associated with root rot affected carrots at Vermilion, Alta. (A.W.H.).

SCLEROTINIA ROT (Sclerotinia sclerotiorum) was reported from Edmonton, Oliver, Bowden, Red Deer and Ponoka, Alta. (A.W.H.). In the Ste. Clotilde-Sherrington, Que., area 3/22 fields examined showed tr.-light infection before harvest (R.C., T.S., L.T.). At Oromocto, N.B. 7% damage was reported in stored carrots in Nov. (S.R.C.). At Berwick, N.S., approx. 50% of bin-stored carrots were lost by Oct. 1. (T.C.).

ASTER YELLOWS (aster yellows ?virus) was present in most plantings of carrots in Sask., but few plants were affected (R.J.L.). Tr. amounts were reported in 5/22 fields in the Ste. Clotilde-Sherrington area of Que. (R.C., T.S., L.T.). It was not a major problem in commercial fields in N.S. where 5/23 fields were affected; 1-2% infection was reported in Yarmouth, Lunenburg, and Colchester counties, 2-5% in Cumberland, and 10% (severe rating) in Pictou Co. (A.A.MacN.). Up to 3% infection occurred in 10/11 fields examined in N.B. (S.R.C.).

CAULIFLOWER

LEAF SPOT (Alternaria brassicae) was rated sev. (>60% incidence in 1 field in Norfolk Co., tr. in Brant Co., and sl. (11-30%) in 1/4 fields in York Co., Ont. (A.A.R.).

SOFT ROT (Erwinia carotovora). Tr. amounts of head infection were found in Kings and Yarmouth counties, N.S. (A.A.MacN.).

YELLOWS (Fusarium oxysporum f. conglutinans) was rated sl. in 1/5 fields in Halton Co., Ont. (A.A.R.).

ROOT ROT. Fusarium sp. was associated with 10% incidence of root rot in Brant Co., Ont. (A.A.R.).

CLUBROOT (Plasmodiophora brassicae) was rated tr. in 1/3 fields in Lincoln Co., sl. in 1/3 fields in Essex Co., mod. in 1/1 field in Welland Co., Ont. (A.A.R.).

DAMPING-OFF (Pythium spp., Fusarium spp.) was observed in tr. amounts in 2/4 fields in Lincoln and Norfolk counties and in 1/5 fields in Halton Co., Ont. (A.A.R.).

WIRE STEM (Rhizoctonia solani). Up to 10% infection was found in 1/7 fields in Oxford and in 1/1 in Norfolk Co., Ont. (A.A.R.).

DROP (Sclerotinia sclerotiorum) caused tr.-sl. damage in Oxford, Welland, and Halton counties, Ont. (A.A.R.).

BLACK ROT (Xanthomonas campestris). Infection was moderate (31-60% of plants affected) in 3/4 fields examined in York Co. Incidence was similar in Oxford (3/7), Welland (1/1), and Essex (3/3) counties (A.A.R.).

LEAF SPOT (Xanthomonas spp.) was rated mod. in 3/4 fields in York Co., Ont. Unidentified bacteria were isolated from leaf spot affected plants in Wentworth Co., Ont. (A.A.R.).

BORON DEFICIENCY followed by bacterial soft rot was responsible for the breakdown of 2% of the heads in 2/7 fields examined at Maugerville, N.B. (S.R.C.).

CELERY

LEAF BLIGHT (Alternaria dauci). Mod. infection was reported in 1/6 fields in York Co., Ont. (A.A.R.).

EARLY BLIGHT (Cercospora apii). Tr. amounts were observed in 1/5 fields examined in s.w. Que. (R.C., T.S., L.T.).

SOFT ROT (Erwinia carotovora). Infection was light in a 10-acre field at Ste. Dorothée, Que. (R.C.).

BACTERIAL BLIGHT (Pseudomonas apii) was rated tr. in 2/5 fields examined at Ste. Clotilde, Que. (R.C., T.S., L.T.).

PINK ROT (Sclerotinia sclerotiorum). Traces were seen in 3/5 fields surveyed at Ste. Clotilde and Sherrington, Que. (R.C., T.S., L.T.).

ASTER YELLOWS (aster yellows ?virus) was found in trace amounts in 5/5 fields examined in s.w. Que. (R.C., T.S., L.T.).

MOSAIC (unidentified virus). Tr. in 2/5 fields at Ste. Clotilde, Que. (R.C., T.S., L.T.).

NEMATODE INJURY (possibly Pratylenchus macrophallus). In tr. amounts in 1/5 fields at Ste. Clotilde, Que. (R.C., T.S., L.T.).

CUCUMBER

LEAF BLIGHT (Alternaria cucumerina and A. sp.). Sev. damage occurred in 2/4 fields in Northumberland Co. and infection was rated sl.-mod. in 2/2 fields in Oxford Co., Ont. (A.A.R.). In N.S. 8/28 fields in Kings, Cumberland, Pictou, and Antigonish counties

were affected; incidence was approx. 100%, while severity was rated tr. in 1, light (10% leaf area dead) in 3, mod. (all oldest leaves affected on all plants) in 2, heavy (more than oldest leaves affected, 25-50% of leaf area dead) in 2 (A.A.MacN.). In experimental plots at Kentville, N.S., the percentage of vines killed on test cultivars were 'Burpless', 60%; 'Burpee M & M', 30%; 'Spartangreen', 30%; 'Princess', 30%; 'Duchess', 50%; 'Gemini, 70%; 'Poinsett', 90%; 'Highmark II', 50%; 'Early F1 Hybrid', 30%; 'Marketmore', 20%; 'High Yield', 30%; 'Dixislicer', 50%; '916S', 20%; 'SC-6', 15%; 'MSU527', 30% (C.O.G., E.W.C.).

GRAY MOLD (Botrytis cinerea). Up to 2% infection was present in 3/11 fields examined in Oromocto, N.B. (S.R.C.).

SCAB (Cladosporium cucumerinum) was rated mod. in 2/6 fields in Essex county, Ont. (A.A.R.). At La Pocatière, Que. 'Hybrid Challenger' showed 50% fruit infection by Sept. 1, and 100% by mid-Sept. In other varieties incidence was light (H.G.). In experimental plots at Acadie, Que., fruit infection in test cultivars was rated 'Gemini', 0; 'Highmark II', tr.; 'Polaris', 15%; 'Challenger', 50%; 'Palomar', 50%; 'Long Marketeer' and 'Exposition', 50-75% (L.J.C.). Scab was reported from all parts of N.B. (7/11 fields tr.-sev.) and was especially severe in home gardens (S.R.C.). In N.S., scab was observed in only 1 field, in Antigonish Co., where it was rated sev. (>50% fruit infected) on 'Marketer' and 'Tablegreen' and heavy (25-50% infected) on 'Armor'. 'Highmore' was apparently immune (A.A.MacN.).

POWDERY MILDEW (Erysiphe cichoracearum) was rated sev. in 1/2 fields in Oxford Co., and 2/7 in Norfolk Co., tr. in 1/5 in Durham Co., and mod. in 1 greenhouse in Essex Co., Ont. (A.A.R.).

BACTERIAL WILT (Erwinia tracheiphila). In Ont. bacterial wilt was rated sev. in 1 field in Simcoe Co. and tr.-sl. (up to 30% incidence) in 3/5 fields in Durham Co., 3/4 in Northumberland; 4/4 in Kent; 2/2 in Oxford; 2/4 in Welland; 5/7 in Norfolk; and 1/3 in Huron (A.A.R.).

WILT (Fusarium sp.) caused loss of about 30 tons of greenhouse-produced fruit at Haney, B.C., where improper soil fumigation was practised (D.J.O.). Fusarium wilt was reported as sl. in 1/2 fields in Halton Co., Ont. (A.A.R.).

DAMPING-OFF (Fusarium spp., Pythium spp., Rhizoctonia solani) was rated tr. in 2/11 fields in Norfolk and Welland counties and sev. in 3/6 fields in Essex Co., Ont. (A.A.R.).

ANGULAR LEAF SPOT (Pseudomonas lachrymans) was reported on a specimen at Saskatoon, Sask. (R.J.L.). At Grand Coulee, Man., 100% incidence and sev. losses occurred in a field of pickling cucumbers (M.D.S.). The disease was widespread in Ont. where field ratings by county were Kent, 1 sl. 1 sev./4; Norfolk, 1 sl./7; Essex, 6 mod./6; Oxford, 1 mod. 1 sev./2; Huron, 2 tr./3; Simcoe, 1 sev./1; Durham, 5/5 sl.-sev.; Northumberland, 1 sev/4 (A.A.R.). At Oromocto, N.B. incidence in 3/11 fields was tr.-70% (S.R.C.). In N.S. 2/4 fields were affected in Kings Co., 1 mod. (10-25% fruit affected), and 1 sev. (>50% fruit affected). (A.A.MacN.).

MOSAIC (cucumber mosaic virus). In experimental fields at Acadie, Que., mosaic was rated tr. on 'Gemini' and 'Highmark II', sl. (25% diseased fruit) on 'Expo', sev. (50-75%) on 'Palomar' and 'Challenger', and extremely sev. (75-100%) on 'Long Marketeer' and 'Polaris' (L.J.C.). At Oromocto, N.B. 10% incidence was reported in 1/11 fields (S.R.C.). In Kings Co., N.S., 2/4 fields were affected - 1 mod. (10-25% fruit affected), 1 sev. (>50% fruit affected) (A.A.MacN.).

EGGPLANT

WILT (Verticillium spp.) was attributed to V. dahliae in the Ont. counties of Norfolk, 1/1 fields tr.; Essex, 1/1 sl. (10-30% incidence); Lincoln, 1/2 sev. (61-100%); and Oxford, 1/2 sev. (A.A.R.). Verticillium sp. affected a few plants in an ornamental plot at Ste. Clotilde, Que. (R.C.).

LETTUCE

GRAY MOLD (Botrytis cinerea) was reported in 3/3 fields (1-10% incidence) in Essex Co., Ont. (A.A.R.); and in 2/8 fields at Sherrington, Que., where ca. 70% of a 5-acre field was destroyed (R.C., T.S., L.T.). In N.S. gray mold was more important than in the previous few years because of excessive rainfall and was most severe on over-mature plants; incidence: Halifax Co., 1/8 fields, 5-10% plants; Pictou Co., 1/7 fields, tr.; Cape Breton Co., 4/5 fields, 2-tr., 2-2%.; Digby Co., 1 garden, 10% (A.A.MacN.).

DOWNY MILDEW (Bremia lactucae) occurred in tr. amounts in 2/8 fields near Ste. Clotilde, Que. (R.C., T.S., L.T.). In N.S. downy mildew was present only in Halifax Co., 5/8 fields - 1 tr., 1 light (1-10% plants affected), 1 mod. (10-90%), 2 heavy (90-100%). (A.A.MacN.).

DAMPING OFF (Fusarium spp.) Tr. infection was observed in 1/3 fields in Dundas Co., Ont. (A.A.R.).

ROOT ROT (Pythium sp.) was light-mod. in a 3-acre field at Sherrington, Que. The condition may have been partially due to NH_4-N fertilizer injury. (R.C.).

BOTTOM ROT (Rhizoctonia solani) caused minor damage on the early crop in muck soil

market gardens near Vancouver, B.C. (H.N.W.T.). Tr. infection was seen in 1/8 fields at Ste. Clotilde, Que. (R.C., T.S., L.T.).

DROP (Sclerotinia sclerotiorum). Mortality from drop was relatively low in early lettuce on muck soils near Vancouver (H.N.W.T.). Tr. amounts of disease were found in 1/1 field in Lambton Co. and in 1/3 fields in Dundas Co., Ont. (A.A.R.). Tr.-light infections were reported in 2/8 fields near Ste. Clotilde, Que. (R.C., T.S., L.T.). At Oromocto, N.B. 20% damage occurred in 1 field (S.R.C.). Tr. was reported from 1 field in Pictou Co., N.S., while 1-2% of plants were diseased in a Cape Breton Co. field. (A.A.MacN.).

ASTER YELLOWS (aster yellows virus). Infection ranged from trace to light in 3/8 fields near Ste. Clotilde and Sherrington, Que. (R.C., T.S., L.T.). About 3% damage was observed in a field at Shediac, N.B. (S.R.C.). Aster yellows was a major problem affecting lettuce production in Pictou Co., N.S., where 4/7 fields were affected, 3 sev. (> 10%), 1 light (1-2%). It caused light to moderate damage in Cape Breton Co. The disease appeared in late July and caused most damage in late Aug. and Sept. Older fields were most severely affected, with up to 100% infection in fields approaching maturity. Extensive plantings in Yarmouth and Halifax counties were free from aster yellows (A.A.MacN.).

TIP BURN (physiological) was observed in 1/8 fields at Ste. Clotilde, Que. (R.C., T.S., L.T.), and mod. damage was seen in a 5-acre field at Sherrington, Que. (R.C.). Tip burn was present in tr. amounts in one field in each of Cape Breton and Pictou counties (A.A.MacN.).

MARGINAL LEAF BURN (cause undetermined) was found in tr. amounts on plants in 1/8 fields at Ste. Clotilde, Que. (R.C., T.S., L.T.).

SOFT ROT SLIME (cause unidentified). In N.S. incidence varied from zero in Yarmouth Co. to sev. (10%) in late, mature lettuce in Halifax Co., where 2/7 fields were affected, and in Cape Breton Co., where 2/5 fields were rated light-mod. (up to 5% of plants affected). Tr. was reported from 1 Pictou Co. field, and the disease was sev. in Colchester Co. gardens (A.A.MacN.).

MATRIMONY VINE (Lycium halimifolium)

POWDERY MILDEW (Oidium sp.). Infection was general in senescent leaves in Nov. at Vancouver, B.C., where matrimony vine is grown in Chinese market gardens as a pot herb. The perfect state was not found, even on fallen leaves (H.N.W.T.).

MUSKMELON

LEAF BLIGHT (Alternaria cucumerina) was observed in 2 fields in Norfolk and Halton counties, Ont; incidence in each was 11-30% (A.A.R.).

SCAB (Cladosporium cucumerinum). Sev. scab (61-100% incidence) was found in 1/1 field in Norfolk Co., Ont. (A.A.R.).

BACTERIAL WILT (Erwinia tracheiphila) was reported in tr. amounts (1-10%) in 1/2 fields in Oxford Co., Ont. (A.A.R.).

POWDERY MILDEW (Erysiphe cichoracearum) was rated sev. in 2/4 fields in Essex Co., Ont. (A.A.R.).

FRUIT ROT (Fusarium spp.). Incidence was sl. (11-30%) in 1/1 field in Prince Edward Co., Ont. (A.A.R.).

ONION

PURPLE BLOTCH (Alternaria porri). Infection was sl. (11-30%) in 1/3 fields in Durham Co. and sev. (61-100%) in 1/6 fields in Kent Co., Ont. (A.A.R.). Of 18 fields examined near Ste. Clotilde and Sherrington, Que., 5 showed tr. infection and 4 light. (R.C., T.S., L.T.).

NECK ROT (Botrytis allii). Dry weather extending to picking time resulted in very lt. infection and negligible damage in the Okanagan Valley, B.C. (M.F.W.). The disease was reported from Edmonton, Alta. (A.W.H.) and was rated mod. (31-60%) in 1/6 fields in Essex Co., Ont. (A.A.R.).

LEAF BLIGHT (Botrytis squamosa, Botrytis spp.). B. squamosa affected all 18 fields examined in the Ste. Clotilde-Sherrington areas of s.w. Que.; incidence ratings were 10-tr. 2-light 5-mod. 1-sev. (R.C., T.S., L.T.). In Ont., Botrytis spp. affected fields in Durham Co. (1-mod./3), York Co. (3 mod.-sev./8) and Lambton Co. (1-mod. 1-sev./4) A.A.R.).

DAMPING OFF (Fusarium spp., Pythium spp.) caused tr. infections in 1/8 fields in York Co. and in 1/6 fields in Essex Co., Ont. (A.A.R.).

BASAL ROT (Fusarium oxysporum f. cepae). In the Okanagan Valley, B.C., high incidence and serious losses were sustained on one farm near Oliver, but the disease was not serious in the Kelowna district (M.F.W.). Unidentified fusaria were associated with 10-30% incidence of basal rot in 1/6 fields in Essex Co., Ont. (A.A.R.).

PINK ROOT (Fusarium spp.). In Ont. Fusarium was the only pathogen isolated from

roots showing symptoms of pink root; incidence ratings were sl. 1/2 fields in Lincoln Co., mod. 1/6 in Kent Co., mod. 1/2 in Welland Co., and sl. 1/3 in Durham Co. (A.A.R.).

BULB ROT (Penicillium spp.) caused tr. infection in 1/6 fields in Essex Co., Ont. (A.A.R.).

WHITE ROT (Sclerotium cepivorum). Of 17 farms near Kelowna, B.C., on which low levels of infection were detected in 1964, two developed very high levels in 1967, resulting in total loss of the crops (M.F.W.).

SMUT (Urocystis magica). In the Kelowna, B.C. area treated fields had low losses from smut, but in cold dry ground where emergence was slow the recommended fungicide-insecticide treatment caused PRE-EMERGENCE INJURY to poorer batches of seed (M.F.W.). In Ontario tr. infection was found in 4/8 fields in York Co., 1/6 in Essex Co., and 1/2 in Lincoln Co. (A.A.R.). Infection ranged from tr. to light in 3/8 at Ste. Clotilde, Que., and light to mod. infection was reported in a 30-acre field on organic soil at Sherrington, Que. (R.C.).

TIP BURN (physiological). Incidence was rated tr. in 1/4 fields in Lambton Co. and mod. in 3/6 fields in Kent Co., Ont. (A.A.R.).

PARSNIP

BOTRYTIS ROT (Botrytis sp.) was reported from plantings at Edmonton and Bowden, Alta. (A.W.H.).

LEAF SPOT (Cercospora pastinacae) was reported on 60% of the plants in a field examined at Sheffield, N.B. (S.R.C.).

CANKER (Itersonilia perplexans). Light infection was observed in 1/4 plantings in Kings Co., N.S. (A.A.MacN.). At Norton, N.B. 10% damage resulted to parsnips in storage (S.R.C.).

SCLEROTINIA ROT (Sclerotinia sclerotiorum) occurred on parsnips at Edmonton, Alta. (A.W.H.).

PEA

GRAY MOLD (Botrytis cinerea) was light in 1/9 fields in Yamouth Co., N.S. (A.A.MacN.).

POWDERY MILDEW (Erysiphe polygoni) was reported from 6 locations (A.W.H.) and in 8/124 fields of seed peas in Alta. (D.S.MacL.). Sl.-mod. damage occurred in Sask., where powdery mildew is the most troublesome disease of peas, particularly for gardeners who expect the crop to extend over several weeks (R.J.L.).

WILT (Fusarium oxysporum) was observed at Calgary, Alta. (A.W.H.). Elsewhere in Alta., F. oxysporum f. pisi was found in tr. amounts in 13/124 fields of seed peas; and in 3 fields, near wilt (F. oxysporum f. pisi race 2) was reported (D.S.MacL.). In N.S. 4 fields representing ca. 50 acres of processing peas were severely affected in the Auburn, Weston, and Harbourville Mountain areas; vascular symptoms were typical of near wilt (W.L.S., C.L.L.).

ROOT ROT (Fusarium, Pythium) was rated 8-tr. 2-sl.-mod./10 fields under irrigation in s. Alta. in early July (F.R.H.), and was found in tr. amounts in 31/124 Alta. fields of seed peas (D.S.MacL.). A pathogenic Fusarium sp. was isolated from roots of garden peas at Saskatoon, Sask. (R.M.). In c. Ont. incidence of root rot attributed to Fusarium spp. was rated up to 30% in 3/4 fields in each of Haldimand, Kent, and Norfolk counties, 1-tr./2 in Northumberland and 1-sl. 1-sev./4 in Prince Edward Co. (A.A.R.).

FOOT ROT AND BLIGHT (Phoma medicaginis var. pinodella = Ascochyta pinodella; Mycosphaerella pinodes). In Man. mod. infections occurred in experimental plots at Morden, and in 2/4 fields examined at Winkler all plants were severely affected (M.D.S.). At Grand Falls, N.B., a 20-acre field was plowed under because of blight; more than 90% of the plants were severely stunted and showed footrot and necrosis of the lower leaves and nodes; three other fields examined in the area were less severely affected. The disease was most often found in fields in which peas and potatoes have alternated for several years (W.L.S.). Blight was tr.-light in 2/5 fields examined near Florenceville, N.B., and in 3/8 fields in the Sherwood-Brookfield area of P.E.I. (W.L.S.).

LEAF AND POD SPOT (Ascochyta pisi) was found in 38 fields in s. Alta., but incidence was rated tr. or very light. (D.S.MacL.). Tr. infections were found in Sask., but the dry season kept spread to a minimum (R.J.L.). Leaf spot was light in test plots at Kentville, N.S. (C.O.G., W.L.S.).

BACTERIAL BLIGHT (Pseudomonas pisi). In Alta. tr.-sev. infections were reported in 48/124 fields of seed peas inspected by the CDA Plant Protection Div. (D.S.MacL.). In 52 acres near Gem, Alta., incidence was rated <5%, severity sl.; in the Brooks, Alta. area incidence was <5%, severity mod. in 15/37 fields (470/1200 acres); at Cluny, Alta., incidence was 1% and severity sl. in 1/3 fields; and in the Rosemary, Alta. area three plantings of 24, 106 and 71 acres each showed ca. 5% incidence and sl. damage (M.D.S.).

STEM ROT (Rhizoctonia solani) caused mod. damage in 8/10 irrigated fields examined in early July in s. Alta. Many of the fields had been cropped the previous year to potatoes (F.R.H.). Tr. infections were seen in 2/8 fields in Kent and Norfolk counties,

Ont. (A.A.R.).

RUST (Uromyces fabae). Tr. infections were observed on several varieties in yield trials at Kentville, N.S. At Brookfield, P.E.I., all plants were affected and severity was rated high in a 10-acre field of 'Dark Skin Perfection' (W.L.S.).

BLIGHT (cause unknown). A sudden blighting of leaves and stems affected about 800/1000 acres of peas grown for freezing and canning near Grand Falls, N.B. The condition appeared early in August on a number of farms on which peas were being grown under contract with one processor. According to field supervisors, the crop appeared to be developing normally until about flowering, when growth stopped and vines quickly senesced. When examined on Aug. 15, up to 90% of the plants in individual fields were necrotic; leaves and stems were almost uniformly brown, without lesions or other signs of recognizable disease. Few of the plants were affected by footrot or rootrot, and most had well developed root systems. No signs of vascular discoloration were evident. Scattered through the fields were healthy green plants with well-filled pods. In several fields the green plants occurred in linear strips of one row running parallel to the direction of the rows, giving an appearance similar to that of fields treated with a sprayer or applicator having a faulty nozzle. Tissues from affected plants were examined microscopically and were plated on potato dextrose agar and nutrient agar, but no bacterial or fungal pathogens were detected that could account for the intensity of the condition in so many fields. The company reported that analyses of soil samples also failed to indicate a cause of the condition. Plant tissues were not analyzed for herbicide residue or viruses (W.L.S.).

PEPPER

EARLY BLIGHT (Alternaria solani) was rated tr. in 1/6 fields in Lincoln and sl. in 3/6 in Essex Counties, Ont. (A.A.R.).

FRUIT ROT (Phoma destructiva). Minor damage occurred in 1/6 fields in Essex Co., Ont. (A.A.R.).

DAMPING-OFF (Pythium spp., Rhizoctonia solani, Fusarium spp.). Up to 30% incidence was reported in 4/5 greenhouses in Essex, Norfolk, and Elgin counties and tr. in 1/6 fields in Lincoln Co., Ont. (A.A.R.).

SOFT ROT (Pythium spp.). Tr. was observed in 1/1 fields in Brant Co., Ont. (A.A.R.).

WILT (Verticillium spp.) was attributed to V. dahliae in tr. amounts in 1/6 fields in each of Elgin and Lincoln counties and in mod.-sev. amounts (31-100%) in 3/6 fields in Essex Co., Ont. (A.A.R.).

BLOSSOM-END ROT (physiological) affected up to 10% of the fruit in 2/12 fields in Essex and Lincoln counties, Ont. (A.A.R.), and caused about 5% damage in 1/1 fields at Oromocto, N.B. (S.R.C.).

POTATO

EARLY BLIGHT (Alternaria solani). In c. B.C. most varieties other than Netted Gem were affected and yields reduced because of early death of vines (E.F.C.). It was reported from Edmonton, Camrose, and Winterburn, Alta. (A.W.H.). Sl.-mod. damage was recorded in 9/65 fields in Sask. (B.H.W.). Early blight was more prevalent in 1967 in Que., where 38.7% of the fields were affected, as compared with 29.8% in 1966. In 1967 the disease was most prevalent and sev. in the n.e. part of the province, where 66.3% of the 351 fields inspected were affected; disease ratings for the province were 239-sl. 42-mod. 11-sev./ 751 fields (G.E.). In field trials at La Pocatiere, Que., most varieties and lines were practically free from early blight, but all plants of 'F6438' were infected and damage was sev. (H.G.). At Ste. Clotilde and St. Michel, Que., early blight was rated tr. in 4/18 fields (R.C., T.S., L.T.). At Jemseg, N.B. infection ranged from tr. to 100% in 7/7 fields and although defoliation occurred in 2 fields, losses were not sev. because the crop was near maturity (S.R.C.).

BLACK DOT (Colletotrichum coccodes) was reported from Naton, Alta. (A.W.H.). At La Pocatiere, Que., many varieties and seedlings grown in sandy soil were slightly affected, and symptoms were more noticeable on tubers than in 1966 (H.G.).

BACTERIAL RING ROT (Corynebacterium sepedonicum). Three fields in the Vancouver, B.C. area were affected; two had been planted with N. Dakota seed and the third with locally grown seed (J.C.H.) Field surveys in Alta. showed the incidence of ring rot to be considerably lower than in 1966. The percentage of farms affected in 1967 were as follows (1966 figures in brackets): Lethbridge, 23.4 (35.0); Calgary, 6.3 (35.0); Brooks, 16.7 (22.9); Edmonton, 7.8 (29.6). In addition ring rot was positively identified in diseased tubers from more than a dozen locations in Alta. (A.W.H.). In Sask. fewer specimens than usual were examined in 1967, although the disease continues to be an important one in the province (R.J.L.). Of 751 fields inspected in Que., 58 (362 acres) were affected. Following harvest, ring rot was detected in potatoes representing an additional 42 acres. The percentage of Que. potato fields denied certification because of ring rot has declined steadily since 1960, when 21.3% were affected; figures for succeeding years were: 1961 - 12.6%, 1962 - 9.7%, 1963 and 1964 - 10.7%, 1965 - 7.1%, 1966 - 8.2%, 1967 - 7.5% (G.E.). Ring rot was also detected in 1/18

fields in the Sherrington, Que., area (R.C., T.S., L.T.).

BLACK LEG (Erwinia atroseptica) was much more prevalent in the B.C. interior than in 1966; it was found in seed imported into the area but was most sev. in seed grown in the area in 1966 (E.F.C.). In Alta. it was reported from Ponoka, Peace River, Sangudo, Two Hills, Wetaskiwin, and Woking (A.W.H.) and Edmonton (R.P.B.). In Sask., one garden showed about 30% loss, although certified seed had been planted (R.M.); and two fields were rejected (B.H.W.). Tr. infections were found in 1/3 fields in Lambton Co., Ont. and in 1/2 in Oxford Co., blackleg was rated sl. in 2/3 fields in Kent Co. (A.A.R.). In Que. 421/751 fields inspected were affected; the 1967 figure of 56.4% contrasts with 60.9% in 1966 and 65.9 in 1965; 2.5% of the fields (191 acres) were rejected in 1967, compared with 6.3% in 1966 and 4% in 1965; sl. infection was noted in stored potatoes (G.E.). 'Sebago' appeared quite susceptible to black leg (15% infection) at La Pocatiere, Que. (H.G.). At Sherrington, Que., tr. was reported in 1/18 fields (R.C., T.S., L.T.). In Nfld. incidence varied from 1% to 5% in most fields examined, but in 1 field at Salmonier 50% of the plants showed stem infections; several varieties, but chiefly 'Sebago', were affected (O.A.O.).

SOFT ROT (Erwinia carotovora) was reported from Red Deer and Alder Feats, Alta. (A.W.H.) and caused 15% loss in 1/1 field near Jemseg, N.B. (S.R.C.).

STEM-END ROT (Fusarium solani (Mart.) App. & Wr. var. eumartii (Carp.) Snyd. & Hansen). Two samples of dry rot near the stem end were received, one from Vancouver Island and one from the Cariboo. The pathogen was identified as F. solani f. sp. eumartii by Dr. W. C. Snyder. This is the first record of the forma specialis in B.C., although the disease is not new, having previously been included under Fusarium solani (D.J.O.).

DRY ROT (Fusarium spp.) was reported from Grimshaw and Leduc, Alta. (A.W.H.) and affected potatoes in storage at Leader, Sask. (R.M.). In Que. incidence of dry rot was sl. in 11 potato lots in storage but reached 15% and 25% in 2 lots of 'Keswick' that had been harvested under unfavorable soil conditions (G.E.).

BLACK ROT (Fusarium spp.) was reported from Stony Plain, Alta. (A.W.H.).

WILT (Fusarium spp., Verticillium spp.). Tr. amounts were observed in Sask. (B.H.W., R.J.L.).

SILVER SCURF (Helminthosporium solani). Incidence was light-mod. on seedlings of many varieties in plot trials at La Pocatiere, Que. (H.G.). It was noted in 10 potato lots in storage, where infection ranged from 0.25 to 0.5% (G.E.).

RHIZOCTONIA (Pellicularia filamentosa = Thanatephorus cucumeris [Frank] Donk). Unsuitable growing conditions in c. B.C. resulted in many weak plants which were severely affected by Rhizoctonia; cv. 'Netted Gem' was most severely attacked (E.F.C.). It was reported from Camrose, Edmonton, and Disbury, Alta. (A.W.H.). In Sask. this disease occurred in about half (65) of the fields examined where damage was sl.-mod. (B.H.W.). Rhizoctonia solani and Fusarium spp. were associated with tr. amounts of stem canker observed in 1/3 fields in each of Elgin, Essex, Kent, Lambton, and Welland counties, Ont. (A.A.R.). In Que. fields examined by Plant Protection inspectors, Rhizoctonia was less prevalent than in 1966; it was observed in 67 fields or 8.7% of the fields inspected, compared with 195 fields or 21.9% in 1966, and 251 fields or 29.4% in 1965. Of 378 bins inspected in the fall of 1967, 21.6% were affected; 72 were rated sl. and 8 mod. In 1966, 125 lots or 32.5% were affected (G.E.). The disease was sev. on 'Kennebec' and on some 20 seedling lines grown at Ste. Clotilde, Que. A few seedlings were also severely affected at L'Assomption, and a light infection was recorded at La Pocatiere (H.G.). Only tr. infections were found in 2/18 fields examined in the Sherrington, Que. area (R.C., T.S., L.T.).

STEM-END HARD ROT (Phomopsis tuberivora). 20% of the tubers in a lot of certified 'Early Epicure' seed grown at Ladysmith, B.C. were found to be infected. The hot, dry summer of 1967 may have been a contributing factor. It is believed that small amounts of the disease occur commonly, but this is the first laboratory confirmation in B.C. since 1948. (D.J.O.).

PINK ROT (Phytophthora erythroseptica). Pink rot was associated with late blight affected tubers in a few fields where care had not been taken in limiting sprinkler irrigation in the Fraser River Delta area, B.C. (H.N.W.T.).

LATE BLIGHT (Phytophthora infestans) was more prevalent in Que. in 1967 than in the preceding 2 years; it was present in 216 fields or 28.6% of those inspected compared with 41 fields (4.6%) in 1966 and 27 fields (3.1%) in 1965; of the fields affected 128 were rated sl., 73 mod., and 15 sev. (G.E.). In the Ste. Clotilde, St. Michel areas of Que., late blight was rated 2-mod. 5-sev./8 fields of early maturing potatoes and 3-tr. 1-lt./10 fields of late varieties (R.C., T.S., L.T.). In N.B. late blight was not sev. in commercial areas, but foliage blight and tuber rot were sev. in other parts of the province (S.R.C.). Late blight was quite common in N.S. but did not appear until relatively late considering the unusually wet season; it was found in the Yarmouth, Scotts Bay, Lower Truro areas, and in Halifax Co. on Aug. 8. It was common in Cape Breton, Colchester, Halifax, and Yarmouth counties, where heavy fog, cool temperatures, and

frequent rain showers occurred. Losses were high in Colchester Co. and the Yarmouth area where fungicides were not used and where 2 - 3% root rot was common by Aug. 23. Considerable late-season infection occurred in the Kentville area and sev. tuber infection was reported in unsprayed plantings (C.O.G., A.A.MacN.). In P.E.I. blight developed rapidly late in the growing season and became sev. in poorly sprayed fields in September. Some growers lost heavily from tuber rot, particularly in the variety 'Kennebec' (L.C.C.). Light-mod. infection and mod. damage were reported in several areas of e. Nfld. and tuber rot was common in storage; however, there were few reports of blight in the c. and w. parts of the province (O.A.O.).

LEAK (Pythium ultimum). Severe infection occurred prior to digging in a 40-acre field of 'Kennebec' potatoes at Ladner, B.C. A hot summer coupled with heavy irrigation and rainfall late in the season were contributing factors. Twenty percent of the crop was left on the field and a further 10-20% was culled out at the receiving station (D.J.O.). In Sask., specimens from a field of early-harvested potatoes indicated sev. tuber breakdown (R.J.L.). At La Pocatiere, leak was light-mod., particularly in cv. 'Teton', at early harvest in Aug. when warm conditions prevailed (H.G.). Sl.-mod. damage was observed in 26 lots or 6.3% of the bins of stored potatoes inspected after harvest (G.E.).

POWDERY SCAB (Spongospora subterranea). In Que. the disease was mostly confined to the Lower St. Lawrence district and sl. infections were reported in 8% of the bins inspected in that area but the infection was mostly sl. (G.E.). Light infection was noted at La Pocatiere on 'Green Mountain' and some other varieties or lines and the disease appeared less sev. than in 1966 (H.G.).

COMMON SCAB (Streptomyces scabies). Hot, dry weather in c. B.C. seemed to increase the incidence of scab, and all varieties except 'Netted Gem' showed more scab than usual (E.F.C.). One 4-acre field of 'Pontiac' at Ladner, B.C. was 100% affected and unfit for market; the grower had used chicken manure as fertilizer in 1966 (H.N.W.T.). Infection was reported from many localities in n. Alta. (A.W.H.), but incidence was less than normal in Sask.. (B.H.W.). It was rated 1 sl./2 fields in Oxford Co., Ont. (A.A.R.). Light-mod. infection was observed in a 10-acre field of 'Green Mountain' at La Pocatiere, but 'Huron' 'Cherokee', and 'Norland' appeared quite resistant (H.G.). Common scab was found in every potato-growing area in Que., but was less prevalent than in the preceding 2 years. In storage infection was rated 188-sl. 12-mod. 4-sev./378 bins inspected. Percentage of bins affected was 53.4 in 1967, 68.4 in 1966 and 70.5 in 1965. Incidence within bins was usually in the 0.25 - 0.75% range, with a few lots of 1 - 3%; the most sev. infections were observed in Bonaventure and Charlevoix counties (G.E.). Scab was widespread in N.B. (S.R.C.) and was mod.-heavy in the St. John's area of Nfld. (O.A.O.).

WART (Synchytrium endobioticum). In c. Nfld. wart was generally not sev. in 1967. The dry weather in June and July over most of the island retarded the establishment of infection when the potatoes were most susceptible. Incidence and damage were rated mod. (O.A.O.).

WILT (Verticillium spp.). Tr. infection in 1/3 fields in Ontario Co., Ont., was attributed to V. dahliae (A.A.R.). In Que. V. albo-atrum was found in tr. amount in 1/18 fields near Ste. Clotilde (R.C., T.S., L.T.) and was reported elsewhere in 63 (8.3%) of the fields inspected; three fields representing 31.5 acres were rejected; wilt was most prevalent in cv. Kennebec, but losses were negligible (G.E.).

PURPLE TOP (aster yellows ?virus). Tr. amounts were seen in 13/65 fields inspected in Sask. (B.H.W.). Although aster yellows was present in most plantings of carrots in Sask., incidence in potatoes and annual and perennial flowers was generally low (R.J.L.).

LEAF ROLL (virus) was reported from eleven locations in Alta. (A.W.H.). In Sask. incidence of leaf roll was greater in 1967 than in the previous year, and 1/65 fields inspected was rejected (B.H.W.); it was also reported from a home garden in Saskatoon (R.M.). In Que. leaf roll was less prevalent than in the previous 2 years; it was observed in 53 (7.4%) of the fields inspected, and one (25 acres) was rejected. Incidence in 1966 was 178 fields (20.2%); in 1965, 197 fields (23%); the disease is apparently more prevalent in the area north of Montreal than elsewhere in the province (G.E.). Leaf roll was light in 1 field in Yarmouth Co., N.S. (A.A.MacN.).

MOSAIC (viruses). Tr. amounts were found in 1/65 fields in Sask. (B.H.W.). In Que. 245 (32.5%) of the fields inspected showed infection, a decrease from 356 (40.4%) in 1966 and 457 (57.9%) in 1965. Fields rejected because of mosaic were 42 (255 acres) in 1967, 107 (702 acres) in 1966, and 102 (645 acres) in 1965 (G.E.). Mosaic was commonly observed in Halifax Co., N.S., where home-grown seed was used; 3/3 fields were affected: 1 light (<5% plants affected) 2 sev. (75% plants affected). In Cumberland Co., N.S., 1/4 fields was heavily infected, with stem streaking common (A.A.MacN.).

SPINDLE TUBER (virus) was rated tr. in 2/65 fields (B.H.W.), but it is thought to be increasing in prevalence in Sask., where difficulty in field diagnosis prevents effective roguing (R.J.L.). In Que. a few infected plants were detected in 7 fields of 'Kennebec' (G.E.).

WITCHES' BROOM (virus). Tr. amounts were

reported in Sask. (B.H.W.).

BLACK HEART (physiological) was reported from six areas in Alta. (A.W.H.).

HOLLOW HEART (physiological). Because of wet weather in the fall, hollow heart was widespread and caused mod. damage of all varieties in Que. (H.G.).

MAGNESIUM DEFICIENCY affected 40% of the crop in 1 field at Jemseg, N.B. (S.R.C.).

FROST INJURY was found in 94 lots or 24.3% of the crop inspected in Que. Losses of 2-4% were sustained from injury from frost and adverse weather conditions experienced in Oct. (G.E.).

RADISH

GRAY LEAF SPOT (Alternaria brassicae) caused tr. infection in 1 seed field at Vauxhall, Alta. (F.R.H.) - a first report on Raphanus in Alta., although the pathogen has been reported on brassicas in the province.

BLACK LEAF SPOT (Alternaria brassicicola). Tr. infection was observed at Vauxhall, Alta. (F.R.H.). This is also a first report on radish in Alta.

BLACK POD BLOTCH (Alternaria raphani). Tr. infection was found in 2 seed fields at Vauxhall, Alta. in late August. This is the first report of this pathogen in Alta. (F.R.H.). Of 7 fields (38 acres) of seed radish inspected by Plant Protection Div. in s. Alta., 6 were affected by A. sp. (probably A. raphani) (D.S.MacL.).

RHUBARB

LEAF SPOT (Ascochyta rhei) was reported from Fort Saskatchewan, Alta. (A.W.H.) and Merrickville, Ont. (W.L.S.).

ROT (Fusarium sp.) caused about 2% damage in a field at Keswick, N.B. (S.R.C.).

RUTABAGA

BOTRYTIS ROT (Botrytis sp.) was reported from Edmonton, Alta. (A.W.H.).

SOFT ROT (Erwinia carotovora) was reported from Calgary, Bowden, and Lethbridge, Alta. (A.W.H.). At Fredericton, N.B., 100% loss occurred in 1 field in Sept. when soft rot developed in growth cracks (S.R.C.). Warm weather and frequent thunderstorms during August in the Lethbridge, Nfld. area promoted the development of soft rot in epidemic proportions in fields of 'York' rutabaga - only the 'York' variety was affected. Approximately 40% of the plants of this variety were affected, and none of the affected roots were harvested. Rot developed initially in growth cracks on the shoulders or in root maggot injuries below ground. At St. Davids on the w. coast of Nfld. about 5% of the 'York' plants examined were affected (O.A.O.). Tr.-light (up to 1%) incidence of crown rot in 2/7 fields in Pictou and Antigonish counties and sev. (90% loss) infection in 1/5 fields in Cape Breton Co., N.S. were noted in Aug.; as in the other Atlantic Provinces, rot was usually associated with growth cracks (A.A.MacN.).

DOWNY MILDEW (Peronospora parasitica) infection followed by rot affected 10% of a 10-acre field of 'Laurentian' at La Pocatiere, Que. (H.G.). It was rated tr. in 1 field in both Antigonish and Cape Breton counties and sev. in Kings Co., N.S. (A.A.MacN., C.L.L.). Mod. infection was observed on the Avalon Peninsula, Nfld. (O.A.O.).

CLUBROOT (Plasmodiophora brassicae) incidence was mod. (32-60%) in 1/4 fields in York Co., Ont. (A.A.R.). In Que. 3 fields in the Ste. Clotilde-Sherrington area were rated 2-tr. 1-light (R.C., T.S., L.T.), and in 1 field on alluvial soil at Riviere-Ouelle 80% incidence and sev. damage occurred following cool wet conditions during early growth (H.G.). Tr.-15% infection was reported from 3/22 fields in s. N.B. (S.R.C.). In N.S. clubroot was present only in the counties of Pictou (1-tr./5 fields), Antigonish (1-tr./4 fields), and Cape Breton (2-light [1-2%]/5 fields). In both Pictou and Antigonish counties, the variety 'York' stood up well in areas where clubroot was formerly a serious problem, but in Cape Breton Co. both 'York' and the older 'Laurentian' were affected (A.A.MacN.). [The variety 'York', developed at the CDA Research Station, Charlottetown, P.E.I., was released in 1964 and seed was generally available in 1966. It possesses resistance to several races of P. brassicae in the Atlantic Provinces and Quebec but is susceptible to race 1, which is present in certain areas of N.S., N.B., and Nfld. - Ed.].

RHIZOCTONIA ROT (Rhizoctonia solani). Incidence of skin blotch was 1% in a field at Blissfield, N.B. (S.R.C.) and 10% in a field of 'York' in Antigonish Co., N.S. (B.B., C.O.G.). Rot caused mod. damage to 'Laurentian' rutabaga at Vernon, P.E.I., where high day and night temperatures during July and Aug. resulted in conditions favoring rapid growth and subsequent cracking of the fleshy roots followed by entry of the pathogen (G.W.A.). R. solani was isolated from rutabaga showing "crater rot" symptoms in storage at Prince George, B.C., where the disease is of general occurrence but seldom affects more than 1-2% of the root (D.J.O.).

SCAB (Streptomyces scabies) was rated tr. in 1 field at Keswick, N.B. (S.R.C.).

BLACK ROT (Xanthomonas campestris). Discoloration of the root surface and vascular tissue occurred at Grand Forks, B.C., where the disease was spread by wash water contaminated by a few diseased roots (D.J.O.).

BROWN HEART (Boron deficiency) was sev. in 1/3 fields at Sherrington, Que. (R.C., T.S., L.T.) and affected 50% of a field of 'York' in Antigonish Co., N.S. (B.B., C.O.G.).

CHEMICAL INJURY. Malformation caused by 2,4-D drift caused sl. damage in Sask. (R.J.L.).

CRACKING. At Cloverdale, B.C., 85% of the roots in a 4-acre field were lost from cracking shortly before harvest; cracking followed the application of irrigation after a long dry period (D.J.O.). In other areas, growth cracks were rapidly invaded by rot-inducing pathogens: by soft rot bacteria in N.B., N.S., and Nfld. and by Rhizoctonia solani in P.E.I.

SURFACE PITTING. At Vancouver, B.C., a superficial pitting of unknown cause affected up to 90% of the roots in several shipments of rutabagas from Quesnel, B.C. The condition (Fig. 1) did not appear until several days after washing. Laboratory examination failed to detect any significant bacterial infection and no parasitic fungi were isolated (D.J.O.).

Figure 1. Superficial pitting of rutabaga following washing. Grown at Quesnel, B.C.

SPINACH

GRAY MOLD (Botrytis cinerea) was rated tr. in 1/1 field in Kent Co., Ont. (A.A.R.).

SOFT ROT (Erwinia carotovora). Mod. (31-60%) infection was reported from 1 field in Kent Co., Ont. (A.A.R.).

SQUASH

LEAF SPOT AND FRUIT ROT (Alternaria cucumerina) caused sev. damage to fruit in N.S. (C.O.G.).

STORAGE ROT (Alternaria sp.). A. tenuis was associated with 66% loss of 'Sweet Keeper', 'Green Hubbard', and 'Buttercup' squash in storage at Port Williams, N.S., and with 25% loss of acorn squash at Canning, N.S. In both instances low temperature injury appeared to be a predisposing factor in disease development (T.C.).

STORAGE ROT (Botrytis sp., Fusarium sp., Rhizopus sp., Sclerotinia sp.). Tr. amounts of Fusarium roseum and Rhizopus sp. were found on 'Sweet Keeper' at Sheffield Mills, N.S.; and F. roseum and Botrytis sp. initially caused 25% loss of bulk-stored 'Buttercup' and up to 75% loss following bagging, at Canning, N.S. (T.C.). Fusarium and Sclerotinia were associated with a 2% loss at Maugerville, N.B. (S.R.C.). Sclerotinia sclerotiorum caused 2% loss of 'Sweet Meat' at Port Williams, N.S. (T.C.).

BACTERIAL SOFT ROT (Erwinia carotovora), an uncommon field disease in N.S., was reported in light amounts on young squash in a Digby Co. field following unusually rainy weather (A.A.MacN.).

FUSARIUM WILT (Fusarium oxysporum) affected approx. 25% of a field in Digby Co., N.S.; apparently a new record for this province (A.A.MacN.).

BLACK ROT (Mycosphaerella citrullina) was found on many varieties, including 'Sweet Meat' and some Japanese hybrids, in field trials at Kentville, N.S. (T.C.).

SOFT ROT (Rhizopus sp.). A tr. amount was reported from 1 field of summer squash in Kent Co., Ont. (A.A.R.). Tr. amount was reported from storage at Sheffield Mills, N.S. (T.C.).

SWEET CORN

EAR ROT (Fusarium spp.) affected 20% of the crop in 1 field at Oromocto, N.B. (S.R.C.).

ROOT ROT (Fusarium spp.) was rated tr. in 1 field in Norfolk Co., Ont. (A.A.R.).

SMUT (Ustilago maydis) occurred commonly in home gardens in N.B. and N.S. (S.R.C., A.A.MacN.).

STALK ROT (cause unknown). A tr. amount was found in a field at Rosemary, Alta. No known pathogen was isolated (F.R.H.).

TOMATO

EARLY BLIGHT (Alternaria solani) occurred in tr. amounts in 1/1 greenhouses in both Elgin and Lincoln counties and in 1/4 greenhouses in Brant Co., Ont. Sl. infection was found in 1 greenhouse in Northumberland Co. Field infections in Ont. were rated 3-tr. 1-sl/3 in Norfolk, 1-sl./6 in both Essex and Lincoln, 1-mod./3 in Wentworth, 3-mod./4 in Kent, 3-sl./3 in Durham, 1-sl./5 in Northumberland, and 2-sl./8 in Prince Edward Co. (A.A.R.). In experimental plots at Acadie, Que., the incidence of the disease on the fruit of several cultivars and lines was Heinz 1350, 6%; 26-37-26, 12%; I_{ω} S_{δ}, 26%; F_{3} -3058, 29%; Manitoba, 30%; Starfire, 42% (L.J.C.). Incidence ranged from tr. to 100% in 11/17 fields in the Oromocto-Gagetown area of N.B., and sev. defoliation occurred in 7 fields (S.R.C.). In N.S. early blight was of economic importance in parts of Cumberland (1-tr., 1-sev./3 fields) and Antigonish (1-sev./2 fields) counties, where differences in varietal susceptibility were apparent; tr. infections were also found in 1/2 fields in Pictou Co. and in 1 field in Kings Co. (A.A.MacN.). In the Okanagan Valley, B.C., there was no evidence of early blight throughout the season (M.F.W.).

ALTERNARIA FRUIT ROT (Alternaria tenuis). In the Okanagan Valley, B.C. incidence of fruit rot was very light on several varieties and damage was negligible, even on fruit harvested from unsprayed fields and stored for up to 2 weeks (M.F.W.).

FRUIT ROT (Alternaria, Phoma, Collectotrichum, Fusarium) was sev. following frost in Pictou Co., N.S.; 50-75% of the green and ripe fruits were affected (A.A.MacN.).

NAILHEAD SPOT (Alternaria tomato) was sev. on a particularly susceptible selection in a breeding program in the Fraser Valley, B.C. (D.J.O.).

GRAY MOLD (Botrytis cinerea) was reported from Olds, Alta. (A.W.H.). In s. Ont. greenhouses it was rated 1 tr./4 in Brant Co., 1 tr./1 in Elgin Co., 1 tr./5 in Norfolk Co., 1 sl./1 in Lincoln Co., and 1 mod. 1 sev./2 in Essex Co. Mod. infection occurred in 1/5 fields in Northumberland Co., Ont. (A.A.R.). Tr.-70% blossom blight and fruit rot was noted in 3/17 fields near Oromocto, N.B., (S.R.C.). Infection in Digby Co., N.S., was rated light (leaf spot only) in 3/4 fields; in Cumberland Co., 1 light, 1 mod. (leaves and up to 2% fruit affected)/3 fields; in both Pictou and Antigonish Counties, 1 tr./2 fields (A.A.MacN.).

ANTHRACNOSE (Collectotrichum coccodes) occurred on all varieties in the Okanagan Valley, B.C., but incidence was very light and damage negligible in 1967 (M.F.W.). In Ont. tr. amounts were reported in 1/1 fields in Kent Co., 1/3 fields in Norfolk Co., and 3/6 fields in Essex Co., Ont.

BACTERIAL CANKER (Corynebacterium michiganense) was reported from a home garden at Medicine Hat, Alta. (F.R.H.) and was found in most areas of Ont., where incidence was rated 1 tr., 1 mod./2 fields in Lennox and Addington Co., 1 tr./1 greenhouse in Durham Co.; 1 tr./6 greenhouses in Prince Edward Co.; 1 mod., 1 sev./3 greenhouses and 3 tr./6 fields in Essex Co.; and 1 tr./4 fields in Kent Co. (A.A.R.).

WILT (Fusarium oxysporum f. lycopersici) was rated tr. in 1/6 fields in Essex Co., 2/6 fields in Lincoln Co., and 1/2 fields in Oxford Co., Ont. (A.A.R.). At Oromocto, N.B., wilt was noted initially in seedlings in the greenhouse and it later affected 5% of the transplants in the field; the pathogen was suspected to be Fusarium (S.R.C.).

DAMPING-OFF (Fusarium spp.) affected 70% of the plants in 1 field at Sheffield, N.B. (S.R.C.). [See also DAMPING-OFF - Pythium Rhizoctonia, Fusarium].

ROOT ROT (Fusarium spp., Pythium spp.) in Ont. counties was rated tr. in 1/4 fields in Kent, 1/6 in both Lincoln and Welland, and 1/3 in Norfolk (A.A.R.).

LATE BLIGHT (Phytophthora infestans) had little or no affect on early varieties at La Pocatiere Que., but 25% infection and mod. damage was observed on two hybrids in variety trials at the CDA Research Station (H.G.). Tr. infections were reported in 2/17 fields near Oromocto, N.B. (S.R.C.).

SOUTHERN BACTERIAL WILT (Pseudomonas solanacearum) was detected on six farms in Kent Co., Ont.; incidence ranged from 1 to 4% and there was evidence of secondary spread within the row on two farms. Diseased plants were removed in July and no further evidence of the disease was observed later in the season; losses were quite small. The affected plants on all six Ont. farms - and about 80% of all field tomatoes grown in southwestern Ontario - were imported as transplants from Georgia, where bacteria wilt is of common occurrence (R.E.C.L., C.D.McK.). A tr. amount of bacterial wilt was also reported from 1/4 fields in Kent Co. (A.A.R.). The only previous report of Ps. solanacearum in Canada was in Ontario in 1949 [See also Layne and McKeen, CPDS 47:94-98. 1967].

BACTERIAL SPECK (Pseudomonas tomato) was rated tr. in 2/6 fields in Essex Co., 1/4 in

Kent Co., and 2/8 in Prince Edward Co., and sl. in 2/3 fields in Durham Co., Ont. (A.A.R.).

DAMPING-OFF (Pythium spp. Rhizoctonia solani, and Fusarium spp.) occurred in tr. amounts in 1/5 greenhouses and 2/8 fields in Prince Edward Co., Ont. (A.A.R.).

LEAF SPOT (Septoria lycopersici) was rated tr. in 1/3 greenhouses in Essex Co. and sl. in 1/3 fields in both Wentworth and Norfolk counties, Ont. (A.A.R.).

STEM ROT (Sclerotinia sclerotiorum) affected 20% of the plants in 1 field at Homestead, N.B. (S.R.C.).

WILT (Verticillium dahliae). Tr. amounts were found in 1/6 fields in Essex Co. and sl. in 3/4 fields in Kent Co., Ont. (A.A.R.).

BACTERIAL SPOT (Xanthomonas vesicatoria) was reported in tr. amounts in 1/5 fields in Northumberland Co. and in 1/8 fields in Prince Edward Co.; 31-60% infection occurred in 1/3 fields in Northfolk Co., Ont. (A.A.R.).

MOSAIC (cucumber mosaic virus) was reported from Edmonton, Alta. (A.W.H.).

MOSAIC (tobacco mosaic virus). Incidence was 100% in a greenhouse crop at Lincoln, N.B. (S.R.C.).

GRAY WALL (tobacco mosaic virus) was found in about 8% of the early fruit picked from 3/3 fields at Sheffield, N.B., but later fruit were free from this symptom. (S.R.C.).

BLOSSOM-END ROT (physiological) was common in n. Alta. (A.W.H.) and in Sask. was troublesome in locations where tomatoes were crowded or where tree roots competed for available moisture (R.J.C.). In variety trials at La Pocatiere, Que., 4-6% of the fruit of 'Quebec 314', 'Boule de Feu', and 2 hybrids were affected (H.G.). Tr. incidence (1% fruit affected) was reported from fields in both Kings and Pictou counties N.S. and 1% of the fruit in a field in Antigonish Co. were affected (A.A.MacN.).

BLOTCHY RIPENING (physiological). Green streaks on the shoulders of fruit at the stem end were common in tomatoes produced in B.C. during a long hot summer; the flesh beneath such patches was unusually hard (H.N.W.T.). Tr. amounts were seen in 1 greenhouse in Lincoln Co. and in 2/3 greenhouses and 3/6 fields in Essex Co; and 11-20% incidence was reported from 3/4 fields in Kent Co., Ont. (A.A.R.).

CAT-FACE (physiological). Tr. was reported from 1 field at Homestead, N.B. (S.R.C.).

CHEMICAL INJURY. 2,4-D injury was reported from 2 locations in Alta. (A.W.H.).

MAGNESIUM DEFICIENCY was observed in 40% of the crop in 2/3 fields at Waterboro, N.B. (S.R.C.).

FROST DAMAGE occurred in 2/4 fields in Kent Co., Ont.; damage was only tr. (A.A.R.).

HAIL DAMAGE caused sl. damage in 1 field examined in Kent Co., Ont. (A.A.R.).

WATERMELON

ALTERNARIA ROT (Alternaria cucumerina) caused sev. damage to field-grown fruit in N.S. (C.O.G.).

DISEASES OF FRUIT CROPS

A. Pome Fruits

APPLE

CROWN GALL (Agrobacterium tumefaciens). In B.C. incidence was lower than usual in locally grown nursery stock (L.E.L.).

STORAGE ROT. Alternaria sp. was isolated from 60% of a sample of affected 'Golden Russet' apples from Gagetown, N.B., while 'Delicious' and 'Cortland' apples from the same source showed general breakdown (C.L.L.). Alternaria sp. also comprised 90% of the organisms isolated from zonated spots occurring in tr. amounts on apple seedlings in storage at Kentville, N.S. (C.L.L.).

ARMILLARIA ROOT ROT. (Armillaria mellea) affected 30% of the 'Gravenstein' and 'McIntosh' trees in an orchard at Falmouth, N.S. The affected trees have been declining for the past 3 yrs. (C.L.L.).

FRUIT SPOT (Cylindrosporium pomi = Phoma pomi). Calyx-end rot affected about 5% of 'Northern Spy' fruit in storage at Greenwich, N.S.; Alternaria and Penicillium spp. were also isolated (C.L.L.).

BRULURE BACTERIENNE/FIRE BLIGHT (Erwinia amylovora). L'humidité et la chaleur du début de juin ont favorisé le développement de la brûlure bactérienne. Quelques Lobo et McIntosh ont été trouvées affectés par cette maladie dans un verger de Missisquoi, Qué. La variété McIntosh a également été trouvée atteinte par la maladie à Rougemont, Qué. Enfin, on nous a signalé des attaques sur les variétés Alexandre et Wolf River (R.D.).

In Alta., fireblight was reported from Olds and Edmonton (A.W.H.) and caused mod. damage to about 20% of the trees in an orchard at Lacombe, where dry weather in

early summer reduced spread to healthy trees (M.D.S.); at Lethbridge fireblight was sev. on trees at a number of private residences (F.R.H.). In Sask. fireblight made no great gains from the previous year, but it was common and caused mod. damage, particularly in ornamental crabs (R.J.L., M.D.S.). In N.S. fireblight was found in only one apple tree, adjacent to a severely affected pear orchard. (C.L.L.).

In Essex County, Ont., fireblight was of moderate severity, comparable with 1966, but definitely less severe than in 1964 and 1963. Blossom blight was observed on apples within 1 week of petal fall (mid-May) and was followed by twig blight from June to August. Apple varieties affected, in order of increasing severity, included 'Red Delicious', 'McIntosh', 'Ida Red', 'Lodi', and 'Jonathan' (R.E.C.L.).

STORAGE ROT (Gloeosporium album) affected 500 bu. of 'Golden Russet' in storage at Allendale, N.S. (C.L.L.).

BULL'S-EYE ROT (Neofabraea perennans), stat. conid. Gloeosporium perennans) was generally light in all areas of central B.C., but at Naramata it was sev. on fruit of young 'McIntosh' trees interplanted among older 'Newtown' trees that were heavily affected by perennial canker (L.E.L.).

PERENNIAL CANKER (Neofabraea perennans, stat. conid. Gloeosporium perennans) was very light in the B.C. interior, following a very mild winter (L.E.L.).

QUINCE RUST (Gymnosporangium clavipes). At La Pocatiere, Que. incidence was 2-3% on most varieties and 6% on 'Osilda' and 'Anponovska' (H.G.).

FRUIT ROT (Mucor sp.) was sev. in one shipment to the Kelowna, B.C. packing house. The fungus entered affected fruit at the stem end and soft, watery rot developed in cold storage; sporangia on agar were unbranched (L.E.L.).

CORAL CANKER (Nectria cinnabarina) caused tr. damage to 'Melba' trees in 1 orchard at Gagetown, N.B. Canker was sev. on about 60 trees and reduced yield by more than 50% in a large orchard at Aylesford, N.S., where the disease was been troublesome for a number of years. It was also reported in tr. amounts at Lower Canard, N.S., and caused sev. twig infections at Sheffield Mills, following tr. infection of twigs in 1966 and despite a spray program with dichlone and dodine (C.L.L.).

CROWN OR COLLAR ROT (Phytophthora cactorum) was observed in MM104 and MM111 rootstocks in orchards at Kelowna, Summerland, and Penticton, B.C. (D.L.McI.).

POWDERY MILDEW/BLANC (Podosphaera leucotricha) was more sev. in all fruit-growing districts of B.C. than in the past few years (D.L.McI.) but was apparently less prevalent in the Vancouver area (H.N.W.T.). Mildew was sev. on new growth of 'Cortland' at Greenwich, N.S. and was controlled only after three applications of Karathane (C.O.G.). Des traces de l'oidium du pommier ont été notées sur 'Cortland' dans un verger de Frelighsburg, comté de Missisquoi, Qué. C'est la première fois que cette maladie est mentionnée sur des pommiers adultes au Québec (R.D.).

CALYX-END ROT (probably Sclerotinia sclerotiorum) caused tr. damage in 2/3 orchards at Burton, N.B. (S.R.C.).

FRUIT SPOT (Stemphylium spp.) occurred in a controlled-atmosphere storage at Kelowna, B.C. Only fruit at the top of the bins were affected, always on the upper surface; the rot was firm, black and slightly sunken and did not develop further at room temperature. Infection probably followed low temperature damage (L.E.L.).

SCAB (Venturia inaequalis) was reported on a few fruits of 'Spartan' at Summerland, B.C. (D.L.McI.) and the dry summer resulted in little infection in the Vancouver area (H.N.W.T.). Scab was reported from Olds, Alta., (A.W.H.). Au Québec, les conditions climatiques ont été très favorables au developpement de la tavelure en 1967. A la fin de juin, la maladie sévissait dans la plupart des régions pomicoles. Les dommages étaient visibles surtout sur les feuilles quoique, dans plusieurs vergers, les pommes étaient atteintes plus ou moins gravement. Un grand nombre de pomiculteurs ont subi des pertes appréciables. On peut dire, toutefois, d'une facon générale que la recolte est commercialement exempte de tavelure, du moins dans certains districts (R.D.). However, sprayed orchards at La Pocatière, Que., were practically free from scab and infection was light on unsprayed trees (H.G.). In N.B. scab was general in most orchards (47/55) but in only 7 did appreciable losses occur (up to 20%). The extremely wet, cool spring resulted in many ascospore discharge periods, making control difficult. Pinpoint scab was of no consequence (S.R.C.).

LEAF PUCKER (virus). Fruit symptoms were mild-mod. on 'McIntosh' in the Okanagan Valley, B.C.; temperatures were low immediately prior to full bloom but rose to fairly high levels the following week (M.F.W.).

RING RUSSETING (virus). Fruit symptoms on 'Newtown' were mild in the Okanagan Valley, B.C. (M.F.W.).

STEM PITTING (virus). At Bowmanville, Ont. 20-30 trees in a 20-yr-old orchard were found to be in an advanced stage of decline. The affected 'Virginia Crab' trees had been top-worked at 7-8 years of age with 'Spy' scions. Very severe pitting was observed on the trunks and main branches up to the graft

union line. Similar trees top-worked at the same time with 'LaSalle' scions were free from stem-pitting symptoms. The virus was apparently carried by the 'Spy' scions (W.R.A., T.R.D.).

FRUIT DEFORMITY. Inspection of 2210 apple trees in 7 orchards in the Niagara Peninsula at harvest did not reveal any fruit deformity attributable to virus infection. Malformations caused by the rosey apple aphid were unusually prevalent in 3 orchards (T.R.D.). In N.B. fruit deformity of unknown causes occurred in varied incidence from tr. to 28% in 53/55 orchards examined; the 'McIntosh' variety was most frequently affects (S.R.C.). Note also the following from Quebec orchards.

MALFORMATION DES POMMES (Cause inconue). Une malformation chez la pomme 'McIntosh' s'est avérée presque générale dans les regions pomicoles du Québec. Il s'agit ici de sillons originant à l'oeil du fruit et l'apparition de protubérances entre ces derniers. Une enquête révélé un fort pourcentage de ces pommes dans quelques districts, notamment dans le comté des Deux-Montagnes. On a noté 80%, 70%, 40%, 75%, 80%, etc. de fruits affectés au cours de nos observations. La malformation a été remarquée à partir du début de la saison sur la toute petite pomme. Cette malformation résulte vraisemblablement de l'action des basses témperatures que ont sévi au cours du déroulement très lent cette année des divers stades végétatifs. (R.D.).

BITTER PIT (Physiological) was reported sev. on one tree at Gagetown, N.B. (S.R.C.).

MAGNESIUM DEFICIENCY was observed in tr. amounts in 27/55 orchards examined in N.B., and defoliation occurred in trees in a few scattered orchards (S.R.C.).

RUSSETING (spray damage) caused 30% damage in an orchard at Burton, N.B. (S.R.C.).

TACHE AMERE (Physiogenique). Des pommes 'Cortland' et 'Délicieuse' en provenance de deux vergers de Franklin centre, comté d'Huntingdon, Qué., ont été trouvées gravement affectées par la tache amère (R.D.).

WATER CORE (Physiological) was sev. in overripe fruit of early varieties in 2 orchards at Gagetown, N.B. (S.R.C.).

PEAR

LEAF SPOT (Botryosphaeria obtusa). A scattering of infected leaves were observed in an orchard of 'Clapp' and 'Bartlet' pears at Kentville, N.S. (C.O.G.).

FIRE BLIGHT (Erwinia amylovora). In B.C. light infection occurred in some orchards at Summerland after harvest; elsewhere in the Okanagan Valley fire blight was at a very low level (L.E.L.). In N.S. fire blight was active in 21/24 orchards examined and 13 had current active infections. (C.L.L., R.P.L.). In Essex Co., Ont., no blossom blight was observed on pears, but twig blight appeared in June and continued throughout the summer (R.E.C.L.).

CANKER (Nectria cinnabarina). Trace infections were found on 'Clapp' pears at Canard and Bridgetown, N.S. (C.L.L.).

PHYTOPHTHORA FRUIT ROT (Phytophthora cactorum) affected fruit as high as 10 ft. above the ground in an orchard at Lower Canard, N.S. (C.O.G., R.G.R.).

SCAB (Venturia pirina, stat. conid. Fusicladium pyrorum) caused 3% damage in 3/3 orchards examined in N.B. (S.R.C.). At Vancouver, B.C., scab was reported frequently in home gardens (H.N.W.T.).

ANJOU PIT (Cause unknown). Anjou pit or cork spot of 'Anjou' pear caused mod. losses in a number of orchards in several districts throughout the Okanagan Valley, B.C., where it was the first serious occurrence of the disease since 1962. The condition characteristically appears in hot summers and is considered to be a physiological disorder (M.F.W.).

QUINCE

LEAF SPOT (Fabraea maculata) disfigured the leaves of one tree, and fruit spot was seen on locally grown fruit at Vancouver, B.C. (H.N.W.T.).

B. Stone Fruits

APRICOT

CANKER (Cytospora sp.). Cytospora canker was severe on apricots at the Research Station, Harrow, Ont., orchard in 1966 and 1967. Symptoms included the appearance of gum at cankers in spring, dead branches on which buds failed to expand and also, in early summer, of a severe wilt of long shoots that had cankers at their base. (B.N.D.).

FIRE BLIGHT (Erwinia amylovora). A few infected trees were observed in Essex Co., Ont. (R.E.C.L.).

BROWN ROT (Monilinia fructicola) developed in fruit left unpicked in orchards at Summerland, B.C., but carry-over of mummified fruit to the 1968 season was expected to be very light (L.E.L.).

NECROTIC RING SPOT (necrotic ringspot virus) was detected at St. Catherines, Ontario, in 1/30 trees tested by mechanical inoculation of herbaceous test plants using apricot petals and/or young leaves (T.R.D.).

CHERRY

SHOT HOLE (Coccomyces [Higginsia] hiemalis) caused about 2% damage in an orchard at Moncton, N.B. (S.R.C.), and in Kings Co., N.S., was common on all unsprayed sweet cherry trees (C.O.G.).

BLACK KNOT (Dibotryon morbosun [Apiosporina morbosa]). Trace infection was found in commercial orchards at Moncton, N.B. but was widespread in home gardens and among wild species (S.R.C.).

BROWN ROT (Monilinia fructicola) occurred on a few cherry fruits at Summerland, but brown rot was not a problem in any stone fruits in the Okanagan Valley, B.C. (L.E.L.). Trace infection was reported at Gagetown, N.B. (S.R.C.). In the Annapolis Valley, N.S., scattered infections were seen on sweet cherry trees in a few orchards (C.O.G.).

BROWN ROT (Monilinia laxa). At Salmon Arm, B.C., light blossom infection occurred on sweet cherry in one isolated orchard; however captan and ferbam sprays were applied, and brown rot did not develop in the fruit (L.E.L.).

POWDERY MILDEW (Podosphaera clandestina). For the first time in many years infection of sweet cherry fruit was prevalent enough in B.C. to cause substantial losses (D.L.McI.). In N.S. numerous perithecia were found on leaves of sour cherry at Tupperville, Annapolis Co. At Kentville, N.S., powdery mildew was seen for the first time on sour cherry in 1966, and in 1967 it occurred on sweet cherry terminals of trees adjacent to those infected in 1966. Powdery mildew also appeared at another location 75 miles from Kentville in 1967. In P.E.I. powdery mildew was widespread and caused mod. damage at Hazelbrook (G.W.A.).

BACTERIAL CANKER (Pseudomonas mors-prunorum). In N.S. there has been no spread of the disease outside the two originally affected orchards. In one of these orchards, 12 sweet cherry trees wilted and died during July and August, 1967 (C.O.G.). At St. Davids, Ont., an orchard of 6-year-old-sweet cherry trees planted on former asparagus land was severely damaged by bacterial canker. Because of the high nitrogen level of the soil these trees had made very rapid growth and the wood was soft and very susceptible to bacterial infection. Of 327 trees examined in July, 191 had slight infections that could be pruned out; 17 had moderate infections involving larger branches and sectors of the trees; 29 were severely affected with cankers in the main branches and trunk. Many of the severely affected trees were dead by fall (W.R.A., T.R.D.).

VIRUS DISEASES. In an old (at least 30 years) cherry orchard at Stoney Creek, Ont., 30 sweet cherry trees were indexed for viruses: SOUR CHERRY YELLOWS virus was isolated from 19 sweet cherry and 8 sour cherry trees; CHERRY NECROTIC RING SPOT virus, from 15 sweet cherry and 10 sour cherry trees; and TOMATO BUSHY STUNT virus, from 4 sweet cherry trees; the latter virus was detected only in trees that showed symptoms of the disease (T.R.D.). Of 23 old (20-30 years) sweet cherry trees at Vineland, Ont., 5 carried SOUR CHERRY YELLOWS virus and 4, CHERRY NECROTIC RING SPOT virus. Of 17 younger (4-5 years) sweet cherry trees at the same location, 1 carried SOUR CHERRY YELLOWS and 1, CHERRY NECROTIC RING SPOT virus (T.R.D.).

WINTER INJURY to fruit buds resulted in loss of most of the sweet cherry crops in the Annapolis Valley, N.S. in 1967 (C.O.G.).

PEACH

CROWN GALL (Agrobacterium tumefaciens) was prevalent in peach nursery stock imported into B.C. but was less prevalent than usual in locally grown nursery stock (L.E.L.). Incidence of crown gall continues to be sev. in southwestern Ont. nurseries. A random sampling of 530 nursery stocks of five cultivars at the time of digging in November 1967 showed an incidence of 30.4%. In another block, where 633 nursery stocks of eight cultivars were examined, incidence was 25.7%. Most galls were at the crown region where they developed to 2 or more inches in diameter (B.N.D.).

BROWN ROT (Monilinia fructicola) was commonly observed on a white-flowered ornamental peach at Summerland, B.C. (D.L.McI.). A few infections were seen in orchards in the Annapolis Valley, N.S. (C.O.G.).

FRUIT ROT (Rhizopus nigricans) was not reported in fruit that had been adequately treated with dichloran (residue level 10 ppm), but a loss of 25% was reported in storage at Oliver, B.C., where treatment resulted in residue levels of less than 1 ppm (L.E.L.).

BLIGHT (Stigmina carpophila). At Okanagan Falls, B.C., blight was common on fruit in an orchard irrigated by overhead sprinklers (D.L.McI.).

LEAF CURL (Taphrina deformans). Light infections occurred in some orchards at Summerland, B.C., during rainy periods early in the season (D.L.McI.); leaf curl is present every year in home gardens in the Vancouver, B.C., area where control measures are seldom applied (H.N.W.T.). In N.S. tr.

infections were common throughout the Annapolis Valley (C.O.G.).

CANKER (Valsa spp.). Incidence of cytospora canker was very severe in southwestern Ont. in the spring of 1966. Severity of canker was expressed by expansion of old perennial cankers on limbs, scaffolds, and trunks and also by a dieback condition originating in new infections that took place in the fall of 1965 and spring of 1966, which killed considerable parts of affected twigs and shoots. In the spring of 1967 there was the usual incidence of canker. Of 1480 twigs (1966 growth) on 74 'Redhaven' trees examined, 71% were infected. Of 1106 twigs (1966 growth) on 58 'Dixired' trees examined, 53% were infected. A majority of these new infections had taken place at or near leaf scars or small cracks on internodes. Others were at broken twigs and fruit pedicels. The small cracks on internodes were the major site of infection and may have resulted from an ice shell that formed around the twigs in March 1967 and remained continuously for three days, the cracks may thus be a form of winter injury (B.N.D.).

BACTERIAL SPOT (Xanthomonas pruni). Incidence of bacterial spot of peach during the growing season of 1967 was much less than in 1965 and 1966 in commercial orchards in southwestern Ontario. However, susceptible cultivars continued to be severely affected at the Harrow Research Station orchard. Usually this disease spreads and assumes severe proportions during the months of July and August and it is assumed that it is aided by rain and wind. It may be interesting to compare the rainfall data for these months which totalled 6.46, 10.63, 3.86 inches in 1965, 1966, and 1967, respectively. The relatively dry weather during these months in 1967 may have contributed to the lighter incidence of bacterial spot (B.N.D.).

NECROTIC RINGSPOT (necrotic ringspot virus) was detected in 4/22 peach trees being used as breeding stock at St. Catherines, Ont. The virus was isolated from petals or young leaves by mechanical inoculation of herbaceous hosts (T.R.D.).

WINTER INJURY destroyed most peach fruit buds in the Annapolis Valley, N.S. (C.O.G.).

PLUM

BLACK KNOT (Dibotryon morbosum [Apiosporina morbosa]). In N.S. specimens were identified from Cape Breton, Halifax, and Cumberland counties (C.O.G.). It was widespread throughout N.B. in home gardens and wild species (S.R.C.).

BROWN ROT (Monilinia fructicola) severely affected one old tree in a home garden at Vancouver, B.C. (H.N.W.T.).

PLUM POCKETS (Taphrina communis). Damage of about 5% was reported in an orchard at Chatham, N.B. (S.R.C.), and scattered infections occurred in the Annapolis Valley, N.S., mostly in home gardens (C.O.G.).

C. Ribes Fruits

CURRANT

BLISTER RUST (Cronartium ribicola) caused sev. damage to currants at Oak Point, N.B. (S.R.C.).

POWDERY MILDEW (Sphaerotheca mors-uvae) was reported from Swawell and Breton, Alta. (A.W.H.).

D. Rubus Fruits

BLACKBERRY

WILT (Fusarium sp.). All canes examined in early Aug. at Topsoil Pond, Nfld., were dead or dying, and a Fusarium sp. was isolated from the bases of 8/8 stems (O.A.O.).

LOGANBERRY

CANKER (Didymella applanata). The causal agent of the canker disease that has affected loganberry for several years in the Saanich Peninsula, B.C., has been identified as Didymella applanata (Niessl) Sacc. on the basis of the perfect state found in the spring of 1967. The disease as found was not considered to be of economic importance (H.S.P.). Spur blight of loganberry attributed to D. applanata was reported to cause sl. damage at Saanichton in 1931 -- Ed.

LEAF AND CANE SPOT (Septoria rubi). Because of the relatively dry season, this disease was of minor importance in the Saanich Peninsula, B.C. (H.S.P.).

RASPBERRY

CROWN GALL (Agrobacterium tumefaciens) affected 5% of the canes of 'Trent' and 'Carnival' cultivars grown under a certified program in a nursery at Billtown, N. S. (C.O.G.).

GRAY MOLD (Botrytis cinerea) caused 5% damage in 3/3 plantings examined at Moncton, N.B. (S.R.C.). In the Annapolis Valley,

N.S., fruit rot was sev. in several commercial plantings that had not received fungicide protection (C.O.G.). In P.E.I. both ripe and green fruit were severely decayed, with about 80% incidence on 'Tweed' following a prolonged period of frequent showers, very high humidity and high night and day temperatures (G.W.A.).

SPUR BLIGHT (Didymella applanata) was of minor importance in the Lower Fraser Valley, B.C. (H.S.P.) and infection was generally light throughout the Annapolis Valley, N. S. (C.O.G.).

ANTHRACNOSE (Elsinoe veneta) was found in 4/11 plantings in N.B., where damage ranged from tr. to 20% (S.R.C.). Slight infections were reported in all plantings examined in the Annapolis Valley, N.S. (C.O.G.).

YELLOW RUST (Phragmidium rubi-idaci) caused 60% damage in 1/11 plantings examined at Moncton, N.B. (S.R.C.).

BACTERIAL BLIGHT (Pseudomonas syringae) was rare in the Lower Fraser Valley, B.C. and no damage was reported (H.S.P.).

POWDERY MILDEW (Sphaerotheca macularis) was severe on nursery stock at Melvern Square, N.S. 'Trent' was less severely affected than 'Fairview' (C.O.G.).

WILT (Verticillium albo-atrum) caused 40% damage in a planting at Westfield, N.B. (S.R.C.).

LEAF CURL (raspberry leaf curl virus) was present in 7/7 plantings in N.B. where the disease continues to be serious in many home plantings; incidence ranged from tr. to 100% (S.R.C.).

MOSAIC (virus) was also found in the 7 plantings examined in N.B., with incidence of tr.-100% (S.R.C.). At South Berwick, N.S., about 2% of the plants in a foundation plot were infected (C.O.G.). Mosaic was sev. in a planting at Rivière-Quelle, Que. (H.G.).

E. Other Fruits

BLUEBERRY

CROWN GALL (Agrobacterium tumefaciens) occurred in younger plantings of highbush blueberry in the Lower Fraser Valley but was of little economic importance (H.S.P.). At Centreville, N.S. 50% incidence and 20% damage was reported in several varieties of blueberry (C.L.L.).

BLOSSOM AND TWIG BLIGHT (Botrytis cinerea) caused tr. to 60% damage in 7/21 plantings at Pennfield, N.B. (S.R.C.). Tr. infection was reported on 'Jersey' at Sheffield, N.S. (C.L.L.).

RED LEAF (Exobasidium vaccinii) continues to increase in N.B. where tr.-20% damage occurred in 21/21 fields examined in Charlotte Co. (S.R.C.). Heavy infection of native lowbush blueberry was reported from Avondale, N.B. (O.A.O.).

CANKER (Godronia cassandrae f. vaccinii). Despite a dry summer in the Lower Fraser Valley, B.C., little cane mortality was observed (H.S.P.).

POWDERY MILDEW (Microsphaera penicillata var. vaccinii). Severe infection occurred in 'Jersey' and 'Burlington' at Morristown, N.S. (C.L.L.).

MUMMY BERRY (Monilinia vaccinii-corymbosi) was prevalent in all districts where highbush blueberry is grown in the Lower Fraser Valley, B.C. In heavily infected fields, damage (loss of fruit) was more than 20% in susceptible varieties (H.S,P.).

TWIG AND BLOSSOM BLIGHT (Monilinia vaccinii-corymbosi). At Sheffield, N.S., incidence was rated tr. on 12% of 'Burlington', 12% 'Colville', and 6% of 'Jersey'; damage was estimated at 1-2% (C.L.L.).

WITCHES'-BROOM RUST (Pucciniastrum goeppertianum) was found in 3/3 plantings in N.B.; incidence was rated tr. in most fields, but 30% damage occurred in a 150-acre planting at Sackville (S.R.C.). Infection was very light on native lowbush blueberries at Avondale, Nfld. (O.A.O.).

RING SPOT (virus). Incidence and damage were estimated at 1-2% in 'Blueray' at N. Kingston, N.S. (C.L.L.).

STUNT (virus) was observed in a single plant in a 2-acre planting at Sheffield, N.S. (C.L.L.).

DIE-BACK (winter injury) caused 70% damage to a planting at Sackville, N.B. (S.R.C.).

CRANBERRY

LEAF SPOT (Gibbera compacta) affected about 10% of a bog at Aylesford, N.S., with heavy infection in one area (C.O.G.).

SPECKLE (Acanthorhynchus vaccinii, Guignardia vaccinii, and Gibbera compacta; see Carlson and Boone, Plant Dis. Reptr. 50:539-543, 1966). In N.S. fruit infections resembling speckle affected 5% of the crop at the Aylesford Bog and 20% at the Saulmerville bog; foliage was heavily infected at both. Isolations from more than 1000 fruit yielded Acanthorhynchus, 2%; Guignardia, 3%; and Gibbera, 1%. G. vaccinii was also identified with a rot that occurred in the field at Margaretsville, N.S. in 1966 (C.L.L.).

STORAGE ROT (Godronia cassandrae f. vaccinii and other fungi) affected 3.5% of fruit in storage at Aylesford, N.S. G. cassandrae was isolated from 22.8% of the fruit plated, and other major storage pathogens from about 10% (C.L.L.).

FIELD ROT. Guignardia vaccinia was associated with a rot that occurred in tr. amounts in the field at Margaretsville, N.S., in 1966 (C.L.L.).

BLACK SPOT (Mycosphaerella nigro-maculans) was reported for the first time in Canada in 1966 but could not be found in the same planting at Pitt Meadows, B.C. in 1967 (H.S.P.).

BERRY ROT (Sphaeronema pomorum Shear). S. pomorum was found for the first time on cranberries in N.S.; it was isolated from 13.1% of the fruit from the Saulmerville bog (C.L.L.). This is the first report of this disease to the Survey -- Ed.

FALSE BLOSSOM (virus) affected 2-3% of the blossoms in a 16.5-acre bog at Melville, N.S., and 4% of a 2-acre bog at Auburn. Trace infections were found in a 20-acre bog at Aylesford and a 5-acre bog at Auburn, N.S. (C.L.L.).

GRAPE

POWDERY MILDEW (Uncinula necator). Because of the consistently warm, sunny weather, incidence was unusually low throughout the Okanagan Valley, B.C. (A.J.H.).

STRAWBERRY

GRAY MOLD (Botrytis cinerea). Fruit rot was prevalent on 'Agassiz' in a planting at Summerland, B.C. (D.L.McI.). The cool, wet weather that prevailed in the Maritimes at blossom time and through much of the growing season contributed to extensive gray mold infection. In N.B. fruit rot was prevalent in all 38 fields examined, with damage ranging from tr. to 60% (S.R.C.). In N.S. gray mold was found in most plantings (C.O.G.) and was of major economic importance, with many soft berries breaking down before reaching market (A.A.MacN.).

LEAF BLIGHT (Dendrophoma obscurans). Trace to mod. infections were found in most plantings in the Annapolis Valley, N.S. (C.O.G.).

LEAF SCORCH (Diplocarpon earliana) occurred in tr. amounts in 21/38 fields examined in N.B. (S.R.C.).

LEAF BLOTCH (Gnomonia fructicola) was more prevalent than usual on both old and new plantings at Kentville, N.S.; most varieties were affected (C.O.G.).

LEAF SPOT (Mycosphaerella fragariae) was prevalent (75% incidence) and caused severe damage to old plantings throughout Bellechasse Co., Que. (H.G.). In N.B. 33/38 plantings were affected, with damage ranging from tr. to 100%; 7 fields of 'Cavalier' were severely defoliated (S.R.C.). Severe infection was observed on some varieties in the Annapolis Valley, N.S., by mid-September (C.O.G.).

RED STELE (Phytophthora fragariae). In the Lower Fraser Valley, red stele was prevalent in low, poorly drained fields (H.S.P.). At Cambridge, N.B. 10% damage occurred in 2/2 fields that were in their second year of production (S.R.C.). At the Kentville, N.S. Research Station it was found that the runner plants taken from symptomless mother plants frequently developed symptoms when brought into the greenhouse in late fall (C.O.G.). Tr. infections were found in 3 commercial plantings of 'Cavalier' and 'Redcoat' near Charlottetown, P.E.I., while entire plantings were killed in 2 home gardens (C.B.W.).

POWDERY MILDEW (Sphaerotheca macularis) occurred generally throughout the Lower Fraser Valley, B.C., on the foliage of susceptible varieties; some minor fruit infections were observed (H.S.P.). Foliage infection was prevalent on 'Agassiz' in 1 planting at Summerland, B.C. (D.L.McI.). The entire crop of a planting of 'Cavalier' was destroyed by mildew at Waterboro, N.B. (S.R.C.).

STORAGE MOLD (Typhula sp.). Losses of 6-26% occurred among strawberry plants in cold storage at three locations in N.S. (C.L.L.)

WILT (Verticillium dahliae) caused 3% damage to a planting of 'Redcoat' at Berwick, N.S. (C.L.L.). In King's Co., N.S., about 25% of a newly planted 2-acre field of 'Redcoat' was affected. Infection occurred during the summer and the pattern of disease development was indicative of soil infestation from a previous crop. A similar source of inoculum was apparent in a small first-year planting in Lunenburg Co. where differences in varietal reaction were apparent; percentages of plants affected were: 'Redcoat', 50; 'Sparkle', 30; 'Dunlap', 0. (A.A.MacN.).

ROOT ROT (various organisms and nematodes) was prevalent in all 38 fields examined in N.B.; many mother plants were killed and rootlet development affected (S.R.C.).

GREEN PETAL (virus). In N.B. damage ranged from tr. to 3% in 17/38 fields examined. Surveys of first-crop-year plantings in N.S. showed the disease to be widespread in all fields. In Colchester, Pictou and Cumberland counties 6/6 fields were affected, with incidence ranging from 4 to 70% and damage averaging 32% for 2324

clones examined; 5 of the 6 fields were free from clover. In 5/5 fields in Yarmouth and Digby counties, incidence was 0.7 to 25%, with damage averaging 5.5% for 6100 clones examined. Damage averaged 8.4% for 6500 clones in Westmoreland, Queens, and York counties, where incidence varied from 0.5 to 31% in 9/9 fields. In Kings Co. incidence of 2.3 to 21% and damage of 6.9% was estimated for 13,800 clones examined in 10/10 fields (H.T.S. and A.A.MacN.). In P.E.I. 10% infection of 'Sparkle' was reported from a 25-acre planting, with lesser amounts in 'Redcoat' and 'Cavalier'. 'Sparkle' also showed higher incidence (30%) in a 5-acre field. Most other plantings near Charlottetown contained up to 3% infected plants (C.B.W.). Green petal was also reported in 9/9 plantings in Queen Co., P.E.I., with incidence ranging from 12% to 70%, and damage averaging 34.5% for 3500 clones examined (H.T.S.). Green petal was also found in a number of fields in the lower St. Lawrence region of Quebec, mostly in Kamouraska Co., but it was less severe than in 1966. Striking symptoms were evident during the first 2 weeks of July. Infection levels at other locations surveyed were as follows: La Pocatiere: 'Red Coat', 1 field - 20%; 1 field (near the St. Lawrence R.) - free; 'Senator Dunlap', 1 field (3rd crop) - 30%. St. Philippe: 'Red Coat', 1 field (1st crop) - 5%; 'Sparkle', 1 field - 100%. Riviere Quelle: 'Red Coat', 1 field - free. St. Roch: 1 field - free, 1 field (1st crop) - 30%; 1 field (3rd crop) - 50%. At. St. Pacombe green petal appeared suddenly in a field of 'Sparkle' on August 8, and within a few days 80% of the plants showed symptoms. Other records were Ste. Louise: 1 field - 15%; St. Jean: 1 field - 50%; St. Charles: 'Sparkle', 1 field - 100%; 'Red Coat', 1 field (25 acres close to the 'Sparkle' plot) - free. In Bellechasse Co., green petal was not found in 22 fields examined (H.G., L.D.).

WITCHES' BROOM (virus) was reported in one field at Moncton, N.B.; damage was less than 1% (S.R.C.).

CHEMICAL INJURY. At Stanley, N.B., 60% damage was reported in one field where 2,4-D applied the previous fall caused deformed buds and fruit (S.R.C.).

HEAT DAMAGE. In the Lower Fraser Valley, B.C., severe drought conditions during June caused greatly reduced yields in non-irrigated fields; mature and near-mature fruits turned a dark color and were unacceptable to processors. Little permanent damage was done to plants with good root systems (H.S.P.).

DISEASES OF TREES AND SHRUBS

ACER - Maple

ANTHRACNOSE (Gloeosporium apocryptum) caused only light leaf browning on sugar maples (A. saccharum) in N.B. and N.S. during 1967 (G.A.V.S.). In Nfld. 50% of the leaves on a tree at St. John's were attacked by G. apocryptum (O.A.O.).

HYPOXYLON CANKER (Hypoxylon mammatum) was recorded on A. ginnala at Pontrillis, Sask. (B.C.S.).

NECTRIA CANKER (Nectria cinnabarina) was found on three or four branches of several Norway Maples (A. platanoides) at St. John's, Nfld. (O.A.O.).

TAR SPOT (Rhytisma punctatum) was observed on a specimen of A. macrophyllum at Vancouver, B.C. (H.N.W.T.).

DETERIORATION of roadside maples was most apparent near Sault Ste. Marie, Ont., and in s. Ont. The condition was associated with winter salting of roads (M.J.L.).

CHEMICAL INJURY - Chlorosis and dwarfing of leaves, presumably from herbicide damage, was observed on Manitoba maple (A. negundo) in s. regions of Ont. (M.J.L.).

AESCULUS - Horsechestnut

CANKER (Nectria cinnabarina) affected a tree at St. John's Nlfd. (O.A.O.).

AMELANCHIER - Juneberry

RUST (Gymnosporangium spp.) infection was observed at Lamont, Calgary, Wainwright, and Beaverlodge, Alta. (A.W.H.). Severe infection by G. clavariiforme was reported at La Pocatière, Que. and vicinity (H.G.).

CARAGANA - Pea tree

LEAF SPOT (Septoria caraganae). The distribution pattern of this disease differed markedly from that reported in 1966. It was found infrequently around Winnipeg, Riverton, and Swan Lake, Man., and was not reported from the western grasslands of Sask., where it caused severe defoliation in 1966 (B.C.S.).

DIEBACK (Tubercularia vulgaris, Curcurbitaria caraganae, and Camarosporium caraganae) was locally severe in shelterbelts in Man. and Sask. and reduced the effectiveness of windbreaks (B.C.S.).

CATALPA

LEAF SPOT (Alternaria sp.). An Alternaria sp. was isolated from material received from Fenwich, Ont. (T.R.D.).

CHAMAEDAPHNE - Leatherleaf

RED LEAF (Exobasidium vaccinii). Light to moderate infection was found on plants growing in a cranberry bog in King's County,

N.S. (C.L.L.).

CRATAEGUS - Hawthorn

FIREBLIGHT (Erwinia amylovora) was reported from 4 locations in the Annapolis Valley, N.S. (C.L.L., R.P.L.).

LEAF SCALD (Fabraea maculata) caused 25-75% leaf drop of C. oxyacantha in many home gardens in Vancouver and in the lower Fraser Valley (H.N.W.T.).

POWDERY MILDEW (Phyllactinia corylea) was observed near Amisk, Alta. (A.W.H.).

FRAXINUS - Ash

ANTHRACNOSE (Gloeosporium aridum) caused only light leaf browning on individual shade trees throughout mainland N.S. (G.A.V.S.).

RUST (Puccinia sparganioides) caused severe foliar browning on white ash ornamentals at South Maitland, Hants County, N.S., and on young nursery stock at Lawrencetown, N.S. Browning at Wolfville was moderate but elsewhere in western N.S. infections were scattered and light (G.A.V.S.).

JUGLANS - Walnut

BACTERIAL BLIGHT (Xanthomonas juglandis). Three cases of bacterial blight were reported on Juglans regia in home gardens in the Fraser Valley, B.C. (D.J.O.).

JUNIPERUS - Juniper

RUST (Gymnosporangium spp.) was reported from Wainwright, Alta. (A.W.H.). G. juvenescens caused spectacular rust development in Saskatoon in mid-June on J. scopulorum following a few days of light rain and high humidity (R.J.L.).

ROOT LESION (Pratylenchus spp.). Root lesion nematodes were present in large numbers in the roots of junipers and caused severe stunting in the Vineland area of s.w. Ont. (H.A.O., J.L.T., J.W.P., H.D.F.).

WINTER INJURY. Drought caused damage to junipers at Edmonton, Grande Prairie, Red Deer, and other locations in Alta. (A.W.H.).

LONICERA - Honeysuckle

LEAF BLIGHT (Glomerularia lonicerae) caused severe damage in Hants County, N.S. (C.L.L.).

MAHONIA

RUST (Puccinia pygmaea) on Mahonia aquifolium was reported for the first time from the lower mainland area of B.C. (D.S.MacL.).

MALUS - Ornamental Crab

FIRE BLIGHT (Erwinia amylovora) was slight to moderate on trees in the areas around Calgary, Cluney, and Brightview, Alta. (A.W.H.).

SCAB (Venturia inaequalis) damage was heavy in the Moncton area of N.B. (S.R.C.).

PANAX

ROOT KNOT (Meloidogyne hapla) caused heavy galling of the roots of Panax quinquefolius in s.w. Ont. accompanied by severe stunting of the plants and bronzing of the leaves (H.A.O., J.L.T., J.W.P., H.D.F.).

PICEA - Spruce

CYTOSPORA CANKER (Cytospora kunzei) occurred on white and Norway spruce in windbreaks around nurseries and plantations in the Lindsay, Lake Simcoe and Kemptville districts of Ont. (M.J.L.).

WINTER INJURY. Numerous ornamental conifers, predominantly white and Norway spruce were moderately damaged by drought in areas along the north shore of the St. Lawrence River between Montreal and Forestville, and in a few areas of the Eastern Townships and Bellechasse County, Que. (G.B.O.). A range of infection was seen at Wainwright, Vegreville, Camrose, Edmonton, and Two Hills, Alta. (A.W.H.).

PINUS - Pine

SCLERODERRIS CANKER (Scleroderris lagerbergii) a destructive disease of young planted pines was observed in several red and jack pine plantations in s. Que., where it occasionally occureed on more than 60% of the trees (G.B.O.). The disease is prevalent in pine plantations in c. and n.c. Ont. and was observed for the first time in 1967 in the Tweed and Lindsay districts of s. Ont. (M.J.L.).

SALT INJURY. Foliar mortality and discoloration and branch dieback was evident in Ont. along roadsides where salt had been applied and was severe in the s. part of the province (M.J.L.).

WINTER INJURY. Drought was observed throughout Ont. and was more severe than in 1966. Red, Scots, and white pine were more frequently affected but cedars and spruce also showed damage (M.J.L.). Drought caused a varied degree of damage to P. mugo at High Prairie, Alta. (A.W.H.).

POPULUS - Poplar

CYTOSPORA CANKER (Cytospora chrysosperma) was present on hybrid poplars in shelterbelts at scattered locations in Man. and Sask., particularly in s.e. Sask. (B.C.S.). The disease was very prevalent in shelterbelts of trembling aspen and balsam poplar in s. Alta. (H.A.T.). Cankers were observed at Oliver, Aden, Edmonton, and Calgary, Alta. (A.W.H.).

LEAF SPOT (Septoria musiva, stat perf. Mycosphaerella populorum) was observed at Ohaton, Alta.

LEAF AND TWIG BLIGHT (Pollacia elegans) caused light damage at Scotts Bay, N.S. (C.O.G.).

LEAF BLISTER (Taphrina aurea) was found on 5% of leaves of Lombardy poplar at Freshwater, Placentia Bay, Nfld. (O.A.O.).

SHOOT BLIGHT (Venturia populina) affected trees at Vegrevelle, Alta. (A.W.H.).

PRUNUS - Native and Flowering Cherries

BLACK KNOT (Apiosporina morbosa) was widespread on pin and choke cherry in Man. Sask., but incidence and intensity were generally low (B.C.S.). Infections were generally mod. to sev. on open-growing cherry throughout Ont. (M.J.L.). Current and previous infections on pin cherry were common and occasionally sev. in the Maritime Provinces (G.A.V.S.). Black knot was also observed on P. padus var. commutata (May-day tree) at Calgary, Alta. (A.W.H.).

SHOT HOLE (Higginsia hiemalis) was recorded on chokecherry at Calais, Alta. (H.A.T.).

POWDERY MILDEW (Podosphaera sp.) was found on P. padus var. commutata at Edmonton, Alta. (A.W.H.).

LEAF CURL (Taphrina deformans) was found on P. amygdalus, flowering almond, at Vancouver, B.C. The disease was last observed in this area in the 1950's but was not reported at that time (H.N.W.T.).

CHERRY BLIGHT (undetermined cause) was more widespread and sev. than in 1966 on pin and black cherry in e. N.B., c. N.S., and P.E.I. (G.A.V.S.).

RHODODENDRON

LEAF SPOT (Mycosphaerella rhododendri) caused a leaf spot and subsequent disfigurement in a home garden at Powell River, B.C. (H.N.W.T.). The specimen (DAOM 117538) was identified by K.A. Pirozynski.

ROSA - Rose

BLACK SPOT (Diplocarpon rosae) infection was abundant in the St. Andrews area of N.B. (S.R.C.). In Saskatoon a specimen was received from a private garden on 'Canada Centennial' rose (R.M.).

RUST (Phragmidium mucronatum) was observed on a wild rose at Vermilion, Alta. (A.W.H.). Phragmidium sp. caused slight damage to cultivated roses at St. John's, Nfld. (O.A.O.).

BACTERIAL LEAF SPOT (Pseudomonas syringae) was found on a specimen received at the Univ. of Sask., Saskatoon (M.D.S.).

POWDERY MILDEW (Sphaerotheca pannosa) caused mod. damage of Fredericton, N.B. (S.R.C.) and was sev. throughout the season in the Okanagan Valley of B.C., where the disease was prevalent even on relatively resistant varieties despite regular spray programs (M.F.W.). S. sp. was recorded on a rose specimen at Saskatoon, Sask. (R.M.).

SALIX - Willow

TWIG CANKER (Cytospora chrysosperma) caused varying degrees of injury at Lethbridge, Edmonton, Calgary, Lavoy, Leduc, and Wetaskiwin, Alta. (A.W.H.). Cytospora sp. was also reported on laurel leaf willow in Alta. (A.W.H.).

WILLOW BLIGHT (Pollaccia saliciperda and Physalospora miyabeana). In N.S., leaf browning and twig mortality were more sev. than in recent years, particularly in the c. and w. parts of the province where the summer was wet. Willows were severely attacked at Truro, Salem, Kennetcook, and Chester, and in the Annapolis Valley from Grande Pre to Bridgetown (G.A.V.S.).

RUST (Melampsora spp.) was observed at Calgary, Alta. (A.W.H.).

SAMBUCUS - Elder

CROWN ROT (Phytophthora citricola) was reported in Alta. on Red Elder at Edmonton, Sedgewich, Lacombe and Beaverlodge; on Golden Elder at Edmonton and Lethbridge and at Vulcan, Two Hills and Paradise Valley (A.W.H.).

GOLDEN DISCOLORATION (unidentified virus). A virus was isolated from several commercial 'Golden Elderberry' bushes, Sambucus nigra var. aurea, grown in the Okanagan Valley, B.C. The rate of infection in early summer was 100%. Inoculations of Sambucus seedlings reproduced the original "golden" discoloration. Peach and cherry seedlings were highly susceptible to the isolated virus, which is not related to tomato, tobacco or Prunus ringspot viruses or cherry leaf roll virus (A.J.H.).

SORBUS - Mountain Ash

CANKER (Cytospora sp.) was observed at Calgary and Edmonton, Alta. (A.W.H.).

FIRE BLIGHT (Erwinia amylovora) was reported on mountain ash at Edmonton, Bluffton, and Beauwallon, Alta. (A.W.H.) and in the Toronto, Ont. area (M.J.L.).

POWDERY MILDEW (Oidium sp.) heavily infected volunteer seedlings of S. aucuparia growing in peat bogs on Lulu Island, B.C. (H.N.W.T.).

LEAF SPOT (Septoria musiva) caused mod. damage in a nursery bed of European mountain ash at Kemptville, Ont. (M.J.L.).

IRON DEFICIENCY CHLOROSIS. Many cases of chlorosis were observed in Sask. (R.J.L.).

SYRINGA - Lilac

WILT (Verticillium albo-atrum) was sev. at Topsail Pond, Corner Brook, Nfld. (O.A.O.).

TAXUS - Yew

ROOT LESION (Pratylenchus spp.). Severe stunting of conifers occurred in s.w. Ont. These nematodes were present in large numbers in the roots (H.A.O., J.L.T., J.W.P., H.D.F.).

ULMUS - Elm

DUTCH ELM DISEASE (Ceratocystis ulmi). The known limits of distribution of the Dutch elm disease in N.B. did not change greatly in 1967. Infected trees were found for the first time at Jacquet River and Robinsonville, Restigouche County; Doaktown, Northumberland County; Welsford and Hatfield Point, Queens County; and Hampton, Kings County, N.B. (G.A.V.S.). The recovery of the causal fungus from diseased trees at Sault Ste. Marie, Ont. provided a significant western extension of the known range of the disease (M.J.L.). C. ulmi was not isolated from wilted elms surveyed in the Winnipeg, Man. area in 1967 (B.C.S.).

DIEBACK (Tubercularia nigricans) caused mod. branch tip mortality on several roadside Chinese elms at Toronto, Ont. (M.J.L.).

WILT (Verticillium dahliae). V. dahliae Kleb. was isolated from a wilted elm at St. James, Man. but attempts to isolate a causal organism from other elm trees showing wilt in the Winnipeg area were unsuccessful (B.C.S.).

DISEASES OF HERBACEOUS ORNAMENTALS

ALTHAEA - Hollyhock

RUST (Puccinia malvacearum) was observed at Oromocto, N.B. (S.R.C.).

BEGONIA

POWDERY MILDEW (Erysiphe cichoracearum). An infected plant specimen was received from Mundare, Alta. (A.W.H.).

DELPHINIUM - Larkspur

FASCIATION (Corynebacterium fascians). Three specimens showing sev. symptoms were received from a private garden in Saskatoon, Sask. (R.M.).

GLADIOLUS

FUSARIUM ROT (Fusarium sp.) was widespread in Sask. Damage was slight to mod. and the disease was difficult to control (R.J.L.).

HELICHRYSUM - Strawflower

ASTER YELLOWS (Aster yellows ?virus). Approx. 5% of the plants in the H. bracteatum demonstration plot at U.B.C., Vancouver, B.C. were infected (H.N.W.T.).

IRIS

BLUE MOLD ROT (Penicillium sp.) contributed to the poor stand at Langley, B.C. of forcing iris grown in the greenhouse from bulbs produced on Vancouver Island, B.C. in 1967 (D.J.O.).

LATHYRUS - Sweet Pea

ROOT ROT (Fusarium sp.). Severe root rot was reported at Carleton Place, Ont. (V.R.W.).

LILIUM - Lily

BOTRYTIS BLIGHT (Botrytis elliptica) was reported at Warburg, Alta. (A.W.H.).

ROOT ROT (Fusarium oxysporum f. lilii) caused extensive root damage to R. Palmer's Asiatic Hybrids in Naramata county, Okanagan Valley, B.C. Outwardly the plants appeared healthy (A.J.H.).

PAEONIA - Peony

BOTRYTIS BLIGHT (Botrytis sp.) was isolated from decaying buds at Saskatoon, Sask. (R.M.). B. paeoniae caused infection at Breton, Spruce Grove, and Drumheller, Alta. (A.W.H.).

PARTHENOCISSUS - Woody Climbers

WILT AND LEAF SPOT (Cladosporium herbarum) on Boston ivy (P. tricuspidata) was reported at Hudson Heights, Que. Damage was slight (V.R.W.).

POWDERY MILDEW (Uncinula necator) was observed on Virginia creeper (P. quinquefolia) at Edmonton, Alta. (A.W.H.).

PELARGONIUM - Geranium

BACTERIAL LEAF SPOT (Xanthomonas pelargonii) infection in some shipments of cuttings from California required that up to 20% be discarded on arrival at Vancouver, B.C. (D.J.O.).

PHLOX

POWDERY MILDEW (Erysiphe cichoracearum) was common in garden plantings in the Kentville, N.S. district (C.O.G.) and was observed at Banff, Alta. (A.W.H.).

PULMONARIA - Lungwort

RINGSPOT (virus). In the Okanagan Valley, B.C., a virus was consistently isolated from Pulmaria sp. with ringspot symptoms, but never from healthy looking plants of the same species. Re-inoculations of healthy plants were unsuccessful. The isolated virus is serologically related to tomato ringspot virus (A.J.H.).

SAINTPAULIA - African Violet

POWDERY MILDEW (Erysiphe cichoracearum) was observed at Wetaskiwin, Alta. (A.W.H.).

VIOLA - Pansy

POWDERY MILDEW (Sphaerotheca sp.). Slight to mod. infections were found in gardens at Bonanza and Wainwright, Alta. (A.W.H.).

GREY MOLD (Botrytis cinerea) caused mod. damage at Marysville, N.B. (S.R.C.).

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D.J.O. ***	D.J. Ormrod Vancouver, B.C.
G.B.O. *****	G.B. Ouelette Sillery, Que.
G.A.P. *	G.A. Petrie Saskatoon, Sask.
H.S.P. *	H.S. Pepin Vancouver, B.C.
L.P. *	L. Piening Lacombe, Alta.
J.W.P. *	J.W. Potter Vineland Station, Ont.
M.J.P. *	M.J. Pratt Vancouver, B.C.
A.A.R. *	A.A. Reyes Vineland Station, Ont.
R.G.R. *	R.G. Ross Kentville, N.S.
D.J.S. *	D.J. Samborski Winnipeg, Man.
W.L.S. *	W.L. Seaman Ottawa, Ont.
G.A.V.S. *****	G.A. Van Sickle Fredericton, N.B.
T.S. ***	T. Simard Montreal, Que.
J.T.S. *	J.T. Slykhuis Ottawa, Ont.
J.D.S. *	J.D. Smith Saskatoon, Sask.
A.E.S. **	A.E. Straby Ottawa, Ont.
H.T.S. *	H.T. Stultz Kentville, N.S.
B.C.S. *****	B.C. Sutton Winnipeg, Man.
M.D.S. *	M.D. Sutton Ottawa, Ont.
L.M.T. ***	L.M. Tartier Montreal, Que.
B.B.T. *	B.B. Till Summerland, B.C.
R.D.T. *	R.D. Tinline Saskatoon, Sask.
H.N.W.T. *	H.N.W. Toms Vancouver, B.C.
J.L.T. *	J.L. Townshend Vineland Station, Ont.
H.A.T.	H.A. Tripp Calgary, Alta.
T.C.V. ****	T.C. Vanterpool Saskatoon, Sask.
V.R.W. *	V.R. Wallen Ottawa, Ont.
B.H.W. **	B.H. Weibe Estevan, Sask.
M.F.W. *	M.F. Welsh Summerland, B.C.
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INCIDENCE OF GREEN PETAL DISEASE IN CULTIVATED STRAWBERRY IN THE MARITIME PROVINCES IN 1967

H.T.Stultz[1] *and A.A.MacNab*[2]

Green petal disease is of major economic importance in strawberry production in the Maritime Provinces. An extensive survey of strawberry plantations in Nova Scotia, Prince Edward Island, and southern New Brunswick was carried out during the strawberry harvesting season in 1967.

In addition to determining the amount of green petal disease in strawberry plantations, we looked for evidence that its occurrence might be correlated with the presence of phyllody-type symptoms in clovers and other potential hosts living in or near the plantations. The amount of green petal in strawberry often seemed to be positively correlated with the amount of clover phyllody in red clover (Trifolium pratense L.), alsike (Trifolium hybridum L.) or white clover (Trifolium repens L.) growing within or close to the plantations. Frequently other hosts with phyllody-like symptoms were also present along with clover. Among these were Anthemis cotula L., Matricaria matricarioides (Less.) Porter, Chrysanthemum leucanthemum L., Erigeron canadensis L., E. annuus (L.) Pers., Leontodon autumnalis L., and Lactuca sp. Sometimes one or more of these non-clover plants that were subject to phyllody-like symptoms were more numerous than any of the clovers. An exceptional case was observed on a small-fruit farm near Debert, Colchester County, N.S., where no clover was present either within or in the vicinity of a large plantation of first-crop strawberry plants where as high as 70% of the clones contained plants showing symptoms of green petal disease. Coincidentally a high percentage of the numerous wild asters (Aster spp.) and golden rod (Solidago spp.) growing in the adjacent uncultivated low-bush blueberry (Vaccinium angustifolium [Ait.]) fields showed symptoms of a phyllody-aster yellows type disease. Nymphs of a known leafhopper vector, Aphrodes bicinctus, were numerous on the strawberry plants in the first row of a new plantation that was also adjacent to one of the weedy blueberry fields.

During July nymphs of this leaf hopper were readily found in all three Maritime Provinces when looked for under clumps of Rumex acetosella L. or any one of the three commonly cultivated clovers, which frequently grow as weeds in strawberry plantations in the Maritime Provinces.

The following is a summary of the amounts of green petal disease observed during July 1967 in strawberry plantations located at various locations in the Maritime Provinces. In each of the plantations visited the amount of disease in plants of a cropping year is based on representative samples of 100 to 2,000 clones comprised of one or more varieties. The results were usually recorded in terms of the number of clones affected regardless of the number of plants in a clone that showed disease symptoms. In first-crop plantations in western Nova Scotia, the amount of green petal disease was usually low in Kings, Digby, and Yarmouth counties, ranging from 0.2% to 25%, and averaging 6.5% for 19 plantations visited (Table 1). In the

Table 1. Incidence of green petal symptoms in strawberry plantings in the Maritime Provinces in 1967

Type of planting in 1967	No. fields examined	Total no. mother plants or clones examined	Incidence of green petal (%)	
			Range	Avg
New plantings	34	29,429	0.0- 5.2	1.4
Fruiting fields				
Western N.S.	19	19,932	0.2-25.0	6.5
Central N.S.	12	2,324	4.0-70.0	32.0
P.E.I.	9	3,501	12.0-70.0	34.5
N.B.	16	6,490	0.5-31.0	8.4
Total	56	32,247	0.2-70.0	11.7

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central Nova Scotia counties of Cumberland, Colchester, and Pictou, numbers of diseased clones were usually high, ranging from 4.0% to 70%, and averaging 32% for 12 plantations visited. In Prince Edward Island the amounts were similar to those observed in the central counties of Nova Scotia, ranging from 12% to 70% and averaging 34.5% for 9 plantations visited. A great variation was observed among the 16 plantations examined in the southern New Brunswick counties of Westmoreland, Queens, and York, with the amounts of diseased clones ranging from 0.5% to 31%, and averaging 8.4%.

Where second- or third-crop plantations were present along with first-crop plantations on the same properties, the percentage of diseased plants was, with one exception, always greater on the first-crop plantation than on either of the other two.

The amounts of green petal diseased plants observed in new plantations, regardless of their location, were characteristic of the nurseries from which the plants originated. For three Nova Scotia certified nurseries the average percentages of diseased plants were 0.66%, 0.82%, and 1.5% for 12, 9, and 6 recipient plantations, respectively. In contrast to the records for plants originating from certified "virus-free" nurseries, we have records for two new plantations in Prince Edward Island set out with plants from common field stock in which the percentage of diseased plants averaged 20% and 50% respectively.

NOTEWORTHY PLANT DISEASES IN CANADA, 1968

W. L. Seaman[1]

This summary is based on reports to the Canadian Plant Disease Survey from plant pathologists in the CDA, provincial departments of agriculture, and universities. Only the apparently important diseases observed in 1968 are reported here; further details concerning these and less prevalent diseases not mentioned are available from CPDS files and will be summarized for later publication. For additional information on the prevalence of tree diseases, especially of commercial plantations, see Annual Report of the Forest Insect and Disease Survey. 1968. Forestry Branch, Can. Dep. Fisheries & Forestry. 141 p.

At ports of entry in 1967-68, plant pests detected by CDA Plant Protection inspectors on plants, plant products, and soil entering Canada included 173 interceptions of material containing fungi, bacteria, or viruses. Eleven of these were of plant quarantine importance. Also, 485 interceptions contained nematodes, of which 398 were of quarantine significance and 5 were new records to Canada.

British Columbia

In 1968 plant diseases were of relatively minor economic importance. Those that caused the greatest concern were collar rot of apple, pear, and cherry; powdery mildew of fruit trees; bacterial and coryneum blights of apricot and peach; godronia canker and mummy berry of blueberry; bacterial and botrytis fruit rot of raspberry; leaf roll of potato; clubroot of crucifers; and root rot of Lawson's cypress.

Lower Fraser Valley--The 1967-68 winter was milder than usual and snowfall was light. The growing season was one of the wettest in recent years and during the 7-month period March-September only May had below-average rainfall. Despite the heavy precipitation, temperatures during this period were satisfactory for growth, and hours of sunshine were above-average during most of the season. All crops produced heavy yields, but harvesting conditions were often difficult, particularly for hay and grain. The first killing frost in farming districts occurred on October 16, and severe cold in December was expected to have prevented the overwintering of the aphid vectors of a number of viruses.

The heavy rainfall in early July resulted in considerable fruit loss from Botrytis cinerea (gray mold) in raspberry and in the first picking of highbush blueberry, but overall the incidence of foliar diseases was surprisingly low. While berry rot caused by gray mold and by powdery mildew continue to cause losses in strawberries and raspberries in B.C., trials at Agassiz in 1968 indicated that several fungicides will provide good control of pre- and postharvest rot of strawberry fruit. The systemic fungicide benomyl was more effective than sulfur in controlling powdery mildew on foliage and it also provided protection up to 8 weeks beyond the last spray (see Freeman & Pepin, CPDS 48:120-123). However, at Abbotsford, evidence was obtained that postharvest applications of fungicides for control of powdery mildew in 'Northwest' strawberry may not result in increased yield the following year. Although benomyl and sulfur applied in July-September 1967 reduced leaf area infection to 19-25%, yields in 1968 were no greater than in unsprayed plots showing 91% average leaf area infection (see Freeman & Pepin, CPDS 49:139). Tomato ringspot virus has been observed in raspberries in B.C. since 1961. Studies at Agassiz have shown that the plant vigor and fruit yield of infected plants of the cultivar 'Fairview' were severely reduced in the first and second years of a plantation, and plants showed a rapid decline in the third year. In some years symptoms may be confused with winter injury. Three other cultivars showed more tolerance to the disease. For details and for a discussion of the terminology used for this and similar conditions see Freeman & Stace-Smith, Can. J. Plant Sci. 48:25-29. The mummy berry disease of highbush blueberry incited by Monilinia vaccinii-corymbosi has been an increasing problem in the lower Fraser Valley for the past several years. However the results of fungicide trials showed that treatment with ferbam gave the greatest increase in yield; the systemic benomyl also increased yield and appeared to be effective in reducing the incidence of infected fruit (see Pepin & Ormrod, CPDS 48:132-133). Growers who are practising chemical control are experiencing a return to normal yields.

Bipolaris iridis (Oudemans) Dickinson and Heterosporium iridis were reported on bulbous iris (Iris xiphium) at Richmond, B.C. Bipolaris iridis is a pathogen of iris in Europe, but this is the first report of the fungus in North America. Losses of 15% were experienced in the affected field (see Straby & Shoemaker, CPDS 48:152).

At Lulu Island, the Monilinia or shoot blight stage of Sclerotinia oxycocci was reported on cranberry for the first time in B.C. Young plantings are often attacked by foliar pathogens which seem to disappear with maturity of the plants. Cotton ball, caused

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by the same fungus, affects a small percentage of fruit in initial fruiting years but it, too, tends to disappear.

The root-knot nematode, Meloidogyne sp., continued to be a problem in carrot production in the Fraser Valley, and leaf spot incited by Trichothecium roseum was reported for the first time in greenhouse-grown cucumber in the Fraser Valley. However basal rot of onion incited by Fusarium oxysporum f. cepae was less prevalent than in many years, and pink root, white rot, and smut were also less common than usual. Losses from blotchy ripening of tomatoes were above average.

Dieback, apparently caused by a Nectria sp., affected about 30% of container-grown plants of Skimmia japonica. Verticillium dahliae severely affected 1- and 2-year-old trees of Acer platanoides in a nursery at Chilliwack. Xanthomonas hyacinthi was reported for the first time in many years in B.C. in hyacinths grown from U.S.-produced bulbs. Angular leaf spot caused by Septoria azaleae caused severe defoliation of container-grown azaleas in a nursery at Langley. This is a new record of this disease in B.C.

Rhizoctonia was present in all potato fields inspected and leaf roll affected 16of62 fields. In the Pemberton area blackleg was the most important problem, occurring in 40% of the fields inspected. On Vancouver Island 37% of the fields examined contained symptoms of secondary leaf roll. Early blight was unusually noticeable in many 'Netted Gem' fields but incidence was very low. Blackleg was more prevalent than in 1967, and rhizoctonia affected 91% of the fields inspected. Yield trials with potato stock freed from viruses X and S indicated a yield advantage of about 10% for virus-free stock.

Cariboo and Central B.C.--Growing conditions were very unusual in 1968. Potato crops were planted in May under ideal conditions but the weather turned very cool and wet following emergence, and in mid-June a frost killed the plants back to ground level but did little permanent damage. Wet weather continued through July and August, and another frost on August 7 caused considerable foliage damage. Despite the poor growing conditions yields were reasonable, but tubers were affected by an above-average incidence of sclerotia of Rhizoctonia solani. Witches' broom was found in almost every field, and the 'Norland' and 'Norgold Russet' varieties were severely affected.

Southern interior valleys--The 1967-68 winter was mild, with an extreme low of 3F; temperatures were below 10F on 4 days, and below 20F on only 20 days. Snowfall was much less than normal, causing temporary fears that there would be a shortage of irrigation water for the 1968 season. There was no winter damage to fruit trees. However the abnormally warm weather in February, March, and early April led to the early swelling of buds, and a cold night on April 13 (19-23F in various districts) caused considerable killing of blossom buds of stone fruits. In the early southern districts, crops of cherry, apricot, and peach were substantially reduced.

There were several prolonged wet periods in May and June, providing apparently ideal conditions for apple scab infections. However there was remarkably little foliage or fruit infection by Venturia inaequalis, presumably because most growers responded promptly to broadcast spray warnings with fungicide applications. In the Kootenays, sprays were required to reduce rotting of strawberry fruit.

After a series of relatively mild winters, powdery mildews continued to increase in severity, especially on apple, but also fairly seriously on Anjou pear, and on sweet and sour cherries.

After normal hot dry weather throughout July and early August, a prolonged period of cool, wet weather began August 11. Cherries matured in dry weather with no splitting or subsequent fruit rotting, but peaches, plums, and apricots had abnormally high incidence of brown rot caused by Monilinia fructicola in the Kootenays, and coryneum blight caused fruit lesions on peach. Some brown rot also occurred on apricot and peach in the Okanagan. Special late-season protective sprays were applied for apple scab and Gloeosporium fruit rots in some districts. In the Kootenays there was considerable pinpoint scab.

Several harvest disorders of fruits appeared to be related to seasonal weather conditions. Prune shrivel was severe, making harvesting impracticable in many orchards. Bartlett pears had considerable pink-end, and late peach varieties bore soft insipid fruits. Prune shrivel is believed to be favored by alternating hot, dry and cool, wet periods; and pear pink-end and soft peach by cool weather preceding harvest.

A record crop of 5500 tons of grapes with unexpectedly high sugar content was harvested, and no disease problems were experienced other than the need for the application of fungicides to control mildew on susceptible varieties; the variety V-37034 was most susceptible.

Tomatoes grew well in July, but the harvest was seriously reduced because of the high incidence of fruit rots caused by Alternaria solani and Colletotrichum coccodes, beginning in late August. Basal bulb rot of onion incited by Fusarium oxysporum f. cepae was unusually severe in many onion plantings.

Crown rot caused by Phytophthora cactorum affected MM104 apple rootstocks in several orchards in the Okanagan Valley, while foliage infection of apple was common, and late season infection with apple scab appeared as pin-point scab and later as storage scab in the same area. Virus-incited leaf pucker caused severe symptoms on 'McIntosh' apples in the Summerland-Kelowna region following lower than normal temperatures during the blossom period early in May. Similarly the virus-incited ring russeting and wrinkle in 'Yellow Newtown' were moderately severe, the former causing downgrading of fruit. The graft transmission of the causal agent of wrinkle was established.

Twig dieback from fireblight occurred in one apple orchard where overhead sprinkler irrigation was used and light late-season infection appeared in some pear orchards. Fireblight has been very rare in this area in recent years. However high-density plantings of dwarf apple trees combined with overhead irrigation provide conditions favorable for the development of such serious diseases as anthracnose, European canker and fireblight. In one such planting in the Osooyos area, Erwinia amylovora, affected the six most important varieties of dwarf apple stock, while nearby standard-sized trees were free from symptoms of fireblight.

Shrivelling of Italian prune fruit was a serious problem in the Okanagan and Kootenay Valleys for the first time in more than 10 years. This condition, which affects fruit near the stem end, was especially serious in late varieties and is believed to be associated with the occurrence of cool weather in the late ripening period near the end of August.

The use of copper-oil paints on perennial cankers of apple caused by Gloeosporium perennans has apparently been effective in preventing extension of the cankers, and the use of Botran treatment appeared to effectively control fruit rot of peach caused by Sclerotinia fructicola and Rhizopus sp.

Bacterial canker of stone fruits caused by Pseudomonas sp. was recorded for the first time in orchard fruits in B.C. and appeared in many plantings. Trees may have been predisposed to infection by the severe frosts of April 13. Bacterial colonies similar to those of Pseudomonas syringae were isolated from cankers on peach and cherry limbs showing symptoms of dieback in several orchards in the Okanagan and Similkameen Valleys. However, despite repeated attempts, the pathogenicity of these colonies was not established. The widespread outbreaks are believed to be associated with a series of mild winters and with spring frost in April.

A filamentous virus apparently unrelated to the previously reported virus from the sweet cherry cultivar 'Lambert' was isolated from one field planting of the cultivar 'Stella'; no symptoms were apparent in infected trees in the orchard.

Most potato crops were affected by Alternaria solani but the amount of blackleg (Erwinia atroseptica) declined from 1967, appearing only in crops grown from imported seed. Rhizoctonia was present in all fields but caused little damage and harvested tubers were clean. Leaf roll affected only a few crops, a great improvement over previous years.

Alberta

Southern Alberta--Lack of snow cover during a short period of very low temperatures in late December 1967 resulted in moderate to severe winterkilling of alfalfa and turf grasses. Damage to alfalfa and turf from the low-temperature basidiomycete was also severe, and pink snow mold incited by Fusarium nivale was widespread on lawns in the Lethbridge, Calgary, and Edmonton areas. However damage from pink snow mold on turf and on winter wheat was much less than in 1967, presumably because of a lighter snow cover. Above-normal temperatures and below-normal precipitation from January to March favored the survival of volunteer winter wheat and many fields were retained as crop. Most of these volunteer crops yielded poorly because they were heavily infected with wheat streak mosaic virus, and they served as sources of infection for nearby fields of spring wheat.

The spring and early summer were cooler than normal, precipitation was normal, and winds were light. Damage from root diseases was less than usual; early blight of potatoes was not unusually severe and late blight was not reported. Powdery mildew, however, was more severe than usual on some crops.

Crown bud rot of alfalfa incited by Rhizoctonia solani, Fusarium roseum, and Ascochyta imperfecta [Phoma medicaginis] was widespread; in 35 fields examined in the Lethbridge area, 10-30% of the shoots on affected crowns were destroyed, causing an estimated yield loss of 20%. In the same area, losses from Corynebacterium insidiosum of approximately 10% were recorded in one-third of the alfalfa fields examined, and a similar loss was estimated from the stem nematode, Ditylenchus dipsaci, in about 12% of the fields.

Losses ranging from trace to 65% and averaging about 2% occurred in flax in the Bow Island-Foremost area; severe dieback of tops affected approximately half of the fields in the area. The cause of the dieback was not determined.

Because of the cool season grain crops matured later than usual and heavy rains in September further delayed harvesting until a dry period in late October and early

November. The heavy rains delayed seeding of winter wheat and unseasonably cold weather in the fall retarded growth, virtually eliminating the opportunity for fall infection by wheat streak mosaic virus.

Browning root rot of barley and wheat was evident in southern Alberta for the first time in a number of years; isolates resembling Pythium tardicrescens were obtained from many of the affected roots.

A Pythium sp. closely related to P. ultimum was associated with a 70% reduction in emergence of rye in a field near Lethbridge in July 1968 and may have been responsible for the occasionally poor emergence of rye in southern Alberta (see Harper et al., Can. J. Plant Sci. 49:531-533).

Central and northern Alberta--In northern Alberta, early plantings of potatoes in cool dry soils were affected by poor germination, seed piece decay, and an unusually high incidence of rhizoctonia. Dry weather continued through July and was followed by above-normal precipitation during August and September. Erwinia atroseptica was present in 38% of the fields inspected but was absent or present only in trace amounts in Elite plots. Rhizoctonia occurred in all districts and was more severe than in 1967; 24% of the fields were affected. The prevalence of leaf roll increased in the area as compared with 1967, occurring in almost 33% of the fields.

Powdery mildew [Erysiphe graminis] was more prevalent than usual on spring and winter wheat in central Alberta and in the Peace River area. Basal glume rot caused by Pseudomonas atrofaciens and common root rot were also widespread in wheat, as was halo blight, incited by Pseudomonas coronofaciens in oats. Head discoloration from superficial black molds and head blight were very prevalent in cereal crops, and frost injury to wheat, oats, and barley was also widespread following heading.

On barley, Pyrenophora teres was more prevalent than usual, particularly in central Alberta. Studies on the movement of P. teres [Drechslera teres] from infested barley straw and seed indicated that straw was the more important source of inoculum in Alberta and that little long-distance spread of the disease occurred (see Piening, Can. J. Plant Sci. 48:623-625). Rhynchosporium secalis was also destructive in barley, and damage from birds was widespread.

A survey of anthracnose of cereals incited by Colletotrichum dematium carried out in Alberta in 1963 and reported in 1968 indicated that the disease was most prevalent in north-central Alberta and was most severe on crops grown in soils low in organic matter. Anthracnose was found on wheat, oats, barley, and rye and was most severe on oats (see Harder & Skoropad, CPDS 48:39-42).

Pyrenophora bromi (stat. conid. Drechslera bromi) was reported in almost all fields of brome in central Alberta. Drechslera tritici-repentis was isolated by W.B. Berkenkamp from plants of Bromus inermis showing symptoms indistinguishable from those caused by Pyrenophora bromi. The causal organism was identified by R.A. Shoemaker and was successfully inoculated to brome.

A stem eyespot of seed crops of creeping red fescue (Festuca rubra subsp. rubra) incited by Phleospora idahoensis Sprague was described for the first time in Canada in the Beaverlodge area. The disease affected stems, sheaths, and inflorescences and was more severe in sheltered rolling parkland and cleared bush than in open prairie. The eyespot was first noticed in two fields in 1967, but the causal agent was not identified. In 1968, spores of P. idahoensis were detected on plants in only 2 of 20 affected fields. The fungus is potentially seed-borne, and preliminary estimates suggested that seed yield could be reduced by as much as 50% (see Smith et al., CPDS 48:115-119).

All alfalfa fields examined in central Alberta in 1968 were affected by Pseudopeziza trifolii and P. jonesii. In rape, white rust caused by Albugo cruciferarum was prevalent throughout the area and Alternaria brassicae was present in trace amounts.

In a nursery at Devon, collar rot attributed to Phytophthora syringae seriously damaged about 20% of young apple trees imported from B.C.

At Fort Saskatchewan, Alta., approximately 20 square miles of white spruce and jackpine stands were affected by emission of chlorine gas. Noticeable differences in susceptibility to injury were evident among trees in the area, ranging from no noticeable effects to death. Poplars in the area were defoliated but apparently recovered. Canker caused by Septoria musiva was widespread and destructive in poplar in central Alta.

Saskatchewan

In southeastern Saskatchewan very early seeding into cold, dry soil resulted in delayed and uneven emergence. Deep seeding, soil drifting, frost damage, and common root rot also affected stands of seedlings.

The average disease rating for common root rot of wheat, caused by Cochliobolus sativus and Fusarium spp., for the nine Sask. crop districts was 7.9, comparable to the 1967 rating but below that of many of the preceding years. The highest rating (10.9) was recorded in District No. 3, the lowest (6.2) in No. 5. The prematurity blight symptom of infection by Fusarium culmorum caused damage in a few areas, particularly on heavy land. In barley, common root rot was most severe in Crop Districts 6-9; the

average rating for the province was 9.8, with a range of 1.6 to 29.6%.

Take all, caused by Gaeumannomyces graminis, was present in trace amounts in 12 of 50 wheat fields examined in Crop Districts 8 and 9, although incidence reached 36% in one field.

Stem rust was not found in any of the 220 wheat fields examined during the annual wheat disease survey, and the incidence of leaf rust was trace-light in 65 of 222 wheat fields; Crop Districts 4 and 9 were free from leaf rust. The development of stem rust in western Canada was retarded by the cool, wet season and although spore showers of Puccinia graminis were detected in Saskatchewan as early as July 9, the total number of urediospores detected was the lowest since 1961.

Speckled leaf blotch caused by Septoria avenae f. sp. triticea affected 42 of 222 wheat fields and loose smut, though light, was more prevalent in durum than in common wheat. "Green rust", the superficial growth of Alternaria and Cladosporium, was common in some areas.

The importance of the photosynthetic area of tissues above the flag-leaf node in determining the yield of wheat was confirmed in greenhouse tests in Saskatchewan (see Simpson, Can. J. Plant Sci. 48:253-260). Knowledge of the contribution of specific leaves or other plant tissues to yield in field-grown crops should greatly facilitate the development of methods for assessing the effects of foliage diseases on yield.

In the northeastern crop district of Saskatchewan black stem caused by Phoma medicaginis was the most prevalent and the most severe disease of alfalfa in 1968. Common leaf spot caused by Pseudopeziza trifolii f. sp. medicaginis-sativae was also found in most fields but caused little damage.

The first evidence of significant amounts of seed infection of rape by Leptosphaeria maculans in western Canada were obtained in 1968. The collection of the "Brassica" strain of this pathogen on 'Echo' turnip rape at Maidstone marked a considerable western extension of the range of this strain.

Pseudomonas lachrymans was widespread on cucumber and caused severe damage. In potato fields the incidence of Rhizoctonia solani was less than usual (19% of fields inspected). Leaf roll occurred in about 23% of the fields, blackleg in 16%.

Prolonged wet weather beginning in late July favored the development of fire blight in apple, and some plantings were heavily attacked.

Cytospora chrysosperma caused severe dieback to poplar in shelterbelts and plantations throughout southern Saskatchewan.

Manitoba

In Manitoba the 1968 growing season was one of the wettest on record, with cool temperatures prevailing throughout. Leaf rust of wheat was first found in Manitoba on June 12 following a spore shower detected June 1-6. However, leaf rust developed slowly until late in the season and most of the crop escaped damage. The cultivar 'Manitou' remained highly resistant to Puccinia recondita at most rust nurseries across Canada. Stem rust urediospores were first detected in spore traps in Manitoba and Saskatchewan on July 9 and the first rust appeared in field plots on July 23. Stem rust developed slowly in western Canada probably because of the unusually cool, wet weather that prevailed throughout the summer, and the total number of spores trapped was the lowest since 1961. Races C18 and C20 of P. graminis f. sp. tritici accounted for 91% of all physiologic races detected in 1968. Stem rust was unusually light in most rust nurseries across Canada except in those in the barberry area of eastern Ontario, where infection was particularly heavy on rye.

Stem rust of oats did not appear in western Canada until the crop neared maturity and losses, therefore, were negligible. Race C10 of Puccinia graminis f. sp. avenae accounted for about 80% of the isolates identified in western Canada and about 20% of those in eastern Canada. In eastern Ontario races C8 and C9, long associated with barberry areas, again predominated, accounting for approximately 64% of the isolates. All three of these races pose a threat to the varieties of oats now grown in Canada.

In contrast to the relatively light infections of the other cereal rusts, development of crown rust of oats in western Canada was the heaviest in recent years. In most years yield reductions from crown rust occurred only if rust developed before the plants headed. In 1968, however, the cool growing season delayed maturity of the crop and provided suitable conditions for development of rust. Therefore, although infection did not usually occur until after heading, appreciable damage was experienced in farm fields, and losses of 20-27 bushels per acre occurred in experimental plots in Manitoba. The predominant physiologic races of Puccinia coronata f. sp. avenae in western Canada differed markedly in virulence from those in eastern Canada. For more information on cereal rusts in Canada in 1968, see articles by Fleischmann, Martens, Green, and Samborski, CPDS 48:99-111.

The unusually frequent rains that occurred in Manitoba in June and July contributed to the most severe outbreak on record of bacterial black chaff of wheat caused by Xanthomonas translucens. In southern Manitoba in late July 100% infection and up to 20% leaf area involvement was found in fields of 'Manitou' spring wheat and up to

50% leaf area in durum. By August 1 the disease was more widespread and yield losses were thought to have been substantial. X. translucens f. sp. undulosa and f. sp. cerealis were involved (see Hagborg, CPDS 48:112).

Estimates of yield loss from disease are often based upon experiments in which diseases are prevented or partially controlled by the repeated application of fungicides. However little information has been published on the effects of the fungicides themselves on yield in the absence of disease. For the results of one such study, with oats, see Martens et al., Can. J. Plant Sci. 48:425-427.

Light frost caused serious damage to early planted sunflower in the Carberry area. Puccinia helianthi and Septoria helianthi affected all fields examined but caused little damage. However moderate to severe infections of Verticillium dahliae were reported in most fields, where the cultivar 'Commander' usually sustained more damage than 'Peredovik'. Rust pustules were also less abundant on 'Peredovik' than on 'Commander'. Head and stalk rot caused by Sclerotinia sclerotiorum were present in all sunflower fields examined, with head rot predominating; the prolonged cool, wet weather favored the continued production and discharge of ascospores, which infected the young heads but apparently not the stalks.

Blackleg, incited by Erwinia atroseptica, was the most prevalent disease of potato and the chief cause of rejection in fields grown for certification. Rhizoctonia solani affected 46% of the stolons of most fields examined in southern Manitoba and severe infection of tubers was observed in most fields in the Morden-Winnipeg areas. Verticillium albo-atrum was isolated from wilted potato plants near Winkler in a field containing approximately 25% affected plants. Colletotrichum coccodes, Cephalosporium spp., Cylindrocarpon sp., and Volutella sp. were also associated with wilted plants. The last three fungi are new records on potato for Manitoba. Freezing temperatures in mid-August caused yield loss in some areas (see Hoes & Zimmer, CPDS 48:153).

Frost damage to flax was conspicuous in the Carberry and Dauphin areas, where yield losses of 5-10% were estimated in several fields. Aster yellows was also widespread in flax, and Melampsora lini was found in many fields in southern Manitoba, where cool wet weather apparently contributed to the development of rust (see Hoes & Kenaschuk, CPDS 48:153).

Most field peas showed general infection by Mycosphaerella pinodes and Pseudomonas pisi. Mycosphaerella blight was rated moderate or severe in 15 of 20 fields examined, and bacterial blight in 13 of 20.

Meloidogyne hapla Chitwood, the northern rootknot nematode, was found in field-grown cucumbers for the first time in Canada, in a field near Winkler. Roots of volunteer plants of flax and other weeds growing in the affected field were also infected; flax represents a new host record for this nematode in Canada (see Zimmer & Walkof, CPDS 48:154).

Dead and dying elms at Winnipeg showed symptoms similar to those of Dutch elm disease, but Ceratocystis ulmi was not detected. The condition in most of the trees examined was attributed to an environmental or physical disturbance. Verticillium dahliae was isolated from 5 of 100 affected trees and V. albo-atrum from one. Black leaf spot caused by Gnomonia ulmea was very common and severe in southeastern Manitoba.

Ontario

In the major winter wheat producing areas of Ontario, winter killing caused appreciable damage only in Middlesex and Simcoe counties. Total winter and spring damage in the 1967 fall-planted crop of 400,000 acres was estimated at about 11%. However the average yield of 42 bushels/acre was second only to the record year of 1966 (44 bu/acre), and, despite a reduction of more than 11% in acreage, the total production was estimated at only 4% below the 1967 level. Wheat spindle streak mosaic was observed in 32 of 35 winter wheat fields examined in Essex Co. and in 35 of 55 fields in Kent Co. The average percentages of plants infected were 52% and 39%. In about one quarter of the fields all plants were infected by the soil-borne virus. Yield loss from the disease was estimated at 10% when all plants were infected. Assuming an average of 50% infected plants in the two counties in 1967 and 1968, losses were about 5% per year or 2.2 bushels per acre (see Gates, CPDS 49:58-59).

Seeding of spring grains was virtually completed by June 1, germination, development and quality of the crops were good to excellent, and record yields for the province were experienced.

In some areas, above-average winter kill was reported in 1967-seeded fields of hay, clover, and alfalfa, but little damage was experienced in established fields. Production was above average, although the quality of the first cutting was affected by adverse weather conditions.

In most areas corn was planted early, but cool wet weather early in the growing season retarded growth and maturity. Record productions of both shelled and fodder corn were experienced on a total acreage of approximately 1.42 million acres (65% shelled corn). Kernel red streak of corn was first described in Ontario in 1964 (CPDS 45:92-93) and has since been found to be widespread and

severe in Essex and Kent counties, but it has not been found as far east as Ottawa. Experiments at Harrow and Ottawa have indicated that the condition was caused by a strain of the eriophyid mite Aceria tulipae that has become adapted to corn in southern Ontario and parts of the mid-western U.S. (see Slykhuis et al., Can. J. Plant Sci. 48:411-418). In 1968 the condition was found in the Harrow-St. Thomas areas, but incidence was much lower than in the previous few seasons. Crazy top incited by Sclerophthora macrospora caused stunting and leaf proliferation of the inflorescences of corn in a number of fields in Essex and Kent counties. This downy mildew has not been reported previously on corn in Canada, although it was apparently observed in one field in Kent Co., Ont., in 1946. The fungus has also been reported from wheat in N.B. In 1968 the disease in corn was clearly associated with flooded portions of fields and was prevalent in similarly affected areas of the U.S. Midwest. Yellow leaf blight of corn incited by Phyllosticta sp. was first detected on corn in 1967 in southwestern Ontario and was more widely distributed in 1968. The pathogen is regarded as a weak parasite that is unlikely to do much damage unless plants are weakened by factors inducing physiological stress and leaves above the ear become infected. Eyespot of corn incited by Kabatiella zeae is also a new record for Canada; it caused little damage in variety trials at St. Thomas and Brantford in 1967 and 1968. For descriptions of crazy top, yellow leaf blight, and eyespot in Ontario, see Gates & Mortimore, CPDS 49:128-131.

Production of flue-cured tobacco, estimated at 205 million lb was second only to the record year of 1966. Quality was good and there were no losses from frost damage. Damping-off was the most common seedbed disease of flue-cured tobacco, and the recommended fungicide treatment was not always effective and was phytotoxic at high concentrations. Cool, wet weather in early spring favored development of black root rot incited by Thielaviopsis basicola in a number of greenhouses where sterilization procedures were not carried out properly, and some farms experienced considerable losses. Alternaria leaf spot was present throughout the tobacco-growing area, but damage was not usually severe. Sore-shin from Rhizoctonia solani infection was more severe than in most seasons, but losses from early-season damage were reduced by replanting. Weather fleck from air pollutants caused severe losses throughout southwestern Ontario, particularly near Lake Erie, where the severity of damage was comparable to that experienced in 1957. The cultivars 'Virginia 115' and 'Delcrest 66' were less severely affected by weather fleck than 'Hicks Broadleaf' Bell 15', and 'White Gold'

While the total acreage in fruit production decreased slightly in 1968 to 77.9 thousand acres, the value of the principal fruit crops increased by almost 10% to $36.4 million. Compared to 1967 figures, production of the more important fruit crops showed declines for grapes (16%), cherries (38%), and pears (20%) and showed increases for apples (2%), plums (48%), and peaches (32%). The development of the yellow-leaf symptom characteristic of infection by sour cherry yellows virus in sour cherry was favored by a warm pre-bloom period followed by cool post-bloom temperatures in the Niagara Peninsula. Incidence of trees with yellows symptoms was high in most sour cherry orchards in the area. In three 15-yr. old test orchards 2, 11, and 22% of the trees were affected and, of these, 49%, 67%, and 64% showed symptoms for the first time.

This first report in North America of strawberry latent ringspot virus in sweet cherry was based on the serological identification of the virus from a tree at St. Catherines by W.R. Allen.

In the Niagara Peninsula bacterial canker of sweet cherry caused by Pseudomonas sp. has become a serious problem in some orchards. In a 10-year-old orchard of 330 trees 40% were damaged beyond hope of recovery and 70% had slight to moderate cankers affecting the main and secondary branches.

Prunus stem pitting disease, which is causing severe losses in peach orchards in southern Pennsylvania and adjacent states was found in one sour cherry orchard in the Niagara Peninsula in late fall; symptoms were found in five trees, one of which was dead. The disease was not found, however, in any of 250 peach trees examined in 10 orchards in the area.

Peach canker incited by Valsa spp. is widespread in orchards throughout the Niagara Peninsula and constitutes a serious threat to the peach industry in the area.

The vegetable acreages in Ontario reached approximately 121 thousand acres because of increases in acreage planted to processing crops of sweet corn, cucumbers, and green peas. Of the three most important vegetable crops, field tomato acreage and production declined by about 10% from 1967 levels; sweet corn acreage increased by 15% but production rose by only 6.5%. However, a 10% increase in acreage of green peas was accompanied by a 48% increase in production and a 56% increase in farm value. Similarly carrots showed an 80% increase in production on a 12% larger acreage, but the farm value of the crop declined by 50% due to a collapse in price.

A serious outbreak of an early wilt and "rusty root" condition caused extensive damage to carrots in the Bradford Marsh muck soil area north of Toronto. A similar condition was noticed in the same area in 1962 and 1965, but the etiology of the

condition has not been diagnosed nor has a control method been devised (see Fushtey & Filman, CPDS 48:150).

In a survey of market gardens near Ottawa conducted by P.K. Basu, stemphylium leaf spot and early blight incited by Alternaria solani caused severe foliage damage in tomato but fruits were only lightly affected. Plasmodiophora brassicae is established in many fields in the Plantagenet area, where it is a limiting factor in the production of cabbage and other crucifers. Pythium-incited damping-off was a problem in onion seedbeds, and severe damage from downy mildew caused by Peronospora destructor resulted in the total loss of a number of fields. Water logging and bacterial soft rot were problems in lettuce in the Cyrville area. Cucumber mosaic virus, Pseudomonas lachrymans and Fusarium oxysporum f. melonis were the most prevalent diseases of cucumber. In one cucumber field near Cyrville an attempt was made to relate the percentage of leaves affected by fusarium wilt to yield. Based on counts made in randomly selected sampling units comprising approximately 5% of the area of each row, it was estimated that 58% of the leaves of the cultivar 'Market-more' were affected by wilt, while only 8.2% of an apparently resistant cultivar showed symptoms of the disease. Yield in bushels of 'Market-more' was only 12% of that of the more resistant cultivar.

Fusarium poae (Pk.) Wr. was identified as a pathogen of peas growing in infested field plots at Ottawa. In root inoculation tests, isolates of the fungus caused severe wilting and necrosis of beans and peas and chlorosis and stunting of soybean. Isolates of Canadian origin also affected barley and corn but not wheat or oats (see Bolton & Nuttall, Can. J. Plant Sci. 48:161-166). Plasmodiophora brassicae and Xanthomonas campestris were the most important pathogens of crucifers in southern Ont. (see Reyes, CPDS 49:56-57).

Xanthomonas phaseoli affected 5 of 21 Foundation plots of field beans in southwestern Ontario. X. phaseoli var. fuscans was absent from Foundation seed but was still prevalent in registered and commercial fields. Sclerotinia sclerotiorum was present in most field examined, but damage was much less severe than in 1967 (see Wallen, CPDS 48:27-28). Widespread damage from bronzing has been reported in white beans in southwestern Ontario since 1961. Symptoms of the bronze-colored necrotic stippling of young fully-expanded leaves and pods, followed by chlorosis and abscission, have been described as bronzing, sunscald, russet, and rusting. Controlled studies and field observations have indicated that air-borne oxidants, notably ozone, are responsible for the phytotoxic reaction of beans in this region (see Weaver & Jackson, Can. J. Plant Sci. 48:561-568).

Damage to certain market gardens, hay, and cereal crops as well as to trees and shrubs from air-borne fluoride and sulfur dioxide occurred in the Port Maitland area of Haldimand Co., Ont., the years 1962-67. Testimony and recommendations contained in the report of a public inquiry into the problem pointed out deficiencies in methods of assessing damage from air pollutants in agricultural crops and in providing sound advice to counter rumor. Evidence showed that real economic loss was also suffered by a number of market gardeners outside the area affected by air-borne pollutants, when, because of exaggerated and ill founded publicity, they were unable to sell their produce (see Hall, G.E. [Chairman].1968. Report of the committee appointed to inquire into and report upon the pollution of air, soil, and water in the townships of Dunn, Moulton, and Sherbrooke, Haldimand County. Frank Fogg, Queen's Printer for Ontario, Toronto. 355 p.).

A minor extension of the known distribution of Dutch elm disease was made with the discovery of infected trees on St. Joseph Island, just north of the international boundary in the south-central part of the Sault Ste. Marie District. Incidence of the disease was particularly high in those areas where damage from Ceratocystis ulmi was recognized prior to 1961. In these areas, viz. the districts of Kemptville, Tweed, Lindsay, Lake Simcoe, Lake Huron, and Lake Erie, and most of the Pembroke District and the southern half of the Parry Sound District, the average incidence of the disease was 54% and mortality 15%.

Incidence of Gymnosporangium juniperi-virginianae was high on leaves and fruits of apple in southeastern Ontario. Field observations in eastern Ont. have indicated that air-borne basidiospores produced on Juniperus virginiana have an effective range of at least 15 miles, about twice the distance of previous estimates (see Parmelee CPDS 48:150-151). In southern Ontario roadside trees, particularly sugar maples, continued to decline, and roadside plantings of most species of pine also showed heavy dieback and mortality in numerous locations in Ontario.

Quebec

Low soil moisture levels and below normal precipitation delayed early growth in the spring and many pastures suffered from drought. Rainy weather and cool temperatues followed in June, when frost damage occurred in field crops and small fruits in the Gaspe-Lower St. Lawrence and Abitibi-Temiscamingue regions. Quality and yields of all crops varied greatly across the province; drought conditons continued in the Quebec and Lake St. John districts, but most areas received

abundant rainfall throughout the remainder of the growing season. Yields of vegetables, small fruits, and apples were generally satisfactory.

Unusually heavy rainfall in July was associated with the widespread and relatively severe incidence of carrot blights caused by Alternaria dauci and Cercospora carotae in all fields examined in the muck soil area south of Montreal. Botrytis leaf speck and purple blotch caused by Alternaria porri were also common on onion. The occurrence of leaf speck symptoms without the subsequent development of leaf blight suggested that Botrytis cinerea was the dominant pathogen in onion in 1968, whereas the extensive blighting associated with leaf speck in this area in 1967 was characteristic of infection by B. squamosa. Drop, incited by Sclerotinia sclerotiorum, and aster yellows affected most field of lettuce examined in the area. Late blight was extensive and severe in early crops of potatoes examined in early August but was less severe in later varieties (see Simard et al., CPDS 48:124-127).

Bacterial ring rot, incited by Corynebacterium sepedonicum, continued to increase in prevalence in potato (9.5% of fields inspected). Mosaic was the second most important cause of rejection in Quebec potato fields; the increase in prevalence was probably due to a late infestation of aphids in 1967. Early blight and blackleg each affected about 40% of 703 fields inspected. Rhizoctonia solani affected 15% of the fields, an increase over 1967 but less than in 1966. Late blight affected only 5% of fields compared with 29% in 1967; infection was widespread late in the season but caused little damage. Tuber losses of 5-10% occurred in unsprayed fields, and tuber rot was found in 20% of the bins inspected. Storage rot from Fusarium coeruleum destroyed about 90% of 4 carlots of 'Superior' potatoes shipped from New Brunswick in late 1968.

The results of tests reported in 1968 indicated that two races of Pseudomonas phaseolicola were responsible for an epiphytotic of halo blight in beans (Phaseolus vulgaris) in the Ste. Martine area of Quebec in 1966. Of the pathogenic isolates, 87% were of race 2, the remainder of race 1. The source of inoculum was evidently infected Idaho-grown seed (see Wallen, CPDS 48:97-98).

Yellowing, reddening, and stunting of oats, resembling symptoms of P and K deficiency were widespread in eight counties. Blast was severe in parts of Kamouraska Co.

Moderate to severe damage to strawberry plantations from late frost occurred generally throughout the lower St. Lawrence region. Green petal was again prevalent in strawberry plantings in Bellechasse Co., where infection was generally light (5-10%) in first-year plantings, but was more damaging (up to 100% infection) in older plantations. Late-spring frosts caused 20-80% loss in a few fields in Kamouraska Co.

Dutch elm disease is found throughout the range of white elm in Quebec, except in the Abitibi Region and the Gaspe Peninsula; no change in its distribution in Que. was observed in 1968.

Severe damage to 'Quint' apples from infection by Gymnosporangium juniperi-virginianae occurred in Kamouraska Co.

New Brunswick

Dutch elm disease was found at 12 new locations in 1968. Within the known range of the disease in the province about 14% of the trees examined showed symptoms. At Fredericton, since the disease was first found in 1961, an average of 9 trees per year have been located and removed, but in 1968 33 were removed. As of 1968, the disease was not known to occur in N.S. or P.E.I.

Nova Scotia

In Kings Co., Gloeosporium album canker killed a number of 1-yr-old 'King' apple trees, and dieback from coral canker caused by Nectria cinnabarina affected several orchards of 'Spy' and 'McIntosh' apples. Dieback and cankering are becoming increasingly important in N.S., where a number of varieties, but particularly 'McIntosh', are affected.

New infections of bacterial canker incited by Pseudomonas mors-prunorum have not been reported for 2 years in N.S., and most of the infected sweet cherry trees in the two orchards in Kings Co. where the pathogen was first found in 1965 have died. Shot hole caused by Higginsia hiemalis was generally light in cherry orchards in the Annapolis Valley but defoliation of 5% of a 10-acre block of sour cherry trees occurred at Bear River.

Botrytis cinerea fruit rot, powdery mildew, and leaf spot diseases caused by a number of fungi were prevalent in strawberry plantations, but red stele incited by Phytophthora fragariae was not found in commercial plantings. However a severe epiphytotic of red stele occurred at the CDA Research Station, Kentville. In field trials, the most widely grown cultivars 'Redcoat' and 'Sparkle' showed no resistance to the disease. However, the USDA introduction 'Sunrise' and the CDA introduction 'Guardsman' showed some tolerance to the races of P. fragariae present in the field at Kentville (see Gourley & Graig, CPDS 48:93-94). Root rot, involving a complex of causal agents, and the nematode Pratylenchus penetrans reduced one stand at Kentville by 50%.

Losses to strawberry plants in cold storage were negligible during the 1967-68 storage period. Losses of 0 to 1.1% were recorded in the same storages in which severe losses of up to 26% from Typhula sp. were experienced in 1966-67. The improvement in control of mold in 1968 was attributed to adequate spacing of crates and rapid cooling of the plants to -1.1C within 15 days of being placed in storage (see Lockhart, CPDS 48:128-129).

In cranberry bogs at Aylesford, Diaporthe vaccinii fruit rot caused 14% damage and speckle, incited by Guignardia vaccinii & Gibbera compacta, about 12%.

Up to 35% of carrot plants in fields in Cumberland Co. were affected by aster yellows, but incidence was much less in King's Co., where insecticides were applied for control of leafhoppers. Reddish brown spots or blotches of unknown etiology affected carrot roots grown in mineral soils in Kings Co.; lesions penetrated the tissues to a depth of 1/8 inch.

Crater rot incited by Rhizoctonia solani and brown heart caused by boron deficiency affected a number of fields of rutabaga. The dry weather in July and August was thought to have contributed to the development of brown heart. Septoria cucurbitacearum affected all plants severely in fields of squash that had been planted to this crop continually for several years.

Cob rot associated with an unidentified bacterium affected sweet corn in two areas; infection occurred at the base of the cob, gradually spreading up the sheath; affected kernels retained their shape, turned white and became filled with a milky white bacterial suspension.

Corynebacterium michiganense caused moderate losses from bacterial canker in several greenhouses; the pathogen was believed to have been introduced in infected seed.

Fusarium wilt of peas was less prominent in the Kentville area, following severe damage in 1967.

Seedling blight caused by Cochliobolus sativus affected 54% of plants in one field of 'Herta' barley in Kings Co. and 10% of plants in test plots at the Sheffield Farm. In test plots powdery mildew affected all plants of 'Gaines' winter wheat and 'Selkirk' spring wheat. Pseudomonas sp. caused severe damage to oats at several locations where symptoms resembled those of bacterial stripe incited by Ps. striafaciens.

Prince Edward Island

Although January and February were colder than normal, snow cover prevented sufficient frost penetration to kill all potato tubers overwintering in the soil, and consequently volunteer plants were a problem in many seed potato fields. Cool weather in May and June retarded growth, and a frost in early June severely set back most crops of 'Irish Cobbler'. Heavy rains in June provided adequate moisture for later crops despite a very warm, dry July. Precipitation, 0.48 inches, was the lowest on record for the month. Total precipitation from May to September was about 2.3 inches below normal and about 9 inches less than in 1967.

The cool weather early in the season provided conditions favorable for development of Rhizoctonia solani, which was more prevalent than usual in the growing crop, and black scurf was very common on the tubers, especially in the fields that were topkilled early and left for several weeks before harvest. Because of the generally dry season, common scab incited by Streptomyces scabies was more prevalent than usual and caused severe damage in a number of fields. Late blight, caused by Phytophthora infestans, was virtually absent throughout the season. Blackleg, caused by Erwinia atroseptica, and spindle tuber were the two chief causes of crop rejection. The incidence of blackleg showed a considerable decrease from 1967, but the prevalence of spindle tuber, mosaic, leaf roll, and verticillium wilt increased. Because of the warm dry soil conditions during the latter part of the season, it was expected that fusarium storage rot might be a problem in some lots of potatoes, especially those from lighter soils.

Newfoundland

Mastigosporium rubricosum occurred generally on Dactylis glomerata at the Research Station, St. John's, a new report for Newfoundland. Powdery mildew also affected wheatgrass, and moderate levels of Selenophoma donacis var. stomaticola occurred in timothy at the Station. Pink snow mold incited by Fusarium nivale affected 2-5% of the grass on golf greens at St. John's. Leaf scald caused by Rhynchosporium orthosporum affected all canary grass plants examined at the Research Station; 10-15% of the leaf area was affected; this is a new report to the CPDS of this pathogen on Phalaris. Gymnosporangium sp. severely affected juneberry (Amelanchier sp.) in the St. John's area; 50-80% of the fruit and 50% of the leaves were affected.

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