37th Annual Report

OF THE CANADIAN PLANT DISEASE SURVEY 1957

Compiled by

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SCIENCE SERVICE

BOTANY AND PLANT PATHOLOGY DIVISION

CANADA DEPARTMENT OF AGRICULTURE

FOREWORD

In the 37th Annual Report of the Canadian Plant Disease Survey special reports are emphasized. These reports are given more space in order to encourage contributions by specialists who can evaluate the entire disease picture for each crop and district. The titles of special reports are included in the general index. The data compiled from the submissions of many reporters form the back bone of the Report, as in previous years. It is not intended that special reports should supplant these data, but that the specialist can have an outlet for his observations.

The nomenclature of the rust fungi treated in this Report conforms with Cummins and Stevenson's Check List of North American Rust Fungi (Plant Disease Reptr. Suppl. 240, 1956). Cereal rust workers will want to consult the 13th Report of the Plant Pathology Section, Canada Agriculture Research Laboratory, Winnipeg.

The section dealing with diseases of trees and shrubs refers mainly to trees planted as ornamentals or shade trees. Additional information on tree diseases is available in the Annual Report of the Forest Insect and Disease Survey, Canada Department of Agriculture.

Many members of the Botany and Plant Pathology Division, Science Service, contributed to the preparation of this Report. I thank them and the contributors from allied fields, including: W.R. Foster, T.C. Vanterpool, L.V. Busch, S.G. Fushtey, C.B. Kelly, B.H. MacNeill, W.S. Carpenter, J.R. Chard, J. Cutcliffe, E.F. Muir, R. Wilcox, F.Gfeller, D.G. Hamilton, F. Zillinsky, W.I. Illman, R.A. Ludwig, G.L. Brown, D. Leblond, J. Ringuet, S.R. Colpitts and all the District Potato Inspectors whose contributions are represented in the largest single crop report.

It is appropriate to express my thanks to D.W. Creelman who prepared a major portion of this Report and to I.L. Conners for his continued, helpful interest in a project that developed predominantly under his direction.

R.A. Shoemaker,
Mycologist,

13 May 1956
Botany and Plant Pathology Division
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GENERAL INDEX

New and Noteworthy Diseases iv

Maladies nouvelles ou d'importance vii

The Weather and Its Influence on Plant Disease xi

Notes on some Plant parasitic Nematodes encountered in Canada in 1957. G.L. Brown xviii

Phenological Data, 1957 xix

Diseases of Cereal Crops 1

Cereal Rusts in Canada in 1957. G.J. Green, B. Peturson and D.J. Samborski 10

Cereal Diseases observed at Experimental Farms in Western Canada F.J. Zillinsky 21

Incidence of Barley Diseases at Lacombe, Alta. W.P. Campbell 21

Co-operative Barley Tests Survey in 1957. H.A.H. Wallace 22

Ergot of Cereals in Western Canada in 1957. R.A. Shoemaker 23

Helminthosporium on Western Grasses, R.A. Shoemaker 24

Smuts of Cereals in Manitoba in 1957. W. Popp 25

Winter Wheat Disease Survey in Kent County, Ontario. S.G. Fushtey ... 26

Winter Wheat Disease Survey in Simcoe County, Ontario. R.J. Baylis . 27

Agropyron Streak Mosaic on Wheat in Ontario and the Transmission by an Eriophyid Mite. J.T. Slykhuis and R.J. Baylis 28

General Observations on Cereal Diseases in the Maritime Provinces D.G. Hamilton 28

Diseases of Forage and other Field Crops 30

Flax Diseases in Saskatchewan in 1957. T.C. Vanterpool 34

Flax Diseases in Manitoba in 1957. W.E. Sackston and John W. Martens 35

Rape Diseases in Saskatchewan in 1957. T.C. Vanterpool 38

Diseases of Soybeans in Ontario in 1957. A.A. Hildebrand 40

Sunflower Diseases in Manitoba in 1957. W.E. Sackston 43

Tobacco Diseases. Z.A. Patrick and L.W. Koch 46

Diseases of White Beans in Ontario in 1957. R.N. Wensley 51

Diseases of Vegetables and Field Crops 51

Outbreak of Bulb and Stem Nematode in Ontario. W.B. Mountain 51

The Incidence of Leaf and Pod Spot of Peas Caused by Ascochyta pisi in the Ottawa Valley. V.R. Wallen 63

Some recent findings in Potato Virus Research. R.H. Bagnell 78

Diseases of Canning Tomatoes in Southwestern Ontario in 1957 W.G. Benedict 83

Tomato Anthracnose in Ontario. W.I. Illman and R.A. Ludwig 85

Diseases of Fruit Crops 93

Strawberry Disease Survey in Ontario, 1957. A.T. Bolton 111

Diseases of Trees and Shrubs 116

Diseases of Herbaceous Ornamental Plants 122

Index of Hosts 131

New and Noteworthy Diseases

Stem rust of wheat caused even less damage than the relatively slight amount observed in 1956. The amount of inoculum, measured by spore traps, was at about the same low level as in 1956 but caused a moderate amount of rust on susceptible wheat varieties and wild barley. The large proportion of resistant Selkirk wheat planted and warm dry weather that favored early maturity were more influential factors in reducing stem rust. Leaf rust of wheat was the most conspicuous cereal rust in the Prairies and elsewhere in Canada. Selkirk wheat had a moderately resistant type of infection. In southern Man. where infection was most severe, 20% of the crop was affected. Infection was lower in most other areas. Eastern Sask. and central Alta. areas that were affected by drought had only traces of leaf rust.

Septoria diseases affected wheat in most provinces. In Sask., where most leaf diseases were reduced by dry weather, speckled leaf blotch was unusually conspicuous. Both S. nodorum and S. avenae f. sp. triticea were identified in Man. Glume blotch and speckled leaf blotch were common in most provinces. Oats in Man. and eastern Canada were seriously affected by S. avenae f. sp. avenae which caused both leaf spot and stem break damage. Septoria occurred on barley and rye but damage was slight.

The most conspicuous Helminthosporium disease of cereals in western Canada was netblotch of barley caused by H. teres. H. gramineum was rare. H. sorokinianum contributed to the foot rot damage to wheat and barley. The average foot rot ratings for Sask. increased slightly to 10.7 and 14.5 from 9.1 and 11.2 in 1956 for wheat and barley respectively. New records for Canada are: H. triseptatum on Holcus lanatus, H. tuberosum on Secale cereale and H. dictyoides var. phlei on Phleum pratense.

Agropyron streak mosaic was found on A. repens, Triticum aestivum and Triticum x Agropyron hybrids in Ontario. The virus was transmitted by an eriophyid mite. This is the first record of the disease in Canada.

Aster yellows reduced the 12.6 million bu. flax crop 10-15% in Sask. Another detailed survey led to a conservative estimate of the loss in flax yield as 15% for Man. where 865,000 acres would yield an average of only 4 to 5 bushels per acre. Five percent of the Man. sunflower crop was affected but some varieties were free of aster yellow when grown next to diseased selections.

In south-western Ont. Phytophthora root and stalk rot caused the most severe damage to soybeans since 1954. Heavy rainfall in July and increased planting of the very susceptible Harosoy variety both contributed to the increased loss. The new variety Chippewa was susceptible but Harman exhibited tolerance to the disease. It was serious in 5/36 Harosoy fields. Yield was reduced 18-25% in the seriously affected fields through death of plants and reduction of vigor. A second record of Macrophomina phaseoli on soybeans in Ont. was established.

Bacterial ring rot of potatoes (Corynebacterium sepedonicum) increased in prevalence especially in Que. and in districts of Ont. where the use of custom planters is general. Fall weather conditions in eastern Canada were optimum for the detection of ring rot in the field. Black leg (Erwinia atroseptica) continues to be a serious problem in seed stocks in B.C., Alta., Que. and P.E.I. The use of whole seed appears to be of some value in reducing incidence of the disease. Rhizoctonia (Pellicularia filamentosa) was unusually severe in B.C., Sask. and some districts of Ont.

Late blight (Phytophthora infestans) did not cause appreciable losses on potatoes in Canada in 1957. Although generally present in fields, it was held in check by dry conditions in late summer and early fall. Little tuber infection was reported. Common scab (Streptomyces scabies) caused losses in the Interior of B.C., in some districts of Ont., and in the lower St. Lawrence districts of Que. Conditions on the east coast of Nfld. were favorable for the development of wart (Synchytrium endobioticum). Sebago continues to show a high degree of resistance to the disease. Purple top was unusually prevalent in western Canada and in Ont., its distribution being parallel to that of aster yellows in other crops.

Aster yellows was very destructive to carrots, celery and lettuce in the vegetable growing areas of Ont. The pin nematode (Paratylenchus sp.) again caused severe stunting of celery in southern Ont. Botrytis root rot was especially severe on lettuce on muck soils in western Ont. At Leamington, Ont. the bulb and stem nematode (Ditylenchus dipsaci) was heavy on onions grown on muck soil. This infestation presents a serious threat to onion production in Ont. Leaf spot (Alternaria sp.) is causing concern in areas devoted to pickling cucumbers in N.S. and P.E.I.

The presence of near wilt of peas (Fusarium oxysporum Schlecht. f. pisi (Lindford) Snyder & Hansen, race 2) in Ont. has been confirmed. A survey of the canning crop areas has shown it to be widely distributed. Another pea disease new to Canada is Wisconsin pea stunt which was observed in Man. Studies at London, Ont. show that the organism causing tomato

anthracnose in Ont. is Colletotrichum atramentarium (Berk. & Broom) Taubenh. rather than C. gloeosporioides Penz. (C. phomoides Chester) as previously assumed. The same organism has also been shown to be the cause of a field wilt of tomatoes. Gray mold rot (Botrytis cinerea) caused heavy losses in tomatoes in N.S. especially in crops sprayed with dithiocarbamate fungicides. Late blight (Phytophthora infestans) was more prevalent on tomatoes in southwestern Ont. than at any time in the past 10 years.

Fire blight (Erwinia amylovora) continues to be a major problem on apples and crab apples in Sask. and Man. Apple scab was generally well controlled in adequately sprayed orchards. Powdery mildew (Podosphaera oxyacanthae) has become serious in many cherry orchards in the Niagara Peninsula. Little cherry symptoms were unusually severe in the Kootenays and Creston Valley of B.C. Post-harvest losses from brown rot (Monilinia fructicola) and Rhizopus rot were heavy in processing varieties of peaches in Ont. Black knot (Dibotryon morbosum) has become a serious problem in plum production in N.S. Gray mold wilt (Botrytis cinerea) was severe on mulched raspberry plantations in N.S. Green petal of strawberry was found for the first time in Que. and B.C.

Root and collar rot (Phytophthora lateralis and P. cinnamomi) has increased greatly on Lawson's Cypress in B.C. Dutch elm disease (Ceratocystis ulmi) was reported for the first time from N.B. Aster yellows affected many herbaceous ornamentals in the Prairie Provinces, particularly Ageretum, Calendula, Callistephus, Cosmos, Petunia, Tagetes and Zinnia.

Maladies nouvelles ou d'importance

La rouille de la tige du blé a causé encore moins de dégâts qu'en 1956. La quantité d'inoculum, mesurée par des trappes à spores, était à peu près la même qu'en 1956, mais elle n'a produit qu'une infection modérée de rouille chez les variétés sensibles de blé et d'orge sauvage. Parmi les autres facteurs qui ont contribué à restreindre l'infection de la rouille de la tige, il faut mentionner la forte proportion d'emblavures de Selkirk résistant et le temps chaud et sec qui a permis une maturation précoce. La rouille des feuilles du blé a été la rouille la plus apparente sur les céréales dans les Prairies et dans les autres parties du Canada. Le blé Selkirk a été atteint d'infection à résistance modérée. Dans le sud du Manitoba, où l'infection était la plus grave, 20 p. 100 de la récolte ont été atteints. L'infection a été plus faible dans la plupart des autres régions. Les régions de l'est de la Saskatchewan et du centre de l'Alberta, où il y a eu sécheresse, n'ont présenté que des traces de rouille des feuilles.

Les maladies causées par le Septoria ont affecté le blé dans la plupart des provinces. En Saskatchewan, où la majorité des maladies du feuillage était amoindrie par la sécheresse, la septoriose des feuilles a été particulièrement notable. Au Manitoba, le S. nodorum et le S. avenae f. sp. triticea ont été identifiés. La septoriose des glumes et des feuilles était répandue dans la plupart des provinces. Au Manitoba et dans l'Est canadien, l'avoine a été gravement attaquée par le S. avenae f. sp. avenae qui a produit des taches des feuilles et des bris de tiges. Il y a eu du Septoria sur l'orge et le seigle, mais les dommages ont été légers.

L'helminthosporiose la plus apparente chez les céréales dans l'Ouest canadien a été la tache réticulée de l'orge causée par le H. teres. L'H. gramineum a été rare. L'H. sorokinianum a contribué aux méfaits de la pourriture du pied chez le blé et l'orge. Les dommages moyens causés par la pourriture du pied en Saskatchewan se sont accrus légèrement pour se porter à 10.7 et à 14.5, de 9.1 et de 11.2 qu'ils étaient en 1956 chez le blé et l'orge respectivement. Voici de nouvelles mentions pour le Canada: H. triseptatum sur l'Holcus lanatus, H. tuberosum sur le Secale cereale et H. dictyoides var. phlei sur le Phleum pratense.

La mosaique striée du chiendent a été trouvée sur l'A. repens, le Triticum aestivum et sur les hybrides de Triticum x Agropyron, en Ontario. Le virus a été transmis par un tétranique ériophydien. C'est la première mention de cette maladie au Canada.

à 15 p. 100 au Manitoba où 865,000 acres donneraient un rendement moyen de seulement quatre à cinq boisseux l'acre. Cinq p. 100 de la récolte de tournesol au Manitoba ont été atteints, mais certaines variétés étaient exemptes de jaunisse de l'aster lors même qu'elles croissaient à proximité des sélections infectées.

Dans le sud-ouest de l'Ontario, la pourriture des racines et du pied des sojas causée par un Phytophthora a produit les plus graves dommages à cette récolte depuis 1954. Les fortes pluies de juillet et les superficies plus grandes consacrées à la variété Harosoy, qui y est très sujette, ont contribué à augmenter la perte. La nouvelle variété Chippewa a été sensible à la maladie, mais Harman a manifesté de la tolérance. La maladie a été grave dans cinq champs d'Harosoy sur 36. Le rendement a été réduit de 18 à 25 p. 100 dans les champs gravement atteints, et cela par la mort ou l'affaiblissement des plantes. C'est la seconde mention du Macrophomina phaseoli sur les sojas en Ontario.

La pourriture bactérienne en cerne des pommes de terre (Corynebacterium sepedonicum) s'est répandue davantage, particulièrement dans les régions du Québec et de l'Ontario où la plantation se fait communément a forfait. Dans l'Est canadien, les conditions climatiques d'automne ont été idéales pour le dépistage de la pourriture en cerne dans le champ.

La jambe noire (Erwinia atroseptica) continue d'être un grave problème chez les pommes de terre de semence en C.-B., Alberta, Québec et dans l'I.P.-E. L'emploi de tubercules entiers parait contribuer à réprimer la maladie. La rhizoctonie (Pellicularia filamentosa) a été exceptionnellement grave en C.-B., Saskatchewan, et en certaines régions de l'Ontario.

Le mildiou (Phytophthora infestans) n'a pas causé de pertes appréciables aux pommes de terre en Canada en 1957. Bien que généralement présent dans les champs, il a été tenu en échec par les conditions séches de la fin de l'été et du début de l'automne. On n'a signalé que peu d'infection des tubercules. La gale commune (Streptomyces scabies) a causé des pertes dans l'intérieur de la C.-B., dans certains secteurs de l'Ontario, et dans la région du bas St.-Laurent, dans le Québec. Sur la côte est de Terre-Neuve, les conditions ont été favorables à la gale verruqueuse (Synchytrium endobioticum). La Sebago continue d'offrir une très forte résistance à cette maladie. La tige pourprée a été exceptionnellement répandue dans l'Ouest canadien et l'Ontario, sa distribution étant parallèle à celle de la jaunisse de l'aster sur d'autres cultures.

La jaunisse de l'aster a fait de gros ravages chez les carottes, le céleri et la laitue dans les régions maraîchères de l'Ontario. Le nématode-épingle (Paratylenchus sp.) a de nouveau causé un grave nanisme du céleri dans le sud de l'Ontario. La pourriture botrytique des racines a été particulièrement grave chez la laitue des terres noires de l'ouest de l'Ontario. A Leamington (Ont.), le nématode du bulbe et de la tige (Ditylenchus dipsaci) a été abondant chez les oignons cultivés sur terres noires. Cette infestation constitute une sérieuse menace à la production des oignons dans l'Ontario. La tache des feuilles (Alternaria sp.) cause des soucis dans les régions consacrées aux concombres à marinage en N.-E. et dans l'I.P.-E.

La présence de la quasi-flétrissure des pois (Fusarium oxysporum Schlecht. f. pisi (Lindford) Snyder & Hansen, race 2) en Ontario a été confirmée. Une enquête dans les régions de pois à conserve a révélé que cette maladie est très répandue. Une autre maladie des pois, nouvelle pour le Canada, est le nanisme du Wisconsin, observé au Manitoba. Des études faites à London (Ont.) montrent que l'organisme pathogène de l'anthracnose des tomates en Ontario est le Colletotrichum atramentarium (Berk. & Broom) Taubenh. au lieu de C. gloeosporioides Penz. (C. phomoides Chester), comme on le croyait auparavant. Il a été également démontré que le même organisme est cause d'une flétrissure des tomates dans le champ. La pourriture botrytique (Botrytis cinerea) a causé de lourdes pertes en N.-E., particulièrement chez les cultures de tomates qui avaient reçu des pulvérisations de fongicides à base de dithiocarbamate. Le mildiou (Phytophthora infestans) sur les tomates du sud-ouest ontarien a été plus abondant qu'en aucun temps au cours des derniers dix ans.

La brûlure bactérienne (Erwinia amylovora) continue d'être un problème d'importance majeure pour les pommiers et les pommetiers en Saskatchewan et au Manitoba. La tavelure de la pomme a été généralement bien tenue en échec dans les vergers où les pulvérisations étaient adéquates. Le blanc (Podosphaera oxyacanthae) est devenue grave dans plusieurs vergers de cerisiers de la Péninsule de Niagara. Les symptômes de la maladie appelée "petite cerise" ont été exceptionnellement graves dans les Kootenay et dans la vallée Creston de la C.-B. Les pertes causées par la pourriture brune (Monilinia fructicola) et par la pourriture Rhizopus après la récolte ont été lourdes chez les variétés de pêches de conserve en Ontario. Le nodule noir (Dibotryon morbosum) est devenu un grave problème dans la production des prunes en N.-E. La flétrissure botrytique a sévi gravement en N.-E. dans les plantations de framboisiers cultivés sous paillie. Le "pétale vert" du fraisier a été trouvé pour la première fois au Québec et en C.-B.

La racine pourrie et le collet pourri (Phytophthora lateralis et P. cinnamomi) ont augmenté de beaucoup sur le Chamaecyparis lawsoniana en C.-B. La maladie hollandaise de l'orme (Ceratocystis ulmi) a été signalée pour la première fois au N.-B. La jaunisse de l'aster s'est attaquée à plusieures plantes ornementales herbacées dans les provinces des Prairies, particulièrement aux Ageratum, Calendula, Callistephus, Cosmos, Petunia, Tagetes et Zinnia.

The Weather and Its Influence on Plant Disease

The first general frost on the lower mainland of B.C. occurred 28 Oct., 1956, killing cucurbits, dahlias and some other tender plants. Herbaceous ornamentals in partly sheltered gardens were not killed back until 4 Dec. when a few inches of snow fell, the temperature dropping to 13°F. two days later. December was cool and rainy, followed by a colder, snowier January than normal. February, March and April were cloudy and cool with normal rainfall. Snowfall in February, however, was above normal. The last frost occurred in March.

May and June were fine and warmer than usual. A rainy period occurred near the end of June, delaying the ripening of strawberries and raspberries. Summer temperatures were normal with the rainfall in July above normal. The cool, wet conditions favored a heavy attack of rust on pole beans and the progress of an undetermined root rot of canning peas. August and September were warm and sunny. No frosts occurred until mid-October. October had more sun and less rain than usual (H.N.W. Toms).

The 1956-57 winter in the B.C. Interior provided an unusually long period of low temperatures, causing Okanagan Lake to freeze over. There were no sudden temperature drops in the fall or spring and no extremely low temperatures during the winter, hence, no significant tree damage was sustained.

The month of April and the first half of May were unusually warm and dry. Between mid-May and mid-June there were several prolonged wet periods. Temperatures were considerably below normal in July and early August. Late August and the entire month of September were warm and unusually dry, the total rainfall for September at Summerland being only 0.01 in. October and November rainfall were below normal, and temperatures were close to the 40-year average.

The effects of these weather conditions have been the following: (1) blossom infection by fire blight occurred in scattered districts; (2) the May rains favored foliage and fruit scab in the northern districts; June rains favored the development of foliage scab in some southern districts, but with the onset of dry weather in early fall there was less pin point scab than might have been expected; (4) the uneven and unpredictable ripening of peaches and Bartlett pears, with an unusually high incidence of Rhizopus rots, caused considerable trouble in canneries; (5) fruit size in most apple varieties was abnormally large; (6) early entry of trees into dormancy, and the absence of severe temperatures in October and November, have ensured that trees suffered no fall injury; (7) many orchards have gone into the winter with dry soil, which will allow deep frost penetration if extreme winter temperatures are experienced.

Tomato yields were the best in a number of years, and all vegetable crops grew satisfactorily. There was general occurrence of Verticillium wilt in tomato, probably favored by the subnormal temperatures in June, July and August.

Although onions were harvested under ideal dry weather conditions, 25-50% of the stored bulbs in some locations became infected with Botrytis neck-rot. It appears probable that infection occurred when rains fell shortly before the bulbs were ready for harvest (D.L. McIntosh).

In the Kootenays May and early June were dry through the pre-pink, pink and calyx periods. Between mid-June and mid-July there were several prolonged wet periods during which scab developed in unsprayed orchards. The disease, however, was controlled without difficulty in orchards where sprays were applied. The fall weather was mainly mild and dry. A cold period in late November caused some loss of unpicked late apple varieties (J.M. Wilks).

Winter temperatures and precipitation were about normal in s. Alta. permitting good survival of winter wheat and herbaceous perennials. Precipitation was, however, below normal in May and early June causing uneven emergence of spring sown dry-land crops. July, August, and September also provided sub-normal rainfall contributing materially to reduced foliage diseases in both the cereals and forage crops.

In the Edmonton district in 1957 it was very dry until the first of August, when some relief occurred. These drought conditions were not conducive to the development of plant diseases. All diseases except the smuts were, therefore, much less prominent than they have been during the last several years when rainfall was normal or above normal. There was, in late crops, some development of leaf diseases during August and early September. The Peace River district had a wet summer (W.P. Campbell).

Conditions in Sask. at seedling time were satisfactory to start the crops but reserve moisture supplies were limited in many areas. Throughout the growing season no general soaking rains occurred and the development of the grains was dependent on the receipt of local showers. This resulted in a considerable variability between districts and even between fields in the same district. Grains seeded on summerfallow held up fairly well under the extreme drought conditions while crops on stubble suffered sev. deterioration. Temperatures in July were above normal and rainfall during the growing season was as much as 60% below normal. Hail damage during the season was quite heavy and extensive with losses at near record levels. Drought, however, was the chief cause of lower crop yields in many areas of Sask. Diseases such as rust and leaf spots were much less common and less sev. than in previous years, but virus diseases, particularly yellows, flourished on flax, tomatoes, potatoes and ornamentals (H.W. Mead, T.C. Vanterpool).

Mean temperatures throughout the agricultural areas of Man. were about 1° above normal for April and 3° below normal for May, while precipitation was slightly above normal for April and slightly below normal for May. As a result, cereal crops were sown earlier in 1957 than for several years past, giving these crops a better chance to escape rust damage. The prevailing winds at Winnipeg were n.w. for April and n.e. for May, the normal for both months being north.

Much below normal temperatures prevailed during all of June. At Winnipeg the mean temperature for the month was 3.5° below normal. Precipitation was above normal in most of the agricultural areas of the province. In many parts of Man. precipitation it was 1 to 2 in. above normal. The prevailing winds in June at Winnipeg were north, the normal being south. There were no extended periods during May or June with strong persistent southerly winds. Probably owing to the persistently northerly wind during May and June, air-borne rust inoculum was scarcer than usual over Man. and e. Sask. during these two months. All cereal rusts were later than usual in becoming established in Western Canada. This was, no doubt, an important factor in determining the course of rust development in the prairie areas in 1957.

Temperatures were abnormally high during July. At Winnipeg the mean temperature, at 72.3°, was the third highest average July temperature on record. Measurable precipitation occurred on 10 days in July with a total rainfall of 1.68 in., 1.2 in below normal. South winds prevailed over the eastern prairie area during the month. The abnormally high temperatures and low precipitation greatly hastened crop maturity. The premature ripening of cereals restricted rust development.

Temperatures for August were generally slightly above normal throughout Man. and precipitation was considerably above normal (B. Peturson).

The unusual feature of the weather in Essex Co., Ont. in 1957 was the cool, wet summer. Between 1 April and 30 Sept., 28 inches of precipitation were recorded at Harrow. This is approximately 1 in. less than the yearly average. Much of the precipitation occurred in the form of torrential rains during the growing season. The cloudy, wet, cool weather in May and early June favored root rot of cucurbits set in the field under paper. The high greenhouse humidities prevailing during this period favored the development of tomato leaf mold and Botrytis infections in cucumbers, tomatoes and lettuce. Cool, wet weather in August and September provided ideal conditions for the sporulation and spread of infection by the late blight fungus. Rainy periods of two and three days duration prevented the operation of spraying equipment during critical infection periods. The damp weather in late August and early September led to serious outbreaks of brown rot in tree fruit crops (C.D. McKeen).

There was a sharp frost in the Niagara peninsula on 16 May. The minimum grass temperature at St. Catharines was 25°F. and the air temperature was 31°. Considerable damage was sustained by strawberries in full bloom and young tender shoots of grapes. Tree fruits in some locations suffered damage in the form of russet areas on the fruit. The entire crop of one orchard of Astrachan apples was ruined by heavy roughened russet bands. In one pear orchard 50% of the fruit showed frost bands. A high percentage of prunes in many orchards were russeted due to cold weather checking. Internal necrosis and excessive fruit drop in one orchard of Burbank plums was attributed to the low temperature in the early stages of fruit development. This trouble did not occur in a second orchard nearer Lake Ontario. The likely occurrence of frost was forecast by the weather bureau and growers resorted to smudges, sprayers, irrigation lines and airplanes to protect such crops as strawberries and grapes. The use of sprayers proved the most successful.

The week of 9-15 May was almost continually wet. This coincided with the full bloom period of apples and proved very critical for primary scab infection. Ascospore discharge was active and the peak discharge was recorded 11 May. Primary infection was observed 21 May and was prevalent by the end of the month.

Symptom expression of the cherry yellows virus was unusually severe in 1957 and was related to warm weather in the pre bloom period and the cool temperatures at petal fall.

Heavy rains, fog, and high humidity on the weekend of 20-21 Sept. were followed by a serious development of brown rot and Rhizopus rot in Elberta peaches in common storage, in transit, and at market outlets. Losses of 50-60% were common. Losses were much less where the fruit remained on the trees over this weekend (G.C. Chamberlain).

In s.w. Que. frost was the weather factor having the greatest influence on crops and causing the heaviest losses in 1957. Fruit trees in low locations were sev. damaged when temperatures dropped to -40°F between 14-16 Jan. Buds and branches were killed or sev. injured; there was a sparse and delayed bloom; crops were reduced, and many injured trees are unlikely to survive. Silver leaf was a common symptom following the frost damage and was frequently observed in the spring. During the summer and fall many frost damaged trees oozed from wounds, cuts and openings on trunks and branches. Although pear trees were all heavily damaged, some varieties of apples showed a high degree of resistance to frost damage. Cortland was one of the most severely affected varieties.

Another frost caused damage in May. Temperatures of 30°F. on 16 May and 22°F. on 17 May occurred when most apple trees were in the early bloom period and young vegetable plants had just been transplanted

into the field. Many young plants were killed necessitating replacement and a further reduction in the fruit crop was suffered. Orchards on hill slopes with adequate air drainage escaped frost injury, but those in the valleys had practically no crop in 1957. Several species of wild trees, such as Amelanchier, Crataegus and Prunus were also affected and did not bear fruit in 1957.

The weather was cool and humid in May, June and July. At Rougemont, the rainfall for the three months was 2.85, 3.80, and 4.30 in. respectively. Most of the diseases caused by parasitic fungi were favored by these conditions. Fortunately August, though cool, was very dry with a total rainfall of only 0.2 in. The dry weather checked many of the diseases or made control measures effective in the latter part of the season. The abrupt change in weather conditions, however, favored physiological disorders in several crops (L. Cinq-Mars).

Only 4 in. of rain and approximately 5 feet of snow fell in the winter months of January, February and March at Fredericton, N.B. During this period the soil had only a light covering of snow which disappeared during the third week of March. Partially as a consequence of this light snow blanket considerable killing of clovers and alfalfa occurred. Seeding began about 10 May which is an average date for the locality. During the latter part of May and the months of June and July frequent, timely rains occurred ensuring an average hay and berry crop.

Ascospores of the apple scab fungus matured early in the season but the first spore discharge was delayed until 15 May, after which date three more discharges were recorded. Scab was controlled in a satisfactory manner in orchards that were sprayed frequently and well, otherwise much early and considerable late pin-point scab developed, the latter because of the saturated atmospheric conditions which prevailed almost nightly during Aug. and Sept.

In low-lying areas along the lower St. John River cucumber scab was destructive and considerable late blight developed in late-harvested tomato fruit.

The growing season was very favorable for the expression of potato ring rot symptoms and as a consequence many new sources were located. The harvesting season was dry and frost free and excellent crops of grain and bumper, relatively clean crops of potatoes were realized (J.L. Howatt).

Although the precipitation in P.E.I. for the July-Sept. period was 2.71 in. below the 36-year average, late blight of potato was a serious problem in 1957. The first lesions were found on plants in a cull pile on 17 July, and on 22 July scattered lesions were found in a low area of a field of Irish Cobbler at Augustine Cove. The attack was soon general.

The initial outbreak and spread of the epiphytotic were forecast from a study of the rain-temperature-humidity pattern composed of data collected at five points in the province. July was not a wet month, but there were five successive days with showers beginning on the 13th of the month. At this time a 4-week period of high humdiity occurred during which late blight became rampant, moved into all areas, and seriously threatened unsprayed fields of which the Irish Cobbler composed a considerable portion. Proper attention to the application of fungicides, however, resulted in excellent control. This danger period was followed by 3 weeks with little rain and low relative humidities.

The weeks of 2, 9, and 16 Sept. produced ideal weather for late blight with considerable rain and high relative humidities. Again, the disease moved rapidly but little loss was experienced by growers who followed a proper spray schedule.

Losses from late blight tuber rot, except in unsprayed or rarely sprayed fields, were light in 1957. Most tuber infection occurred during the week of 2 Sept., long before harvest. Because of the early inoculation, almost all the diseased tubers were discernible at digging time and were discarded by the pickers (L.C. Callbeck).

In Nova Scotia a severe freeze in February eliminated all prospects for peach and sweet cherry crops in all but the Digby basin district. Many peach trees were severely killed back. Unmulched strawberries also suffered severe winter injury in many areas of the province.

The spring and summer weather in the Annapolis Valley brought a soil moisture deficit to wells, lakes and streams. Crop growth, however, was favored by timely rains and yields of apples and potatoes were above anticipation. Apple scab was favored by several severe infection periods throughout the summer and unsprayed orchards were defoliated and the crop severely damaged before harvest. Late blight of potatoes struck early but did not spread appreciably until well into August. Losses have not been greater than usual from this source. There was no general frost in the area until 22 Oct., but isolated districts experienced frosts in Sept. (J.F. Hockey).

Precipitation in Nfld. during January, February and March was 5 in. above normal while that during April, May and June was more than 6 in. below normal and approximately 9 in. below the total precipitation recorded during the same three months in 1956. Precipitation during July and August was 5.88 in. as compared to the normal of 7.87 in. and to 10.46 in. recorded during the same period in 1956. Temperatures during the winter months were much lower than normal and reached record lows on several occasions. Mean temperatures

during July and August were approximately 10° below the normal means for this 2-month period.

Even though precipitation was low during the growing season, potato wart infection was severe and late blight infection of the foliage was moderate to severe in many fields. Statistics contained in the Meteorological Reports (Torbay) show that rain occurred on as many days in July and August as during the same period in 1956 and the average daily precipitation, although lower than in 1956, was as high as the average for the past seven years. Precipitation readings taken at the St. John's Experimental Farm show that most of the rainfall recorded during July and August occurred during the period 5 p.m. to 8 a.m. (on 16 dates) while only on four days did rainfall occur during the period 8 a.m. to 5 p.m. On five occasions rainfall occurred during the day and night.

Temperatures during July and August this year averaged 10° above those during the same period in 1956, but they were low at night; sunshine was about normal; humidity was high; evaporation was low and, therefore, the high atmospheric moisture, resulting from these climatic conditions, prevented any serious reduction of the soil moisture by transpiration of the root crops.

Infection of root crops by certain diseases such as potato wart and late blight are influenced more in Newfoundland soils by periodic rainfalls than by excessive rainfalls at long intervals.

The growing season was much longer than normal and a killing frost did not occur on the east coast of Nfld. until late in October. Killing frost usually occurs during last week of September or the first week in October. (G.C. Morgan).

Notes on Some Plant-parasitic Nematodes Encountered in Canada in 1957

G. L. Brown
Nematode Section, Entomology Laboratory, Ottawa

The clover-cyst nematode, Heterodera trifolii (Goffart, 1932) Raski & Hart, 1953, which attacks clovers and is fairly widespread in Canada, reproduced parthenogenetically in the greenhouse. White Dutch clover, Trifolium repens L., was found to be highly susceptible to the attack of this nematode, whereas Ladino and hairy vetch, Vicia villosa, were not as susceptible. Limited tests showed that strawberry clover, T. fragiferum, was lightly attacked; the following were not attacked: alsike clover, T. hybridum; red clover, T. pratense; crimson clover, T. incarnatum; zig-zag clover, T. medium; alfalfa (Narragansett), Medicago sativa; and soybean, Glycines max.

The oat cyst nematode, Heterodera avenae Filipjev, 1934, was found on a farm in the Blackwell area near Sarnia, Ontario. Examination of the soil revealed a heavy infestation of one cyst per gram of soil. The farmer's records showed that oats grown in this field since 1951 had shown progressively poorer growth. This is the first record of this nematode species in this area.

The northern root-knot nematode, Meloidogyne hapla Chitwood, 1949, attacked rose, delphinium, peony, and alsike clover in Ontario; vetch in British Columbia; and strawberry roots in New Brunswick. The southern root-knot nematode, Meloidogyne incognita (Kofoid & White, 1919) Chitwood, 1949, attacked gloxinia tubers in British Columbia; and rose, Cissus discolour, and Hova vine roots in Toronto greenhouses.

A root-lesion nematode, Pratylenchus pratensis (de Man, 1880) Filipjev, 1936, was encountered 30 times in collections from red clover, alfalfa, grass, oat, and strawberry fields in Quebec and Ontario, whereas P. penetrans (Cobb, 1917) Sher & Allen, 1953, was encountered only seven times in these habitats.

Examination of diseased African violet plants, grown by private individuals, revealed that large numbers of the root-lesion nematode, P. penetrans, had attacked both the roots and the crown, causing the plants to wilt.

A species of the awl nematode, Dolichodorus sp., attacked the roots of wild rice growing in the Beaufort marshes near Quebec City. This nematode had not previously been recorded from Canada.

The foliar nematode, Aphelenchoides ritzema-bosi (Schwartz, 1911) Steiner & Buhrer, 1932, caused widespread damage to chrysanthemum leaves in outdoor nurseries in southern Ontario.

A tree survey in Ontario and Quebec revealed a number of species of plant-parasitic nematodes associated with the roots of 17 kinds of trees. Most of the plant-parasitic nematodes encountered had not previously been recorded attacking forest trees in Canada. Species of Hemicycliophora, Rotylenchus, and Paratylenchus were observed to be the most frequent tree root parasites. Two ectoparasites, Criconema menzeli (Stefanski, 1924) Taylor, 1936, and Criconemoides demani (Micoletzky, 1925) Taylor, 1936, which were found associated with tree roots, had not previously been recorded from Canada. Another ectoparasite recorded for the first time from Canada was Criconema octangulare (Cobb, 1914) Taylor, 1936, found on moss roots.

Predaceous nematodes belonging to the genus Monochus were found in the soil of 50 per cent of the tree root samples examined from Ontario and Quebec. The six species encountered in order of abundance were: Mononchus papillatus (Bastian, 1865) Cobb, 1916; M. brachyurus (Buetschli, 1873) Cobb, 1917; M. muscorum (Dujardin, 1845) Cobb, 1916; M. parvus (de Man, 1880) Cobb, 1916; M. sigmaturus Cobb, 1917; and M. trionchus Thorne, 1924.

Phenological Data, 1957

In 1957, first anthesis dates for plants under observation at Ottawa were mostly slightly earlier than usual. This contrasts with 1956 when practically all the observed anthesis dates were later than the averages. Table I shows the dates of first anthesis in 1957 and the departure in days from the average date of previous years (I.J. Bassett).

The chief feature of the phenological data collected in the Prairie Provinces in 1957 is that the majority of the species recorded bloomed earlier than normal. There were no excessively wet or cool periods to delay the development of plant growth throughout the season until heading time. Late-flowering species bloomed slightly early and the wheat plots took less than the usual time for early sown wheat to mature (R.C. Russell).

Table I. Phenological Data at Ottawa, Ontario - 1957

Species	No. of Years of Observation	First Dates of Anthesis 1957	No. of Days Departure from Average
Alnus rugosa	6	8/4	2L
Acer saccharinum	22	9/4	3E
Corylus cornuta	5	16/4	1L
Poa annua	6	18/4	8E
Populus tremuloides	17	21/4	3L
Ulmus americana	22	21/4	5E
Populus grandidentata	6	22/4	2E
Acer rubrum	6	23/4	4E
Acer negundo	17	25/4	11E
Betula papyrifera	6	27/4	5E
Celtis occidentalis	5	1/5	10E
*Acer saccharum	22	No flowering on the marker trees this year	
Fraxinus americana	5	3/5	9E
Prunus pensylvanica	16	8/5	9E
Alopecurus pratensis	6	10/5	4E
Fagus grandiflora	5	12/5	4E
Smilacina stellata	16	19/5	1E
Pinus sylvestris	22	19/5	8E
Poa pratensis	6	19/5	9E
Quercus macrocarpa	6	21/5	2E
Rumex acetosella	6	1/6	2E
Anemone canadensis	16	2/6	1E
Juglans nigra	6	5/6	2E
Carya cordiformis	13	10/6	1E
Dactylis glomerata	6	11/6	N
Bromus inermis	16	17/6	1E
Phleum pratense	16	23/6	2E
Agropyron repens	4	24/6	2E
Tilia americana	16	28/6	8E
Rhus typhina	11	1/7	6L
Ambrosia trifida	6	2/7	9E
Catalpa ovata	14	3/7	1L
Cephalanthus occidentalis	12	15/7	3E
Artemisia vulgaris	4	29/7	1L
Ambrosia artemisiifolia	5	1/8	10E
Hamamelis virginiana	14	11/9	9E

*No specimens of Acer saccharum flowered or fruited in the Arboretum, Canada Experimental Farm in 1957. Other non-flowering years were in 1946 and 1951.

(I.J. Bassett)

Table II. Phenological Data taken at Winnipeg, Saskatoon, and Edmonton in 1957

Species	Winnipeg		Saskatoon		Edmonton	
Pulsatilla ludoviciana	--	--	19/4	N	19/4	12 E
Populus tremuloides	22/4	4 E	28/4	2 L	29/4	2 L
Corylus rostrata	--	--	--	--	26/4	6 E
Shepherdia canadensis	--	--	--	--	29/4	10 E
Phlox hoodii	--	--	28/4	1 E	--	--
Salix petiolaris	--	--	3/5	4 E	29/4	7 E
Acer negundo	--	--	3/5	4 E	29/4	5 E
Betula papyrifera	--	--	7/5	4 E	29/4	10 E
Thermopsis rhombifolia	--	--	5/5	6 E	--	--
Prunus americana	8/5	6 E	--	--	--	--
Amelanchier alnifolia	12/5	6 E	8/5	6 E	13/5	4 E
Prunus pensylvanica	--	--	13/5	7 E	8/5	10 E
Viola rugulosa	--	--	13/5	9 E	22/5	N
Smilacina stellata	23/5	1 E	24/5	1 E	13/5	13 E
Prunus melanocarpa	23/5	3 E	24/5	4 E	25/5	4 E
Crataegus chrysocarpa	17/5	6 E	25/5	3 E	23/5	8 E
Cornus stolonifera	26/5	6 E	24/5	6 E	28/5	5 E
Viburnum lentago	2/6	1 E	--	--	--	--
Thalictrum turneri	--	--	--	--	28/5	7 E
Elaeagnus commutata	--	--	30/5	5 E	30/5	7 E
Lonicera glaucescens	--	--	3/6	5 E	27/5	13 E
Hedysarum americanum	--	--	5/6	3 E	--	--
Achillea lanulosa	--	--	5/6	5 E	--	--
Anemone canadensis	7/6	1 L	7/6	4 E	19/6	5 E
Galium boreale	--	--	11/6	4 E	11/6	11 E
Maianthemum canadense	--	--	--	--	5/6	1 L
Zizia aurea	12/6	?	--	--	--	--
Rosa alcea	--	--	16/6	4 E	3/6	8 E
Campanula petiolata	--	--	20/6	2 E	12/7	2 L
Bromus inermis	--	--	23/6	1 E	19/6	8 E
Gaillardia aristata	--	--	22/6	3 E	--	--
Spiraea alba	--	--	25/6	6 E	--	--
Symphoricarpos occidentalis	--	--	25/6	8 E	11/7	6 L
Chamaenerion spicatum	--	--	1/7	2 E	9/7	1 L
Psoralidium argophyllum	--	--	7/7	4 E	--	--
Phleum pratense	--	--	--	--	10/7	3 L
Apocynum androsaemifolium	--	--	--	--	11/7	2 E
Solidago missouriensis	--	--	12/7	3 E	--	--

Species	Winnipeg		Saskatoon		Edmonton	
Solidago canadensis	22/7	N	--	--	18/7	3 E
Grindelia perennis	--	--	21/7	2 E	--	--
Oligoneuron canescens	--	--	25/7	1 E	--	--
Aster conspicuus	--	--	--	--	23/7	1 E
Aster laevis	--	--	26/7	3 E	23/7	7 E
Wheat						
Sown	6/5	7 L	8/5	8 L	1/5	N
Emerged	17/5	7 L	21/5	8 L	11/5	N
Headed	26/6	5 E	6/7	4 L	--	--
Mature	11/8	4 L	8/8	2 E	15/8	4 E

(R.C. Russell)

I. DISEASES OF CEREAL CROPS

WHEAT

ERGOT (Claviceps purpurea). See special report for Prairie Provinces. Trace infection was found in Queens Co., P. E. I. (R. R. Hurst).

POWDERY MILDEW (Erysiphe graminis) was present as 4-tr. 5-sl. 2-mod. 1-sev. /25 fields near Creston, B. C. In s. Alta. 19/99 winter wheat fields were affected: 15-tr. 4-sl. In a survey of spring wheat results were 18-tr. 9-sl. 6-mod. 1-sev. /176 (J. S. Horricks). Ontario records were 17-tr. 11-sl. /58 from Kent Co. (S. G. Fushtey), and sl. on 75% of Reward, 95% of Cascade, 95% of Richmond and sl. -mod. on 100% of Rideau wheat at C. E. Farm, Ottawa, Ont. (R. V. Clark). Moderate infection caused sl. damage in Kamouraska Co., Que. (R. O. Lachance).

HEAD BLIGHT (Fusarium spp.) Fusarium chlamydosporum was isolated from Dakar wheat grown at Winnipeg, Man. F. graminearum was found on wheat from Guelph, Ont. (W. L. Gordon). In Kent Co. ratings were 26-tr. 28-sl. (about 1% of heads) /58 fields (S. G. F.). Scab was of general importance in Essex and Kent Counties, Ont. Eight widely separated fields were examined in each county. An average of 3.8% of the wheat heads were diseased and severity ranged from slight to severe. Gibberella was isolated from duplicate samples from each field (N. J. Whitney). F. culmorum was found on McMurachy wheat from Lennoxville, Que. (W. L. G.).

COMMON ROOT ROT (Helminthosporium sorokinianum and Fusarium sp.). Near Creston, B. C. ratings were 19-tr. 3-sl. /25 fields. In s. Alta. all 99 winter wheat fields examined were affected: 90-tr. 8-sl. 1-mod. A survey of spring wheat revealed 134-tr. 34-sl. /176 fields (J. S. H.). Near Edmonton 4/32 fields had sl. infection (W. P. Campbell). For Sask. crop districts 1 to 9 the disease ratings and September yield-estimate (in brackets) were: 9.3(16.4) 9.3(15.6) 15.5(13.7) 14.0 (14.9) 8.3 (18.8) 11.8 (14.2) 9.0 (15.1) 5.4 (21.9) 10.5(13.1 bu./ac.). The average rating from 202 fields was 10.7. The prematurity blight phase of the disease occurred as 2-tr. 5-sl. and 1-mod. /203 fields (B. J. Sallans). Specimens were received from Indian Head, Avonlea and Regina, Sask. The last two were durum wheat (T. C. Vanterpool).

GLUME BLOTCH (H. sorokinianum and Alternaria sp.) affected 25% of Reward heads slightly and gave sl. -mod. infection of 50% of Cascade spring wheat heads at the C. E. Farm, Ottawa, Ont. (R. V. C.).

LEAF BLIGHT (Helminthosporium triticirepentis). A trace was present in 1/99 winter wheat fields in s. Alta. In the spring wheat survey only 2/176 fields had tr. infection (J. S. H.). Traces were observed on Richmond and Rideau winter wheats but not on Cascade or Reward spring wheats at C. E. Farm, Ottawa, Ont. (R. V. C.).

SEEDLING YELLOWING (Lagena radicicola) was found in rootlets of plants grown in Regina Clay in Sask. (T. C. V.).

TAKE-ALL (Ophiobolus graminis) was less common than usual, 6-tr. 1-mod. /176 spring wheat fields and 21-tr. 15-sl. 2-mod. /99 winter wheat fields (J.S.H.). Near Edmonton 3 fields had tr. infection /32 (W. P. C.). Traces were found at Lestock, Quinton and Shipman for 3/202 fields in Sask. (B. J. S.).

STRIPE RUST (Puccinia glumarum) affected 7/25 fields near Creston, B. C. Ratings were: 3-sl. 3-mod. 1-sev. In s. Alta. 3/99 winter wheat fields had tr. infection and of 176 spring wheat fields 1 had tr. and 1 sl. infection (J. S. H.).

STEM RUST (Puccinia graminis). Near Creston, B. C. 1 mod. and 4 sev. infected fields were found /25 fields. S. Alta. had the least stem rust since 1950: 16-tr. 3-sl. 1-sev. /176 spring wheat fields. There was more stem rust in winter wheat. Ratings were 15-tr. 2-sl. /99 fields (J.S.H.). In Sask. only tr. were recorded in 2/202. The first 1957 collection at Saskatoon was made July 26 (B. J. S.). One field /58 had a trace infection in Kent Co., Ont. (S. G. F.). Tr. to sl. amounts were found on 50% of Reward and Cascade plants at C. E. Farm, Ottawa, Ont. A few Richmond plants had tr., Rideau had none (R. V. C.). Stem rust was not found on wheat in Que. (R. O. L.). Traces were found in all 6 fields examined in Queens Co., P. E. I. (R. R. H.).

LEAF RUST (Puccinia triticina) affected 10-15% of a 1.5-acre plot of Ridit wheat and 15% of another plot of Dawsons Golden Chaff at U. B. C., Vancouver (H. N. W. Toms). Near Creston, B. C. 11/25 fields were affected: 6-tr. 4-sl. 1-sev. In s. Alta. 8/99 fields of winter wheat were affected as follows: 6-tr. 1-sl. 1-mod. Spring wheat had less leaf rust than in any year since before 1948; 28-tr. 8-sl. 1-mod. 1-sev. /176 fields (J.S.H.). Near Edmonton ratings were 4-tr. 3-sl. 3-mod. /32 fields (W. P. C.). In Sask. leaf rust distribution was fairly uniform but rust was most frequently found in e. and s.-e. parts. Ratings were 58-tr. 15-sl. 4-mod. 2-sev. /202 fields examined. The first 1957 collection was made at Saskatoon July 30(B. J. S.). In Kent Co., Ont. it was rated 24-mod. 31-mod. to sev. and 3-sev. /58 fields of winter wheat (S. G. F.). The disease was common in Essex Co., also (R. W. Walsh). Mod.-sev. on all plants of Reward and Cascade and tr. to sl. on Rideau and Richmond at C. E. Farm, Ottawa, Ont. (R. V. C.). Selkirk wheat had a trace on a few plants at Kapuskasing, Ont. (F. Gfeller, R. V. C.).

GLUME BLOTCH (Septoria nodorum) was found in tr. amounts in 1/25 fields near Creston, B. C. (J. S. H.). Near Edmonton, Alta. 10/32 fields

were sl. infected (W. P. C.). Damage was negligible in Sask.; 5/203 fields were only sl. infected (R. C. Russell). Traces were found on Rideau and Richmond winter wheat at C. E. Farm, Ottawa, Ont. (R. V. C.).

SPECKLED LEAF BLOTCH (Septoria spp.) near Creston, B. C. affected 5-tr. 3-sl. 6-mod. /25 fields. Of 176 spring wheat fields there were 74-tr. 3-sl. infections in s. Alta. Winter wheat had 15-tr. 2-sl. /99 fields (J. S. H.). Near Edmonton 17/32 fields were affected as follows: 16-sl. 1-mod. (W. P. C.). In Sask. this disease appeared to be more conspicuous; 60/203 fields were affected and some were severely damaged (R. C. R.). Both Septoria nodorum and S. avenae f. sp. triticea were of common occurrence on wheat in Man. Of 16 specimens examined only one was free of infection. S. nodorum was identified on 5 of the specimens, S. avenae f. sp. triticea on 8, while the specific identity on the remaining 2 specimens was uncertain. Infection ranged from light to moderately heavy (T. Johnson). Trace infection was found on a few Selkirk plants at Kapuskasing, Ont. (F. G., R. V. C.). In s. Ont. 3/58 had merely tr. infection in Kent Co. (S. G. F.). Reward and Cascade plantings had sl. -mod. infection that resulted in sl. damage at C. E. Farm, Ottawa, Ont. Infection was sl. on Rideau and Richmond (R. V. C.).

COMMON BUNT (Tilletia caries) was found in tr. amounts in 1/25 fields near Creston, B. C. In s. Alta. 4/99 winter wheat fields had a trace of bunt (J. S. H.). In Sask. the average damage was tr., slightly more than usual. Two fields had tr. infection, 1 field had 1 to 2%, and 1 field had 6% of the heads affected (R. C. R.). No common bunt was observed in 58 fields surveyed in Kent Co., Ont. (S. G. F.) or in the Ottawa Valley (R. J. Baylis). In Simcoe Co. 16/40 fields (100/500 ac.) were affected. Infections were 12-tr. 1-sl. 3-sev. (0.5-1.0%) (R. J. B.).

DWARF BUNT (Tilletia contraversa) was recorded as 2-tr. 1-sl. 1-sev. /25 at Creston, B. C. (J. S. H.). Sev. damage on one farm also near Creston was recorded (W. R. Foster). Of 99 fields surveyed in s. Alta. 4 fields of Jones Fife near Hillspring had tr. infection (J. S. H.). In Kent Co., Ont. 58 fields surveyed were free of dwarf bunt (S. G. F.). In Simcoe Co., ratings were 6-tr. 4-sl. 3-sev. /40 fields with a total acreage of 500. The average infection rating was tr. (R. J. B.).

LOOSE SMUT (Ustilago tritici). Near Creston, B. C. 3/25 fields had tr. infection. In s. Alta. of 176 spring wheat fields surveyed 5 were tr. 1 was sl. No infection was reported from 99 winter wheat fields (J. S. H.). In Sask. 12/203 fields had loose smut. Ratings were 11-tr. and 1-sl. This disease occurred mainly on durum wheat (R. C. R.). In Kent Co., Ont. ratings were 30-tr. 12-sl. 5-mod. /58 fields (S. G. F.). In Kamouraska Co., Que. 1/10 fields examined had smut. This field of Huron had 2% infection (R. O. L.).

BASAL GLUME ROT (Pseudomonas atrofaciens) was found in 3/203 fields surveyed in Sask. Infection ranged from tr. to 2% (R. C. R.).

BACTERIAL BLACK CHAFF (Xanthomonas translucens). A sl. infection was noted at Jordan, Man. in a field of Selkirk (W. A. F. Hagborg).

WHEAT STREAK MOSAIC (virus) was found in s. Alta. Ratings were 3-tr. 1-mod. 1-sev. /99 fields of winter wheat and 2-tr. /176 fields of spring wheat (J. S. H.).

HEAD DISCOLORATION (cause unknown) was observed in mod. amounts in 1 field of Selkirk wheat near Homewood Man., but not at Jordan where basal glume rot occurred (W. A. F. H.).

APHID INJURY was evident in spring wheat plots at Saskatoon, Sask. near grass roadways. Affected plants were dwarfed and brittle (T. C. V.).

FORMALIN INJURY caused poor emergence of wheat at Zehner, Sask. (T. C. V.).

LEAF SPOT. A leaf spot was severe on Chinook wheat in an experiment on cultural treatments of stubble land at the Swift Current Experimental Farm, Sask. in 1956. It was present again in 1957, but was held in check by the drought of mid-summer. A fungus resembling Ascochyta sorghi Sacc. was found in abundance on over-wintered straw. This straw appeared to be the source of infections of the seedlings growing close by. A similar leaf spot collected in 1956 by R. C. Russell at Wimmer contained a fungus tentatively determined by D. B. O. Savile as A. sorghi (B. J. Sallans, R. D. Tinline).

OATS

ERGOT (Claviceps purpurea). Some varieties showed sl. infection at C. E. Farm, Ottawa, Ont. Certain interspecific crosses in a breeding nursery were severely infected (R. V. Clark).

POWDERY MILDEW (Erysiphe graminis) was present in tr. amounts on 5% of plants in a 1.5-acre plot of Eagle oats at U. B. C., Vancouver. Victory oats in a 1.5-acre plot had tr. infection on 5-10% of plants (H. N. W. Toms). At Creston, B. C. 1/10 fields examined had tr. infection (J. S. Horricks).

COMMON ROOT ROT (Fusarium spp.) infection was 9-tr. 1-sl. /10 fields examined at Creston, B. C., and 14-tr. /29 examined in s. Alta. (J. S. H.). Premature blight caused mod. damage in 1 field at Rosetown and 8% loss in 1 field at Val Marie, Sask. (B. J. Sallans).

LEAF BLOTCH (Helminthosporium avenae) affected 10 fields examined at Creston, B. C.: 3-tr. 6-sl. 1-mod., and 8-tr. 7-sl./29 examined in s. Alta. (J. S. H.). Seedlings had sl. infection at Ottawa, but this disease caused negligible damage in older plants. At Kemptville, Ont. Rodney and Lanark seedlings in plots were heavily infected and the crop yield was reduced (R. V. C.). In P. E. I. tr. infection occurred in all 10 fields surveyed in Prince, Queens, and Kings Counties (R. R. Hurst). In Nfld. 20-30% of leaves were infected in 7/7 fields examined, but damage was not severe (O. A. Olsen).

CROWN RUST (Puccinia coronata). A few Shield plants had trace infections at Kapuskasing, Ont. (F. Gfeller, R. V. C.). At Ottawa all varieties were infected from tr. to 25%. Rodney, Shield and Garry oats had traces on 50% of plants. Previously resistant varieties had trace infection caused by the new race 276 (R. V. C.). Rust was sl. on most varieties tested by Quebec Seed Board, and mod. on Abegweit and Fundy. Infection ranged from mod.-sev. at Macdonald College and Riviere Ouelle, Que. (D. Leblond). Tr.-sev. infection in Queens Co., P. E. I. caused sl.-sev. damage to Abegweit oats. Late-seeded crops in Queens, Kings, and Prince Counties were heavily infected and sev. damaged (R. R. Hurst).

STEM RUST (Puccinia graminis) affected only a few varieties in tr. to sl. amounts at Ottawa, Ont. Most varieties were not affected (R. V. C.).

SPECKLED LEAF BLOTCH (Septoria avenae) was found in tr. amounts in 1/29 fields surveyed in s. Alta. (J. S. H.). Out of a total of 22 Manitoba specimens of oats examined for the presence of Septoria avenae f. sp. avenae 17 were found to be infected. Five showed severe, 5 moderate and 5 slight infection. In 2 samples the amount of infection was not recorded. The distribution of the samples and the amount of infection were as follows: severe: Winnipeg (2), Carman, Gladstone (2); moderate: St. Agathe, Morden, Brandon, Neepawa, Manitou; slight: Winnipeg, Darlingford, Birtle, Erickson, Dauphin (T. Johnson). Trace infections were noted on Shield oats at Kapuskasing, Ont. (F. G., R. V. C.). All varieties grown at Ottawa were more susceptible. There were differences in tolerance but no variety showed marked resistance. The leaf blotch phase caused considerable loss in yield. The stem blackening phase did not cause much lodging at Ottawa, Ont. At Kemptville, Ont. the damage was similar to that observed at Ottawa. Test plots at Morrisburg, Merrickville and Williamstown, Ont. had mod.-sev. infection of all varieties. Leaf blotch and stem blackening were sev. on most varieties. Lodging was not sev. but low soil fertility prevented lush growth and the plants had less tendency to lodge (R. V. C.). At Macdonald College, Que. all varieties grown had mod.-sev. infection and sl. damage by leaf blotch and stem blackening but lodging was sl. Extensive damage was observed at the Experimental Farm, L'Assumption, Que. Some varieties were completely

lodged and sev. affected by leaf blotch and stem blackening. No variety showed marked resistance (R. V. C.). In Quebec Seed Board variety test plots mod. infection was observed; Rodney was most susceptible. Sev. damage was recorded at Caplan and Notre Dame du Lac, Que. (D. L.). Septoria disease was quite severe in P. E. I. Black stem and consequent lodging occurred especially in Abegweit and Rodney. Sev. infection of Abegweit at Charlottetown caused mod. damage (J. E. Campbell). In Nfld. only 1/7 fields examined was affected but 20% of the leaves of Fundy oats were diseased at St. Johns (O. A. O.).

LOOSE SMUT (Ustilago avenae) affected 4/29 s. Alta. fields: 3-tr. 1-sl. (J. S. H.). In Sask. where this disease is usually scarce only a tr. amount was found in 1/36 fields examined (R. C. Russell). A 5-acre field at Ste. Anne de la Pocatiere, Que. had 5% infection (J. A. Parmelee). In Kamouraska and L'Islet Counties 24/26 fields were infected at from 5-10% of loose or covered smut (R. O. Lachance). Tr. infection caused sl. damage in all 15 fields examined in Prince, Queens, and Kings Counties, P. E. I. (R. R. H.).

COVERED SMUT (Ustilago kolleri) affected 3/36 Sask. fields examined. A smaller proportion of fields showed smut this year than last but infection was heavy in one. Ratings were 1-tr. 1-7%, 1-25% (R. C. R.). Traces were found in 7/15 fields examined in P. E. I. (R. R. H.).

HALO BLIGHT (Pseudomonas coronafaciens) occurred in 11/11 fields near Edmonton, Alta. Ratings were 1-tr. 9-sl. 1-mod. (W. P. Campbell). Traces were present in 4/36 fields examined in Sask. where this disease is considered to be of minor importance (R. C. R.). Certain lines were sev. infected in the oat nursery at Ottawa, Ont. but the disease was not general in oat fields (R. V. C.). Six acres of Rodney oats were sl. damaged by a mod. infection at New London, P. E. I. (D. B. Robinson).

RED LEAF (Cereal yellow dwarf virus) was observed causing sl. damage in 1/29 fields surveyed in Alta. (J. S. H.). It occurred in tr. to sev. amounts in plots at Ottawa, Ont. It was more sev. in spaced plantings and near to barley (R. V. C.).

BLAST (Non-parasitic) occurred in all 10 fields examined at Creston, B. C.: 1-tr. 9-sl. (J. S. H.). In s. Alta. 23/29 fields were affected; 14-tr. 9-sl. (E. J. H.). Near Edmonton, Alta. 8/11 fields were affected; 2-tr. 6-sl. Blast was mod. on Victory and Abegweit, sl. on Shield, Fundy, Eagle, Garry and tr. on Rodney in plots at Lacombe. (W. P. C.). In Sask. 7/36 fields were infected but only in trace amounts and the disease was relatively unimportant this year (R. C. R.).

LEAF SPOT (Cause not determined) was sev. on Victory and Eagle, sl. on Abegweit and Shield, tr. on Fundy, Rodney and Garry at Lacombe, Alta. (W. P. C.).

BARLEY

ERGOT (Claviceps purpurea). A trace occurred in 1/93 fields examined in s. Alta. (J.S. Horricks). Nine fields /68 examined in Sask. had trace amounts (R.C. Russell). Traces were observed in 2 fields in P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe graminis). Leaves of 80-90% of plants in 1.5 acres of Vantage barley were severely disfigured at Vancouver, B.C. (H.N.W. Toms). Three/93 s. Alta. fields were affected: 2-tr. 1-mod. (J.S.H.). Sl. infection occurred at C.E. Farm, Ottawa, Ont. (R.V. Clark). In Quebec Seed Board Tests traces occurred on most varieties. Parkland had mod. infection at Honfleur and sev. at Notre Dame du Lac, Que. (D. Leblond).

KERNEL SCAB (Fusarium sp.). Several varieties had tr. infection in a nursery at St. John's West, Nfld. (O.A. Olsen).

STRIPE (Helminthosporium gramineum) affected only 2/93 s. Alta. fields examined and these had only tr. infections (J.S.H.).

SPOT BLOTCH (Helminthosporium sorokinianum) was found on 9/93 fields examined in s. Alta.; 8-tr. 1-sl. (J.S.H.). In the Winnipeg-Morden-Brandon area of Man. 10/15 fields were affected; 2-tr. 4-sl. 2-mod. 2-sev. This is about the same amount of infection as in 1956 (H.A.H. Wallace). Traces were found on a few Nord plants at Kapuskasing, Ont. (F. Gfeller, R.V.C.). Noted on kernels in cereal nursery at St. John's Nfld. (O.A. Olsen).

COMMON ROOT ROT (Helminthosporium sorokinianum and Fusarium spp.) was present in 71/93 fields surveyed in s. Alta. Ratings were 67-tr. 4-sl. (J.S.H.). Near Edmonton 11 fields were sl. affected /59 surveyed (W.P. Campbell). A survey of 63 barley fields in Sask. gave an average disease rating of 14.5. As in other years this exceeds the average in wheat (10.7) (B.J. Sallans).

NET BLOTCH (Helminthosporium teres) was more prevalent than usual in s. Alta. Ratings were 43-tr. 18-sl. 2-mod. /93 observed (J.S.H.). Near Edmonton ratings were 11-tr. 17-sl. 10-mod. 11-sev. /59 (W.P.C.). Infection varied from tr. to sev. in Sask.; 34/68 fields were affected. Damage was more sev. in n.-e. Sask. (R.C. Russell). In Man. the infection level was similar to the 1956 level; 2-tr. 1-sl. 6-mod. 5-sev. /16 in the Winnipeg-Brandon-Morden area (W.A.F. Hagborg). Traces occurred on 5% of Nord plants at Kapuskasing, Ont. (F.G., R.V.C.).

STRIPE RUST (Puccinia glumarum). One field sl. /93 in s. Alta. (J.S.H.).

STEM RUST (Puccinia graminis). Two tr. infections /93 s. Alta. fields (J.S.H.). One tr. and 2-sl. infections were noted /63 Sask. fields (B.J.S.). In the Ottawa district of Ont., rust was tr. to sl. in fields. In cereal nurseries rust was more sev., especially on late-maturing varieties (R.V.C.). A sl. infection was noted in Queens Co., P.E.I. (R.R. Hurst).

LEAF RUST (Puccinia hordei). A 1.5-acre plot of Vantage barley at U.B.C., Vancouver, B.C. had tr. infection (H.N.W. Toms). In s. Alta. 1/93 fields had tr. infection (J.S.H.). Only trace amounts were observed on crops near Ottawa, Ont. (R.V.C.). Varieties in Quebec test plots had sl. infection. Nord was most susceptible. Sev. infection noted at Macdonald College, Que. (D. Leblond).

SCALD (Rhynchosporium secalis) affected 40/93 s. Alta. fields. Ratings were 32-tr. 5-sl. 1-mod. 2-sev. (J.S.H.). Near Edmonton ratings were 14-tr. 13-sl. 4-mod. 4-sev. /59 (W.P.C.). Scald caused trace amounts of damage in Sask. Only 3/63 fields were affected, and in these it was chiefly the lower leaves that were infected (R.C.R.). Nord barley had slight infection on 50% of plants in 1 field at Kapuskasing, Ont. (F.G., R.V.C.). Only one variety (G.B. 61) was infected /7 tested by Seed Board in Que. (D.L.).

SPECKLED LEAF BLOTCH (Septoria passerinii) was noted in 5/93 s. Alta. fields in tr. amounts (J.S.H.), while near Edmonton ratings were 5-tr. 19-sl. 7-mod. /59 (W.P.C.). Damage was sl. in 10/68 Sask. fields (R.C.R.). This disease was present in most Man. fields. It probably caused very little damage because its development was restricted by hot weather in July and an early harvest. Ratings were 2-tr. 7-sl. 3-mod. 4-sev. /25 fields (H.A.H. Wallace, G.J. Green).

COVERED SMUT (Ustilago hordei). In s. Alta. only 1-tr. 1-sl. infections were noted in 93 fields examined (J.S.H.). Near Edmonton ratings were 1-0.5%, 2-3% / 59 fields (W.P.C.). Average damage in Sask. was estimated at 0.5%. Ratings were 11-tr., 5- 1 to 2%, 3-3 to 9%, 1-14% (R.C.R.). All 19 fields examined in Kamouraska Co., Que. were infected from 1-15% (R.O. Lachance).

LOOSE SMUT (Ustilago nuda) ratings for s. Alta. were 1-tr. 2-sl. 1-sev. /93 fields (J.S.H.). Near Edmonton infection was 15-tr., 9-0.5%, 2-1%, 1-5%/59 fields (W.P.C.). In Sask. average infection was 1%. Ratings were 38-tr., 13-1 to 2%, 1-6%, 1-10%, 1-28%. Some false loose smut (U. nigra) was present but less prevalent than U. nuda (R.C.R.). Five acres of Kennate had moderate (2%) infection at Centerville, N.S. (I.V. Hall, D.W. Creelman).

BACTERIAL STREAK (Xanthomonas translucens) was found in traces in 2/93 s. Alta. fields (J.S.H.). Infection ranged from tr. -mod. in 6/6 fields examined in the Red River Valley of Man. (H.A.H.W.).

BARLEY YELLOW DWARF (virus) was noted causing sl. damage in 1/93 s. Alta. fields (J.S.H.). A slight infection was noted in plots at C.E. Farm, Ottawa, Ont. (R.V.C.).

BARLEY FALSE STRIPE (virus) occurred in tr. amounts in 3/93 s. Alta. fields (J.S.H.).

LEAF SPOTTING (physiological) appeared in some varieties grown in sandy soil of s. of Saskatoon, Sask. (T.C. Vanterpool).

RYE

ERGOT (Claviceps purpurea) was present as tr. in 7/21 Alta. fields (J.S. Horricks). In Sask. 5/7 fields were affected. The infection was in tr. amounts, confined to the perimeter of the fields (B.J. Sallans). Most of the fields in Riviere du Loup Co., Que. had tr. infection (R.O. Lachance). Traces reported from Queen's Co., P.E.I. (R.R. Hurst), and 5% infection in the rust nursery at Charlottetown (J.E. Campbell). Although ergot is not usually severe in N.S., Tetra Petkus rye at Nappan had 3-5% infection and 15 ergot bodies were collected from one head (K.A. Harrison).

POWDERY MILDEW (Erysiphe graminis) affected only 3/31 Alta. fields examined: 2-tr. 1-sl. (J.S.H.).

COMMON ROOT ROT (Fusarium spp. and Helminthosporium sorokinianum) damaged 17/21 s. Alta. fields. Ratings were 8-tr. 7-sl. 2-mod. (J.S.H.). In Sask. ratings were 3-sev. 2-tr./5 examined (B.J.S.).

TAKE-ALL (Ophiobolus graminis) was observed in only 2/21 fields in Alta.: 1-tr. 1-sl. (J.S.H.).

STEM RUST (Puccinia graminis). One field at Preeceville, Sask. had sl. infection (B.J.S.).

LEAF RUST (Puccinia secalina) was noted on 15% of a 1-acre plot of Storm rye at Vancouver, B.C. Damage was slight (H.N.W. Toms). In s. Alta. 3/31 fields were found infected; 2-tr. 1-mod. (J.S.H.). Slight infection was noted at Preeceville and Saskatoon, Sask. (B.J.S.).

SPECKLED LEAF BLOTCH (Septoria secalis) occurred in 4/31 fields in s. Alta: 3-tr. 1-sl. (J.S.H.).

BACTERIAL BLIGHT (Xanthomonas translucens). A moderate infection was noted in 1 field at Morden, Man. (W.A.F. Hagborg).

CEREAL RUSTS IN CANADA IN 1957

G.J. Green, B. Peturson and D.J. Samborski

The following is a condensation of the complete report issued as Report No. 13 by the Plant Pathology Section, Canada Dept. of Agriculture Research Laboratory, Winnipeg, Man. in January, 1958.

Cereal rusts caused insignificant losses in Western Canada in 1957. Probably the most important factor restricting rust increase was the large acreage sown to rust resistant wheat and oat varieties in Man., e. Sask., and adjacent areas in the U.S.A. Stem rust development was restricted further by cool early spring weather in s. U.S.A. which reduced the amount of stem rust inoculum. Air-borne inoculum was not carried northwards into Western Canada until rather late in the season. A very light shower of leaf rust spores occurred on 10-12 June but appreciable numbers did not appear in spore-traps until early July. Stem rust spores were found rarely on slides before 22 July. The number of spores caught was much the same as for 1956; much lower than for several years previous to 1956. The late spore movement, along with a comparatively early harvest, left little time for rust development. The rather large amount of rust on susceptible varieties in experimental plots at the end of the season indicated that a considerable quantity of inoculum reached Western Canada before harvest.

Wheat Stem Rust was first observed on 2 July on winter wheat near Winnipeg but it was not found on spring wheat until 12 July. This rust appeared much earlier in 1955 and 1956 when it was found first on 13 and 22 June respectively.

In Man., where nearly all the wheat was Selkirk, only a trace of stem rust was found in farmers' fields. However, the severity of infection in a field of Marquis wheat near Winnipeg was 35%. The scarcity of rust in farmers' fields can be attributed largely to the resistance of the varieties grown. A trace of stem rust was found west to Regina and Saskatoon. Infection was not seen in Sask. but a trace of rust occurred on susceptible varieties in Alta. In n. Alta. the only record of the presence of stem rust was a trace on barley at Fallis, west of Edmonton.

Leaf Rust of Wheat was first observed on 2 July, 1957, about two weeks later than usual. This was by far the most common of the cereal rusts. In Man. where the wheat crop was almost entirely composed of the variety Selkirk, infections were mostly of a moderately resistant type and ranged up to about 20% in severity at harvest time in the southern part of the province. In the more northerly areas infection was considerably lighter. In e. Sask. infection was generally light or a trace though rather severe infection was

reported on susceptible varieties in the east central area (e.g. Kamsack, Kelliher, Quinton). Infection extended at least as far north as a line from Tisdale west to Battleford but there only a trace of the rust was found. The amount of infection diminished westwards through Sask. to trace on all plants, as at Rosetown, or trace on about 10% of the plants, as at Kindersley. In Alta. light infection was found as far north as Lacombe and Camrose but only a trace occurred at Edmonton.

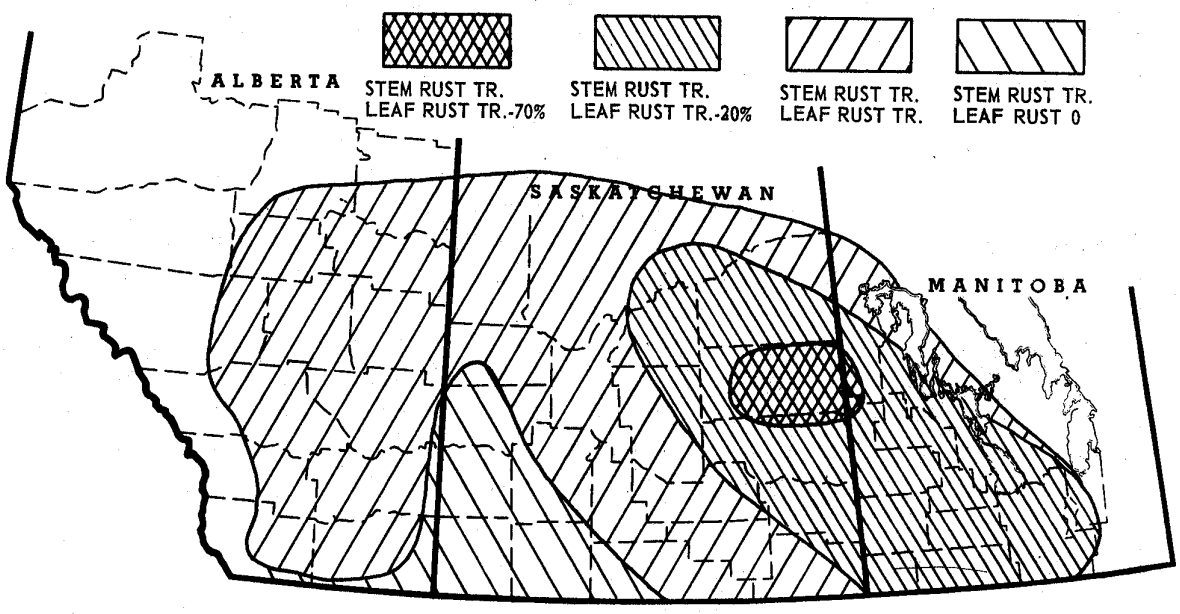

Fig.1 Map of the Prairie Provinces showing approximate intensities of stem and leaf rust in 1957 on susceptible common wheat.

In 1957, Oat Stem Rust was first observed in Man. on 25 July. Only a trace of oat stem rust occurred in farmers' fields in Man., where the varieties Rodney and Garry predominated, but the rust was fairly common on wild oats at the time of harvest. In Sask. this rust occurred in trace amounts in the south-eastern part as far west as Indian Head and was found also in the Canora-Kamsack area in the east-central part of the province. No reports of this rust were received from Alta.

Crown Rust of Oats was first observed in 1957 on 15 July at Christie, Man. Its distribution was practically coextensive with that of oat stem rust.

It was found throughout the agricultural area of Man. and as far west as Indian Head and Melfort, Sask. Infection was generally heavier than that of oat stem rust. Many of the infections were of a susceptible type and it is possible that some late-sown fields sustained damage.

Leaf Rust of Barley was found only in s. e. Man., in the Red River Valley and areas just west of it. Only a trace of infection was found. Rye stem rust had a scanty distribution throughout the agricultural areas of the Prairie Provinces; a trace was found at Edmonton, Alta., and it was observed in the rust nurseries in Man. and at Indian Head, Sask. Light infection of leaf rust of rye occurred in Man. and northwest as far as Preeceville, near Canora, Sask.

Cereal Rusts and Other Diseases in the Rust Nurseries

In 1957, the uniform rust nurseries were grown at 36 locations in Canada. A summary of the disease observations made on the varieties of wheat, oats and barley grown at these locations appears in Table 3.

The varieties grown in the rust nurseries are: Wheat: McMurachy, Lee, Kenya Farmer, Little Club, Marquis, Mindum, Thatcher, Selkirk, Redman, Exchange, Frontana, Ramsey, R. L. 3254. Oats: Bond, Trispernia, Exeter, Garry, Clinton, Landhafer, Rodney, R. L. 2278. Barley: Montcalm, Parkland, Vantage, Feebar. Rye: Prolific.

Wheat Stem Rust

Wheat stem rust failed to develop abundantly in the rust nurseries in 1957. In Western Canada the nurseries at Creston, B. C., Melfort, Sask., Brandon, Man., and Winnipeg, Man. were the most severely infected. Much less rust occurred at Indian Head, Sask., and Morden, Man., and there was no stem rust in seven of the western nurseries. Stem rust was present at all locations in Ont. and Que. except Appleton and Williamstown in Ont., but considerable infection occurred only at Mindemoya, Ont., and L'Assomption, Que. The nurseries in the Atlantic Provinces were free from stem rust except at Fredericton, N. B. where there was a moderate amount of rust. It seems likely that the delayed northward movement of a restricted quantity of stem rust spores helped to limit stem rust development on susceptible varieties in 1957.

Only the very susceptible varieties Little Club, Marquis, Mindum, and Exchange showed over 10% stem rust at any location. The 15B resistant variety McMurachy was most heavily rusted (10%) at Mindemoya, Ont. Evidently race 48A, the only race isolated from McMurachy at Mindemoya, caused most of this infection. The small amount of rust on the varieties Lee,

Thatcher and Redman indicates that there was not much race 15B in any nursery. Kenya Farmer, Selkirk and R. L. 3254 showed only traces of rust.

Wheat Leaf Rust

Heavy leaf rust infections occurred in nurseries in all provinces except Sask. and Alta. The absence or scarcity of leaf rust in the nurseries at Pictou and Lower South River in N. S. and Doyles and St. John's West in Nfld., may have resulted from the poor condition of the plants rather than from the absence of rust inoculum. Other nurseries in the Atlantic Provinces were heavily infected. The scarcity of rust in the Sask. and Alta. nurseries may have resulted from dry conditions and a lack of air-borne inoculum. Severe infections at Morden, Brandon and Winnipeg showed that an abundance of inoculum was present in Man. Possibly the large acreage of Selkirk wheat in Man. acted as a barrier preventing a large-scale rust movement westward into areas where leaf-rust-susceptible varieties are grown.

The leaf rust reaction of the varieties in the nurseries varied little from the expected. The rather high percentage of rust on Lee at Morden and Brandon in Man., and on Selkirk at Morden and Winnipeg in Man., does not necessarily mean that the resistance of these varieties is now altogether ineffective. It seems more likely that much of this infection was produced under conditions favorable to rust development by races to which these varieties are moderately resistant. These varieties had only half as much rust at these locations as the susceptible variety Little Club. Evidence from physiologic race identifications indicates that although biotypes in a number of races can attack Lee, there are no biotypes very virulent on Selkirk. The variety Redman was severely infected at Morden and Winnipeg, Man., Fort William, and Guelph, Ont., but was lightly infected elsewhere. Redman has performed in this matter for a number of years. It is susceptible in areas where races such as 15a and 5a predominate but it is resistant where other races such as 58 predominate. In 1957, races 5a and 15a were most common in Man. and Ont., and in these provinces Redman was severely attacked. This variety was resistant in Sask. and Alta., where it is usually susceptible, presumably because races 1 and 11, which do not attack it, suddenly became predominant there in 1957. Exchange and Frontana were resistant at all locations.

Oat Stem Rust

Oat stem rust was absent or produced only light infections in all nurseries except those at Winnipeg, Man., Kemptville, Ont., Lennoxville, Que., and Kentville, N.S. All nurseries west of Indian Head, Sask., were free from this rust except at Agassiz, B. C. Race identification demonstrated that the light infection on the variety Rodney at Kemptville, Ont., was caused

by race 7A. It is likely that the rust on Rodney at Lower South River, N.S., was this same race but races were not identified from this material. The variety Garry was resistant at all locations.

Oat Crown Rust

Crown rust infections were not severe at many locations in 1957. No crown rust was present in nurseries west of Melfort, Sask., and it occurred sporadically in nurseries in other parts of the country. The relatively large amount of crown rust on the varieties Garry and Rodney, as compared with former years, indicates a rapid increase in the prevalence of races able to attack these varieties. R.L. 2278 was considerably more resistant than either of these varieties.

Rusts on Barley and Rye

Barley was attacked heavily by stem rust only at Creston, B.C. Since Prolific rye in the same nursery was free from stem rust most of the rust on the barley varieties was evidently wheat stem rust. The same situation occurred at Creston last year.

Leaf rust of barley was present in most nurseries in Ontario and Quebec. It occurred also at Fredericton, N.B., Morden, Man., and Creston, B.C. This rust was more widespread and caused somewhat heavier infections than in 1956. Severe infection of rye by stem rust occurred only at Fredericton, N.B., although it was present in appreciable amounts at Guelph, Merrickville, and Mindemoya, Ont., and Kentville, N.S. as well. Leaf rust of rye was widely distributed, being present in nurseries in all provinces except Alta. and Nfld.

Diseases other than Rusts

A summary of the incidence of pathogenic fungi in the rust nurseries is presented in Table 3. Septoria spp. were observed on wheat in nurseries in every province. Mildew of wheat occurred sporadically in all provinces except Man. and Sask. Septoria avenae f. sp. avenae occurred on oats in nearly all the nurseries except those in Sask. and Alta. Its appearance in Man. nurseries for the second consecutive year indicates that it may now be established in the Prairie Provinces. Only light infections have been encountered in these two years but the disease appeared to increase over 1956. Severe infections of barley mildew occurred in B.C. and Que. Septoria passerinii occurred sporadically at locations from B.C. to P.E.I. The heaviest infections were at Morden, Man., and Normandin, Que.; somewhat lighter infections occurred at Ottawa, Ont., Lennoxville, and L'Assomption, Que.

Table 3. Incidence of certain pathogenic fungi on wheat, oats, barley and rye at 36 locations in Canada in 1957 [1/]

Locality	WHEAT				OATS			BARLEY				RYE	
	P. gr. tritici	P. recondita	Erysiphe graminis	Septoria spp.	P. gr. avenae	P. cor. avenae	S. avenae f. sp. avenae	P. graminis	P. hordei	Erysiphe graminis	S. passerinii	P. gr. secalis	P. secalina
Saanichton, B. C.	0	4	2	2	0	0	4	1	0	4	2	0	1
Agassiz, B. C.	0	4	0	3	1	0	3	0	0	4	0	1	4
Creston, B. C.	4	4	2	0	0	0	0	2	2	4	0	0	4
Beaverlodge, Alta.	0	1	0	3	0	0	0	0	0	0	0	0	0
Edmonton, Alta.	0	0	- *	-	0	0	-	0	0	-	-	0	0
Lethbridge, Alta.	0	1	3	0	0	0	0	0	0	2	0	0	0
Lacombe, Alta.	0	2	1	0	0	0	0	0	0	0	2	0	0
Scott, Sask.	0	2	0	1	0	0	0	0	0	0	1	0	0
Melfort, Sask.	3	2	0	3	0	1	0	0	0	0	2	0	1
Indian Head, Sask.	2	2	0	3	1	0	0	1	0	0	1	1	1
Brandon, Man.	3	4	0	4	2	2	2	1	-	0	-	1	3
Morden, Man.	2	4	0	2	2	3	2	1	1	0	4	1	3
Winnipeg, Man.	3	4	0	3	3	4	2	1	-	-	-	1	4
Fort William, Ont.	3	4	0	3	2	3	3	1	2	0	0	0	4
Kapuskasing, Ont.	2	4	0	0	1	0	2	1	0	0	0	0	2
St. Catharines, Ont.	1	3	2	1	0	1	0	0	1	4	0	0	3
Guelph, Ont.	1	4	4	4**	2	3	3	0	3	4	2	2	4
Kemptville, Ont.	2	4	3	1	3	0	0	1	2	4	0	1	4
Ottawa, Ont.	2	4	1	1	2	4	4	1	4	4	3	0	4
Merrickville, Ont.	1	4	4	1	1	4	4	2	2	4	1	2	4
Mindemoya, Ont.	4	4	1	1	2	4	1	1	4	3	0	2	4
Appleton, Ont.	0	3	-	-	2	1	-	2	0	-	-	1	2
Williamstown, Ont.	0	4	0	1	0	4	1	0	2	0	1	0	3
Macdonald College, Que.	2	4	0	0	2	3	1	1	3	3	0	1	3
Lennoxville, Que.	1	4	1	3	4	0	3	1	1	0	3	1	3
Ste. Anne de la Poc., Que.	2	4	0	3	1	0	3	0	1	-	1	0	2
Normandin, Que.	1	4	0	4	1	1	4	0	0	0	4	0	2
L'Assomption, Que.	4	4	-	3	2	2	4	0	1	0	3	0	2
Fredericton, N. B.	3	4	-	4	2	3	3	1	2	0	0	4	3
Kentville, N. S.	0	3	4	1	4	1	4	1	0	0	0	3	3
Pictou, N. S.	0	0	0	1	2	2	2	0	0	1	0	0	0
Lower South River, N. S.	0	0	0	4	2	2	4	0	0	0	1	1	0
Nappan, N. S.	0	4	2	3	1	2	4	0	0	0	0	0	2
Charlottetown, P. E. I.	0	3	0	2	2	1	4	0	0	1	1	0	2
Doyles, Nfld.	0	1	0	0	0	0	3	0	0	0	2	0	0
St. John's West, Nfld.	0	0	-	-	0	0	-	0	0	-	-	0	0

* A dash signifies that no observation was made.

** Septoria nodorum.

1/ 1 = trace, 2 = light, 3 = moderate, 4 = heavy. For the rusts 1 = tr. - 1%, 2 = 2 - 20%, 3 = 25 - 50%, 4 = above 50%.

In addition to the diseases shown in Table 3 the nurseries were examined for the presence on barley of Helminthosporium teres, Rhynchosporium secalis, and H. sativum. H. teres was found in the nurseries from Scott, Melfort, and Indian Head in Sask., and from Morden, Man. R. secalis was present in nurseries from Beaverlodge, Alta., Scott and Melfort, Sask., Morden, Man., and Kapuskasing, Ont. H. sativum occurred at Creston, B.C., Indian Head, Sask., Fort William and Kapuskasing, Ont., Lennoxville, Que., Kentville, Pictou, Lower South River and Nappan, N.S., Charlottetown, P.E.I. and Doyles, Nfld.

Distribution of Physiologic Races

Puccinia graminis f. sp. tritici

Nineteen races and subraces of wheat stem rust were identified in the 1957 physiologic race survey. The number of isolates obtained (186) was smaller than for several years because there was little stem rust in Canada this year. The races isolated (number of isolates in brackets) are: 1(6), 2(3), 10(1), 11(10), 11-1(Can.)(8), 15(2), 15B-1(Can.)(20), 15B-1L(Can.)(14), 15B-4(Can.)(27), 29-1(Can.)(4), 29-2(Can.)(5), 32(3), 34(6), 38(1), 48(2), 48A(7), 56(57), 59(6), 87-2(Can.)(1), 139(1), 140(1) and 152(1).

Physiologic races were identified by the same method used in 1956. The supplementary differential host varieties Lee, Golden Ball, Selkirk, Bowie, McMurachy and Yuma were useful in distinguishing subraces. The other supplementary varieties used were Kenya Farmer, Mayo 54, Frontana-K58-Newthatch II-50-17, Mida-McMurachy-Exchange II-47-26 and Kenya 117A. These five varieties were resistant to all isolates excepting Mayo 54 which was moderately susceptible to race 32.

No dangerous new race was isolated in 1957, but there was a marked change in the prevalence of some known races. Race 15B (33% of the isolates) declined in prevalence for the third consecutive year. A subrace of 15B which was reported but not named in 1956 has been called, tentatively, race 15B-1L (Can.). This subrace is like 15B-1 (Can.) except that it is virulent to the durum wheat varieties Yuma and Langdon. Race 15B-4 (Can.), which can attack the durum wheat varieties Ramsey and Towner, comprised over 14% of the isolates. The well-known race 56 increased in prevalence, comprising 31% of the isolates in 1957 as against 21% in 1956. Many of the wheat varieties are highly resistant to race 56. If only the races isolated from the susceptible wheat varieties Marquis and Little Club and the susceptible H. jubatum in Man. and Sask. are considered, it seems more likely that race 56 comprised over 60% of the rust inoculum reaching these two provinces. The only races which have moderate virulence to Selkirk wheat are races 29-1 (Can.), 29-2 (Can.), 32 and 87-2 (Can.). In spite of the large acreage of Selkirk in Man. and e. Sask. these races did not increase in prevalence in 1957.

More rust collections from the area around Creston, B. C. were analysed than for many years. The race distribution in that area is very different from other regions in Canada. For example, races 1, 10,48 and 140 were found only in collections from the Creston area and the similar races 2 and 59 were common in B. C. but rare elsewhere. These races are much like those found in the states of Oregon and Washington. The race distribution indicates that B.C., Oregon and Washington constitute an ecological region quite distinct from the cereal producing area east of the mountains.

Several years ago American and Canadian workers who identify physiologic races of wheat stem rust agreed that a common source of differential host seed would improve the uniformity and reliability of race identification. The United States Department of Agriculture undertook to increase and care for pure seed stocks of the differential host varieties. Lines of the differential varieties Marquis, Reliance, Kota, Mindum, Spelmar and Acme, derived from single plant selections, were established. They have been tested to selected races in the United States and at Winnipeg and undesirable lines have been discarded. Wheat stem rust races are now being identified at Winnipeg on the provisionally purified differential hosts supplied by the United States Department of Agriculture.

It was agreed at the International Rust Conference in Mexico City in 1956 that certain varieties would be tested to evaluate them as possible supplementary differential hosts. This work, begun in 1956, was carried on in 1957. The varieties Triticum timopheevi R. L. 1312, Illinois-Chinese[2] X T. timopheevi R. L. 2537, Marquillo, Mentana-Rhodesian, Ramsey, Langdon, Yuma, Thatcher[6] X Kenya Farmer and Lee[6] X Kenya Farmer reacted differentially to some of the races used. However, only Ramsey and Yuma or Langdon appear to have value as differential hosts for Western Canada at present.

Stem Rust on Barley and Wild Barley

Rye stem rust was isolated more frequently from barley and wild barley in 1957 than in any year since 1951. One hundred and thirty one collections of stem rust were obtained from Alta., Sask., Man. and Ont. Of 57 collections from barley or wild barley 42 were wholly or partly rye stem rust. Although rye stem rust is more virulent to most rust-resistant barley varieties than wheat stem rust, barley was not harmed to any appreciable extent in 1957.

Puccinia recondita

In 1957, as in previous years, each rust collection was initially increased on Little Club and two single pustule isolates were established and

used for race identification. The remainder of each original culture on Little Club was used to inoculate a "screening" set composed of the varieties Exchange, Frontana, Selkirk, Klein Titan, Mindum, Stewart, Ramsey, Rio Negro, Colotana, Mida-McMurachy-Exchange and Maria Escobar-H-44-Marquis. Wheat leaf rust races were usually identified on the five standard differential host varieties Malakof, Brevit, Webster, Loros and Mediterranean, and on the accessory host varieties Renown and Lee. The complete set of eight standard differential hosts was used in the identification of 146 cultures. Altogether 402 isolates were studied and 11 races were identified. These races are (number of isolates in brackets): 1(44), 5(24), 9(12), 11(78), 15(118), 28(24), 35(15), 58(63), 68(2), 126(19), 140(3).

In 1956, race 15 was the most prevalent race in Man., Sask. and Alta. Race 15 was again the most prevalent race in Man. in 1957 but in Sask. and Alta. races 1 and 11 were predominant. These races are characteristic of the Western Coastal areas and were presumably carried into the Prairies by unusual wind movements. This resulted in a distribution of leaf rust races on the Prairies which is in marked contrast to that of last year. The situation in other parts of the country was relatively unchanged although race 15 was isolated more frequently than in 1956. Race 28 was identified in 24 cultures. This race is very similar to race 126 differing only in the reaction on Hussar. The separation of UN 6 into races 28 and 126 is of doubtful value and was not done in 1956.

The majority of isolates of races 1 and 11 were not virulent to Renown and Lee. The marked decline in cultures virulent on Lee and Renown is due to the predominance of races 1 and 11 in Sask. and Alta. Lee was most susceptible to isolates of race 15 and UN 6. A few isolates in other races were virulent to that variety as well. It was highly resistant to all cultures of races 35, 68 and 140.

The durum wheat varieties in the screening set were moderately susceptible to some isolates, particularly to those of race 58 and race 11. Ramsey was consistently more resistant than were Stewart and Mindum. However, adult plants of these last two varieties were resistant to all the isolates with which they were inoculated.

Rio Negro and Colotana were highly resistant to most isolates. Rio Negro produced a mesothetic reaction with races 28 and 126 and was somewhat susceptible to race 9. Maria Escobar -H-44 - Marquis, a highly resistant variety, was mesothetic in reaction to races 28 and 126. Mida-McMurachy - Exchange and Frontana showed mesothetic reactions with many isolates.

Although most isolates produced a (1) to (2) type reaction on Selkirk, more (2)+ type or (2) to (3) type were recorded in 1957 than in 1956. It is doubtful that this slight change in type of reaction represents a real increase in virulence.

Puccinia graminis f. sp. avenae

In the 1957 physiologic race survey of oat stem rust the 90 isolates obtained were separated into 13 races. The races identified (number of isolates in brackets) are: 1(1), 2(1), 3(1), 4(3), 5(3), 6(5), 7(30), 7A(13), 8(15), 8A(1), 10(1), 12(2), 13(13), 13A(1). Physiologic races were identified by much the same method used in past years. The only change was the addition of the variety Saia to the supplementary hosts Garry and Rodney.

There were some distinct changes in the prevalence of known races in 1957 as compared with the past few years. Race 7 remained the most prevalent race but its predominance diminished sharply from over 60% of the isolates in 1956 to less than 34% in 1957. Race 8 was again second in prevalence to race 7. The number of isolates of race 7A increased from less than 3% of the total in 1956 to over 14% in 1957. This race is important because it can attack the variety Rodney which was released to farmers a few years ago. The distribution of this race was much the same as in 1956. Nearly all the isolates came from Man. where Rodney is a popular variety. In Eastern Canada, races 4, 6, and 13, which are quite similar, increased in prevalence from less than 6% of the isolates in 1956 to over 23% in 1957. These races were not found in Western Canada. They are important because they can attack both the White Russian and Richland types of resistance which are present in many commercial oat varieties.

Two new and important races were discovered in 1957. These races tentatively identified as races 8A, and 13A can attack both of the new varieties Garry and Rodney. They were isolated only from rust collected at Ste. Anne de la Pocatiere, Que.

Puccinia coronata var. avenae

Thirty-three races and sub-races of oat crown rust were isolated from collections received from Sask., Man., Ont., Que. and the Atlantic Provinces. The races isolated (number of isolates in brackets) are: 201(8), 202(10), 203(5), 205(1), 209(9), 210(5), 211(7), 212(12), 213(14), 216(13), 227(1), 229(1), 231(1), 234(1), 239(4), 240(1), 264(2), 274(23), 276(2), 279(14), 280(1), 284(3), 293(2), 1957-1(4).

Races 213, 216, 274 and 279 comprised 44.4% of all isolates and were about equally prevalent in Eastern and Western Canada. In 1956 these four races comprised only 3% of all the isolates. They are pathogenic to all the commercial oat varieties grown in Canada. Three races, 264, 293 and one tentatively designated 1957-1, were isolated in Canada for the first time in 1957.

Four of the races isolated have pathogenic properties of great interest to plant breeders. Race 264 can attack the varieties Sante Fe, Landhafer, Bond and Victoria, and races 276, 293 and 1957-1 can attack all of these varieties except Victoria. These four varieties have been important sources of crown rust resistance for a number of years.

Isolates from aecia collected on Rhamnus cathartica in 1957

Aecial collections were obtained on R. cathartica from P. E. I., Ont. and Man., in 1957. Several grass hosts, which can differentiate between the various varieties of crown rust were inoculated with spores from these collections.

The same three crown rust varieties that were found last year were isolated again this summer. They were the varieties avenae, secalis and festucae. Of these the variety avenae was by far the most prevalent. Ten physiologic races of the variety avenae were identified from the aecial material. All of the races identified from these collections, except race 237, were isolated this year from uredial collections on oats.

Cereal Diseases Observed at Experimental Farms in Western Canada

F. J. Zillinsky

Powdery mildew was the most serious disease on winter cereals at Saanichton, B. C. It was observed in moderate to heavy amounts on winter wheat, oats and barley. Yellow dwarf on barley, red leaf and Helminthosporium avenae on oats, and leaf rust on wheat were present in trace to light amounts. A peculiar stem break condition was noticed on a few barley strains but could not be attributed to insect or mechanical damage.

At Agassiz, B. C., Septoria leaf blotch was severe on oats. Some red leaf and Helminthosporium leaf blotch were also found. Leaf yellowing was noticed on four oat introductions but it did not appear to be caused by either a fungus or bacteria. Mildew and leaf spotting diseases were present on barley varieties. Mildew and leaf rust were observed on winter wheat plots.

Diseases were not conspicuous on wheat, oats or flax at Lacombe, Alta. at this time. The two most conspicuous diseases of barley were scald and net blotch. Other barley diseases observed were bacterial blight and false stripe. Dr. W. P. Skoropad assisted in the identification of cereal diseases at Lacombe.

Diseases on cereals were of very minor importance at Scott, Sask. A few wheat plants which appeared to have been attacked by root rot were noticed. Drought was extremely damaging to all spring-sown crops.

Few signs of disease were observed at Indian Head, Sask. Halo blight was moderate to heavy on some strains of oats but not general in field plots. The most common barley disease was bacterial stripe, particularly on the Lethbridge strains.

Incidence of Barley Diseases at Lacombe, Alta., 1957

W. P. Campbell

Variety	Scald	Net blotch	Septoria	Loose smut	False stripe
Herta	tr.	-	-	-	-
Husky	sl.	tr.	tr.	tr.	-
Velvon II	tr.	tr.	-	-	-
Parkland	sl.	sl.	-	-	-
Traill	tr.	tr.	-	tr.	-
UM 570	mod.	tr.	-	sl.	-

(continued)

Variety	Scald	Net blotch	Septoria	Loose smut	False stripe
Vantage	tr.	mod.	-	-	-
Pirkka	mod.	sl.	tr.	-	-
Compana	sl.	tr.	tr.	-	sl.
Wolfe	mod.	sl.	sl.	-	-
Gateway	mod.	sl.	tr.	tr.	-
Olli	sl.	mod.	tr.	tr.	-

This rating of barley disease severity confirms F. J. Zillinsky's observations recorded above. It supplements the data presented below by H. A. H. Wallace who observed plots in an area free of scald (Rhynchosporium secalis) (R. A. Shoemaker).

Co-operative Barley Tests Survey in 1957

H. A. H. Wallace

An extensive survey of the Prairie Provinces was not made this year, but a survey was made of the plots at Brandon, Portage la Prairie, Morden and Winnipeg, Man. This area is free from scald (Rhynchosporium secalis).

Minerva, Slovak and Piroline at Winnipeg had good resistance to speckled leaf blotch (Septoria passerinii) but were very susceptible to spot blotch (Helminthosporium sorokinianum). In contrast, Freja and Ingred were resistant to spot blotch and susceptible to speckled leaf blotch. As noted in 1956 the 2-row varieties as a group were more resistant to speckled leaf blotch than the 6-row varieties. Traces of yellow dwarf were common. An important observation of this disease, is its greater severity on isolated plants, apparently due to the habits of the aphid. Infection of rod rows wa mostly confined to the end plants. False stripe mosaic, apparently from seed infection, was found on some plants of Opal B, Slovak and Canadian Thorpe.

At Brandon all varieties were completely susceptible to speckled leaf blotch.

Plots of the Western co-operative test at six stations were seen. Hybrid Br M 57-754 was resistant to speckled leaf blotch and susceptible to spot blotch. In contrast Br M 45-680 had fair resistance to spot and net blotch (H. teres). but was susceptible to speckled leaf blotch. Leth. 4362-3, G. B. 61, U. M. 570 W and Husky appear to have some net blotch resistance but are susceptible to speckled leaf blotch. No variety had good resistance to spot blotch. Leth. 4363-45 was very susceptible to bacterial streak.

The Eastern co-operative test at Brandon indicated that 5069-142 and to a lesser extent 5069-40 were resistant to speckled leaf blotch but very susceptible to spot blotch. The Macdonald College hybrids 147, 247, 367 had good resistance to spot blotch but were susceptible to net blotch, speckled leaf blotch and probably to stem rust. The Guelph hybrids 61, 76, 77 seem to have some resistance to net blotch.

In the joint barley test eight hybrids were resistant to speckled leaf blotch and had fair resistance to net blotch but all were susceptible to spot blotch except M 73-812 which was also fairly resistant to physiological brown spot and deserves further testing.

In a special test of standard varieties it was found that Harlan was very resistant to speckled leaf blotch, but like all the other resistant varieties observed it was very susceptible to spot blotch. Titan though fairly resistant to spot blotch was very susceptible to speckled leaf blotch. Peatland and Gartons appear to be fairly susceptible to all leaf spot diseases.

Ergot in Cereals in Western Canada in 1957

R.A. Shoemaker

The data compiled here were collected by J.S. Horricks, Alta., R.C. Russell and B.J. Sallans, Sask., and W. Popp, Man.

Table 4. Results of Ergot Surveys in the Prairie Provinces, 1957.

	Wheat			Barley			Rye		
	Man.	Sask.	Alta.	Man.	Sask.	Alta.	Man.	Sask.	Alta.
Fields with ergot	24	15	1	22	9	1	2	5	7
Fields surveyed	43	203	176	72	68	93	2	7	21
Per cent Fields infected	56	7	0.6	31	13	1	100	71	33

The percentage of infested wheat fields was the highest since the ergot survey began in 1953. Barley infection was greater than average. Rye infection remained high. R.C. Russell noted that wheat infections in Sask. were usually in trace amounts except in one corner of a field where the wheat was close to infected brome grass. In this situation ergot affected a moderate percentage of the wheat heads.

Helminthosporium on Western Grasses

R. A. Shoemaker

Collections of grass leaf spots were made during July, 1957 in order to extend the scope of a study begun in eastern Canada. The stations visited were: University of British Columbia, Vancouver; Washington State College, Pullman; Science Service Laboratories at Lethbridge (southern Alta.); Edmonton (central Alta.); Saskatoon, Sask.; and Winnipeg, Man.; in that order.

At U. B. C. the cereals and forage grasses were particularly healthy. They were growing in a light soil, and despite heavy rain were fairly free of disease. For example, in a 2-acre planting of oats only a few immature lesions typical of H. avenae were found. The only new record is H. triseptatum on Holcus lanatus. With G. W. Bruehl, Washington State College, collections were made in the area around Pullman. Cereal leaf spots were found readily. H. teres was the most destructive species and in one field caused severe damage. At Lethbridge the most noteworthy collection was H. triticirepentis on durum wheat. The disease was fairly severe on durum and appeared as elliptical spots with yellow margins and gray centers. In the Edmonton area (c. Alta.) a more extensive survey was made with W. P. Campbell. The unusual finds were: H. tetramera on Bouteloua sp., H. dictyoides var. phlei on Phleum pratense, and H. tuberosum on Secale cereale. At Saskatoon, leaf spots were extremely rare. There had been very little rain and netblotch of barley which was moderate to severe at other locations was found in relatively small amounts only. At Winnipeg the leaf spots were well represented. This was the last collecting area visited and the fresh material subsequently yielded a higher proportion of viable parasites.

A summary of positive identifications is given below. This list could be extended by intensive local surveys. If any workers find Helminthosporium leaf spots on grasses I will be glad to identify the pathogen in exchange for some of the diseased material.

AGROPYRON SPP.	H. triticirepentis (Died.) Died., Wash., s. Alta., Man.
AVENA SATIVA	H. avenae Eidam, Wash., s. Alta., c. Alta., Sask., Man.
AVENA FATUA	H. avenae Eidam, Wash.
DESCHAMPSIA DANTHONIOIDES	H. sorokinianum Sacc. in Sorok., Wash.
BOUTELOUA SP.	H. tetramera McKinney, c. Alta.
BROMUS SPP.	H. bromi (Died.) Died., c. Alta., Man.
ELYMUS INNOVATUS	H. triticirepentis (Died.) Died., c. Alta., Man.
FESTUCA ELATIOR	H. dictyoides Drechs. Wash., s. Alta., c. Alta., Man.
HOLCUS LANATUS	H. triseptatum Drechs., B. C.
HORDEUM VULGARE	H. teres Sacc., Wash., s. Alta., c. Alta., Sask.
	H. sorokinianum Sacc. in Sorok., c. Alta.
	H. gramineum Rab. in Schlecht., Wash., Idaho.

Barley was the most seriously affected cereal. H. teres caused moderate damage in most areas. Root rot and subsequent vascular water-soaking and necrosis was observed near Lacombe, Alta. H. sorokinianum was abundant on the roots. Spot blotch was not severe and stripe, caused by H. gramineum was not observed in Canada.

KOELERIA CRISTATA H. vagans Drechs., Wash.
LOLIUM PERENNE H. siccans Drechs., Wash.
PHLEUM PRATENSE H. dictyoides var. phlei Graham, c. Alta., Man.

Practically all specimens of timothy observed had necrosis extending downward from the leaf apex. H. dictyoides var. phlei was isolated from some of these specimens, but a direct examination made at regional laboratories would probably show that this disease has a wider distribution than is indicated above.

POA SP. H. vagans Drechs., Wash.
SECALE CEREALE H. triticirepentis (Died.) Died., s. Alta.
H. tuberosum Atk., c. Alta.
TRITICUM AESTIVUM H. triticirepentis (Died.) Died., Wash., Man.
TRITICUM DURUM H. triticirepentis (Died.) Died., s. Alta.

Smuts of Cereals in Manitoba in 1957

W. Popp

The essential features of the field survey of smut of cereal grains in Manitoba in 1957 are the low amount of loose smut in wheat and the low amounts of loose and covered smut of oats (Table 5).

Table 5. Smuts of Cereal Grain in Manitoba in 1957

Kind of grain	Kind of smut	% smut Range	Mean
Wheat	Loose	0-6	0.2
	Bunt	-	0.0
Barley	Loose	0-10	0.9
	Covered	0-20	0.8
	False loose	0-10	0.2
Oats	Loose	0-Trace	Trace
	Covered	0-Trace	Trace

This scarcity coincides with the growing of more resistant varieties. Selkirk wheat is highly resistant to loose smut and is now widely grown. Rodney and Garry oats are highly resistant to oat smut and have largely replaced susceptible varieties. Smut is still quite prevalent in barley. All currently grown

varieties of barley are susceptible to loose smut and most of them are susceptible, in varying degrees, to covered and false loose smut. Except for a high incidence of smutty cars of Alberta Red Winter Wheat, records of the Board of Grain Commissioners indicate that bunt of wheat has been only moderately prevalent in Western Canada for quite a number of years (Table 6).

Table 6. Common Bunt of Wheat in Western Canada

	August 1, 1956 to July 31, 1957.			August 1, 1957 to October 31, 1957.		
Class of Wheat	Cars inspected	Cars graded smutty	% graded smutty	Cars inspected	Cars graded smutty	% graded smutty
Hard Red Spring	185768	173	0.09	42124	17	0.04
Amber Durum	11157	17	0.15	2007	5	0.25
White Spring	199	0	0.00	29	0	0.00
Alta. Red Winter	1275	10	0.78	18	8	44.44
Garnet	281	1	0.36	2	0	0.00
Mixed Wheat	116	1	0.86	21	0	0.00
All Classes	198796	202	0.10	44201	30	0.07

Winter Wheat Disease Survey in Kent County, Ontario

S. G. Fushtey

Fifty eight fields of winter wheat scattered throughout areas suspected of being infested with dwarf bunt were carefully inspected for this disease from 24-27 June, 1957. Notes were taken on other diseases present. Terms used to indicate severity are: free, trace, slight, moderate, abundant, and severe. Leaf rust, 3-severe, 31-abundant, 24-moderate; stem rust, 1-trace, 57-free; common and dwarf bunt, 58-free; loose smut, 5-moderate, 12-slight, 30-trace, 11-free; Septoria leaf blotch, 3-trace, 55-free; Fusarium head blight, 28-slight (about 1% heads affected), 26-trace (less than 1% affected), 4-free; powdery mildew, 11-slight, 17-trace, 30-free. Foot rot readings were taken on lodged areas only. These occurred in 23 fields and were rated for foot rot as follows: 2-abundant, 4-moderate, 15-slight, 2-free. Laboratory analysis of samples revealed Rhizoctonia, Cercosporella, and Ophiobolus present but these have not been sorted out so one specific causal organism cannot be indicated. Lodging in fields that were free from root rot probably resulted from heavy rain.

Winter Wheat Disease Survey in Simcoe County, Ontario.

R. J. Baylis

Since the official recognition of dwarf bunt in Ontario in 1952, five annual surveys of winter wheat have been completed by a joint effort of the Ontario and Canada Departments of Agriculture. The field surveys have established that the disease is fairly widespread throughout the areas of wheat production bordering on Lake Huron, but its occurrence seldom amounts to more than trace infections each year.

As indicated in previous reports, Kent and Simcoe counties were chosen for a concentrated survey by each Department. Dr. Fushtey of Guelph has inspected many fields in Kent over the past 3 years, particularly in 2 townships, in an effort to discover the source of dwarf bunt infection in several seed samples from the Chatham area examined by the Plant Products Division. To date not a single field with dwarf bunt has been found in Kent county. On the other hand, in Simcoe at the northern edge of the wheat belt which is concentrated in the south and western part of the province, an average of 25 percent of the fields surveyed showed dwarf bunt in the same period - 1955-57-inclusive.

Significant among the observations made each year in the same area is the fact that dwarf bunt infestation is increased very obviously by bad farm management. In 1955 (P. D. S. 35:6) a field very severely dwarf bunted was reported for the Stayner area in Simcoe. The following year (P. D. S. 36:4) several neighbouring farms were infested, one severely (1%). In the survey this year (1957), both of the farmers who had the severe infections had replanted to winter wheat on the same infested fields and again had the distinction of achieving a severely dwarf bunted crop. The unfortunate consequence of this indifference is that, between them these 2 farmers have spread the disease to several neighbouring farms by the sharing of seeder and combine, and to some by the sale of infested seed. A perfect example of how the pathogen is returned to the soil was photographed on one farm where a swather was operating at 10"-12" leaving the majority of dwarf bunted heads uncut within the stubble.

An unusual amount of lodging as a result of wet weather during ripening was evident in Simcoe as was the prevalence of take-all (Ophiobolus) resulting from early spring infection. Cercosporella herpotrichoides which was observed in 1956 as a cause of lodging was not a factor this year.

Agropyron Streak Mosaic on Wheat in Ontario and its Transmission by an Eriophyid Mite

J. T. Slykhuis and R. J. Baylis

Agropyron streak mosaic was found on Agropyron repens in a number of locations near Ottawa and Toronto in 1957. The disease was also identified on wheat, and Triticum x Agropyron hybrids in plots at the Central Experimental Farm, Ottawa. This is the first record of the disease in Canada.

Collections of a mosaic disease on A. repens were first made in 1934 at Arlington, Virginia when the disease was designated Agropyron, or quack grass mosaic. A strain of the same virus was isolated in 1951 from wheat growing near diseased A. repens at Arlington. (McKinney, H. H. In: U. S. D. A. Yearbook of Agriculture pp. 350-360, 1953). A virus disease of A. repens similar to the mosaic reported by McKinney was also found in S. Dakota in 1950 (Slykhuis, J. T. S. Dakota Agr. Exp. Sta. Tech. Bul. 11, 1952). Slykhuis called the disease Agropyron streak mosaic and found that wheat, rye, and seven species of Agropyron were susceptible. The viruses isolated from A. repens in Virginia, S. Dakota, and Ottawa all produce similar symptoms and appear to have a similar host range.

The chlorotic streaks caused by the Agropyron streak mosaic virus most closely resemble the streak symptoms caused by mild strains of wheat streak mosaic virus on their respective hosts. However, the two viruses differ in their host range. Agropyron streak mosaic virus will infect species of Agropyron that are not susceptible to wheat streak mosaic. On the other hand Agropyron streak mosaic does not cause symptoms on oats or barley, but both these hosts develop symptoms from infection by the wheat streak virus.

In greenhouse tests at Ottawa, Agropyron streak mosaic, like wheat streak mosaic was transmitted to wheat by eriophyid mites as well as by manual sap inoculations. Eriophyid mites are common on A. repens, but do not appear to transmit the virus from it readily. However eriophyid mites from wheat have transmitted Agropyron streak mosaic to wheat and A. repens.

General Observations on Cereal Diseases in the Maritime Provinces

D. G. Hamilton

The prevalence and severity of Septoria avenae on oats made all other disease problems of this crop seem insignificant in 1957. Heavy infections

of Septoria were evident at all locations where oats were examined in N. B., N. S. and P. E. I. A leaf discoloration, resembling the symptoms usually associated with the red leaf virus disease, was present in patches at the edges of many plots and fields at most locations in each province.

Leaf blotch of barley was very severe at most locations. The general appearance and lack of vigor of some plots indicated that common root rot might be responsible. This was noticeable particularly on the Experimental Farms at Charlottetown, P. E. I., and Nappan, N. S. Leaf discolorations indicative of the yellow dwarf virus were noticeable on plants at the edges of plots at most locations.

II. DISEASES OF FORAGE AND OTHER FIELD CROPS

A. FORAGE LEGUMES

ALFALFA

BLACK STEM (Ascochyta imperfecta) was present as a trace in 1/6 fields at Creston, B. C. Infection was rare in s. Alta. hay fields. Irrigated stands at Maple Creek had a uniform slight infection. Several of these stands had been allowed to go to seed (E. J. Hawn). Ratings for c. and n. Alta. were: 4-tr. 5-sl. 4-mod./42 (W. P. Campbell). Damage was moderate in Sask.; 45/48 fields were affected. The disease developed slowly during the dry summer but increased rapidly during the wet weather after mid-August (H. W. Mead). Crops grown for hay had slight to moderate infections in Man. Seed crop infections were rated moderate to severe (W. C. McDonald).

LEAF SPOT (Cercospora zebrina) occurred in plots at Winnipeg but was not commonly found elsewhere in Man. (W. C. McD.).

DOWNY MILDEW (Peronospora aestivalis) was rated: 4-tr. to sl./6 at Creston, B. C.; 2-sl./47 in s. Alta. (E. J. H.), 1-mod. at Beaverlodge /42 in c. Alta. (W. P. C.). Slight damage was seen in Sask.; 6/48 fields were affected. Most varieties were moderately infected at Snowden, n. Sask. at the end of May (H. W. M.).

YELLOW LEAF BLOTCH (Pseudopeziza jonesii) infection was less in Sask. than in previous years; 12-sl./48 (H. W. M.). In Man. moderate to severe infections were widespread. It was the most damaging leaf spot in Foundation seed plots of the varieties Vernal and Rambler (W. C. McD.).

COMMON LEAF SPOT (Pseudopeziza medicaginis) infection was slight in U. B. C. plots, Vancouver (H. N. W. Toms). Damage was sl. in 1 field at Agassiz and 1/6 fields examined at Creston, B. C. Ratings for s. Alta. were: 7-tr. 4-mod. 1-sev./41 (E. J. H.). In n. and c. Alta. ratings were 3-tr. 6-sl. 4-mod./42 (W. P. C.). Damage was moderate in Sask. The disease was more serious in s. Sask., especially at Indian Head. Twenty fields were affected out of 48 examined (H. W. M.). Infections were widespread but only slight to moderate in Man. (W. C. McD.). Moderate infection was noted in a new planting of Grimm at Charlottetown, P. E. I. (J. E. Campbell). Traces were found in all 7 fields surveyed in Prince, Queens, and Kings Counties (R. R. Hurst). Several varieties had 10-20% of leaves affected in plots at St. John's, Nfld. (O. A. Olsen).

ROOT CANKER (Rhizoctonia solani) was observed on a specimen from Kelowna, B. C. (E. J. H.).

CROWN BUD ROT (Rhizoctonia solani, Fusarium roseum and Ascochyta imperfecta) ratings were: 8-tr. 5-sl. 18-mod. 2-sev./41 s. Alta. fields and 1-sl. 5-sev. /6 irrigated fields at Maple Creek (E. J. H.).

LEAF SPOT (Stemphylium botryosum) damage was moderate, on the average. It was rare in n. Sask. and common in s. Sask. Altogether 25/48 fields observed were affected (H. W. M.). Plots at Ashern and Winnipeg, Man. had considerable infection, but field infections were slight (W. C. McD.). Plots at St. John's, Nfld. had up to 5% infection (O. A. O.).

CROWN ROT (low-temperature basidiomycete). A survey of 42 fields in n. and c. Alta. revealed the following infections: 1-tr. 5-sl. 9-mod. 6-sev. (W. P. C.). Damage in Sask. was slight and occurred on individual plants in 10/48 fields examined (H. W. M.).

BACTERIAL WILT (Corynebacterium insidiosum) was severe in a field that was sown in 1955 at Kelowna, B. C. Ratings for s. Alta. were 2-sl. 8-mod. 2-sev. /41 and 1-mod. 5-sev./6 irrigated fields near Maple Creek (E. J. H.). A survey of 42 fields in n. and c. Alta. gave these data: 2-tr. 5-sl. 5-mod. 4-sev. near Edmonton (W. P. C.). Slight infections were noted in dry land plots at Snowden, n. Sask. and in irrigated fields at Val Marie, s. Sask. (H. W. M.).

ASTER YELLOWS (Callistephus virus 1) was found on a specimen from Winkler, Man. (W. C. McD.).

WINTER KILLING was moderate in plots at Saskatoon and slight at Snowden, Sask. (H. W. M.). One field was severely damaged in Queens Co., P. E. I. (R. R. H.).

POTASSIUM DEFICIENCY symptoms were slight and localized in 1 field at Lethbridge, Alta. (E. J. H.).

COMMON CLOVER

LEAF SPOT (Ascochyta meliloti). The fungus had conidia 15-20 x 5-6 μ. Damage to red clover was moderate at Routhierville, Que. (D. Leblond).

SOOTY BLOTCH (Cymadothea trifolii) occurred in moderate amounts on scattered plants in plots at Agassiz, B. C. Traces were found in 1 field of red and 1 of alsike clover near Rolling Hills, Alta. (E. J. Hawn). Traces were found in 10 fields in Queens Co., P. E. I. and damage was negligible (R. R. Hurst). Slight infection was noted in Ottawa Red and Dollard red clover at Heatherton and on roadside plants at Cornerbrook, Nfld. (O. A. Olsen).

POWDERY MILDEW (Erysiphe polygoni) was found in trace amounts on red clover in 2 fields near Rolling Hills, 1 irrigated field near Hays, and in plots at Lethbridge, Alta. One field of alsike near Rolling Hills had trace infection (E. J. H.). In n. and c. Alta. 17/25 red clover fields were affected as follows: 1-tr. 9-sl. 5-mod. 2-sev. (W. P. C.). In Sask. the damage was slight and concentrated in the northern area. Of 12 red clover fields surveyed 10 were diseased (H. W. Mead). Moderate infection was observed on red clover on roadsides in the Chateauguay district of Que. (R. Crete). Red clover and alsike plants in the greenhouse were severely attacked and the infected leaves dropped at Kentville, N. S. (C. O. Gourley). Only traces were found in all 10 red clover fields examined in Queens Co., P. E. I. (R. R. H.). In plots at Charlottetown a moderate infection caused slight damage to red clover (J. E. Campbell).

NORTHERN ANTHRACNOSE (Kabatiella caulivora) infection was 3-tr. 9-sl. 6-mod. 1-sev. /25 red clover fields in n. and c. Alta. (W. P. C.). A few red clover plants were affected in 2 fields near Nipawin, n-e. Sask. Ten other fields surveyed were clean (H. W. M.). The variety Ottawa Red had trace infection at Heatherton, Nfld. (O. A. O.).

LEAF SPOT (Pseudopeziza trifolii). A slight infection was noted in plots at Charlottetown, P. E. I. (J. E. C.).

LEAF SPOT (Stemphylium botryosum) infection was slight on red clover varieties Ottawa Red and Dollard in plots at Heatherton, Nfld. (O. A. O.).

LEAF SPOT (Stemphylium sarcinaeforme) damage was moderate and concentrated in n. -e. Sask. Ten/12 red clover fields were affected (H. W. M.). Slight infection was observed in red clover plots at Charlottetown, P. E. I. (J. E. C.).

RUST (Uromyces trifolii) infection was moderate in red clover plots at Charlottetown, P. E. I. (J. E. C.). One red clover field had moderate infection in May but damage was slight later in the season (R. R. H.).

CROWN ROT (low-temperature basidiomycete). One alsike field in central Alta. had moderate infection. Two others were clean. One red clover field near Edmonton had slight infection (J. B. Lebeau).

DECLINE AND PHYLLODY (? virus) was present in red and alsike clover but caused little damage. However, ladino clover was severely affected and this disease limits the usefulness of ladino at Ste. Anne de la Pocatiere, Que. (R. O. Lachance).

LEAF SPOT (cause not determined) slightly affected all 3 alsike fields examined in c. Alta. (J. B. L.).

WINTER INJURY. Ladino plots on well-drained, gravelly soil were completely destroyed at Ste. Anne de la Pocatiere, Que. (R. O. L.).

SWEET CLOVER

GRAY STEM CANKER (Ascochyta caulicola) was observed on plants on the roadside at Mossleigh, Alta. (E. J. Hawn). Damage was moderate in Sask. Ten/12 fields observed were diseased and most varieties and selections grown at Saskatoon were infected (H. W. Mead). Localized patches were severely infected in 1 field near Manitou. Only traces were found in other parts of Man. (W. C. McDonald).

SUMMER BLACK STEM (Cercospora davisii). Trace to moderate infections were widespread through Man. (W. C. McD.).

LEAF SPOT (Leptosphaeria pratensis (Stagonospora meliloti)) infection was slight in 1 field near Beaverlodge, Alta. (E. W. B. Ward).

ROOT ROT (Phytophthora cactorum) destroyed 75% of a 50-acre cover crop grown after corn near Cottam, Ont. (R. W. Walsh).

COMMON LEAF SPOT (Pseudopeziza medicaginis). In the late summer infection was slight near Saskatoon and Melfort. Six/12 fields surveyed in Sask. were diseased (H. W. M.). This disease was widespread in Man. in July. Moderate to severe infections were observed s. -w. of Winnipeg where damage was most severe (W. C. McD.).

BASAL STEM ROT (Sclerotinia sclerotiorum) damage was less than in previous years. Only traces were found in 2/12 fields examined in Sask. (H. W. M.).

ASTER YELLOWS (Callistephus virus 1). Plants from a field near Ochre River, Man. showed typical symptoms: proliferation of seed stalks, thin, leaf-like petals and profuse hairiness of peduncles. The floral parts were knotted in a ball which turned to dust when rubbed (Reference: Hilgardia, 16: p. 637. 1945) W. C. McD.). A few plants were affected at Morristown and Kentville, N. S. (C. O. Gourley).

MOSAIC (Bean virus 2) damaged a foundation seed plot of the variety Erector at Brandon, Man. Most plants were badly stunted and seed yields are expected to be much lower than in previous years (W. C. McD.).

LEAF MOTTLE (? virus). One plant at Saskatoon was severely damaged. Leaves became mottled brown, and dropped. New leaves formed. The plant was stunted but the stem was not distorted (H. W. M.).

B. OIL-SEED CROPS

FLAX

Flax Diseases in Saskatchewan in 1957

T. C. Vanterpool

The flax acreage in 1957 was 2,025,000 and yielded an average of 6.2 bu./ac.; about 2 bu. below the yearly average. Two factors were mainly responsible for this low yield: the drought and heat of midsummer, and the aster yellows epidemic.

Seedling Blight and Root Rot (Pellicularia praticola (Pat.) Flentje (Rhizoctonia solani) appears to be gaining in importance. Greatest damage was recorded in the south in an area from Moose Jaw to Indian Head. The Regina Experimental Farm reported a 30 to 35% reduction in stand of flax on fallow. The Indian Head Farm reported a 20% reduction. The blighting of flax on cereal stubble was noticeably less. The blighting of plants continued until the middle of July or later. The prolonged dry, warm weather relatively early in the season appears to have favored this disease. If the disease continues to cause damage several practices known to have slight inhibitory effects will have to be given attention.

Aster Yellows (Callistephus virus 1). The California strain is considered to be the primary cause, but the various symptom types which appeared towards the end of the season suggest that one or more other strains are also present. The disease was first noticed early, about the middle of July, lightly scattered throughout fields. Surveys in central areas during the first three weeks of August showed that the disease was generally light on the maturing early-sown fields west and southwest of Saskatoon, but in e. Sask. a few fields showed 25 to 30% infestations in the late-sown fields. The same disease picture was often repeated in individual fields; one field near Saskatoon showed 2% yellows in the normal early-maturing part but 26% on the late, greener growth from low areas. By the end of the third week in August the estimate was a 5% loss for the province. Another survey in central and eastern districts between three and four weeks later showed that yellows had increased about 50 to 75%, following the late August rains. Much of this additional yellows appeared on late growth of side branches. Most of the healthy part of this late growth did not mature before harvest, so that in the early-sown fields at least the late increase in the percentage of yellows caused only a slight further reduction in yield. In late-sown fields of Raja and Marine varieties particularly, the late increase of yellows reduced yield substantially. The eastern parkbelt losses ranged from 30 to 60% in late fields. For the province as a whole the loss would be somewhere between 10 and 15%, with the heaviest losses being sustained in the eastern parkbelt and

only traces to slight losses in the western third of the province. The total loss in flax yields from aster yellows was estimated to be 1 1/4 to 2 million bushels in Sask. In the first report to the P. D. S. (33:38) on flax yellows in Sask., it was referred to as a 'potentially serious disease'. The epidemic of 1957 has amply borne this out. The scarcity of the disease in 1956 suggests a low carry-over of virus inoculum in perennial weeds, and that the greater part of this year's inoculum was derived from swarms of viruliferous leafhoppers from further south.

There is some concern as to the extent yellows infection during the early stages of seed formation may affect the filling of the seed. The relatively large numbers of small undeveloped bolls and of papery sterile seeds suggest that the effect on seed filling by these late infections may be appreciable.

Blight (Alternaria linicola). Towards the end of the season a few fields showed a browning of the top third of many flax plants. Isolations made from the lower end of this stem zone usually yield Alternaria spp., including A. linicola. Effect on yield is considered of no significance this year, but the conditions provided inoculum which could infect the maturing seed.

Pasmo (Septoria linicola). Recorded as slight on a sample received from Saltcoats.

Selenophoma linicola. Collected in scattered 'traces' in the University plots at Saskatoon, on the dry pedicels and fine top branches where the pycnidia form. It is several years since it was last found.

Frost. Flax escaped damage from the frost of 22 May. Some late flax seed was damaged by fall frosts. Damaged seed was blackish green or dark blackish maroon. This seed was plump, but soft, when the frost occurred.

Chemical Injury. TCA herbicide was used as a spray to control wild millet or green foxtail (Setaria viridis (L.) Beauv.) w. and s. w. of Saskatoon. Several sprayed fields of flax showed severe tip and leaf yellowing and burning, but stem distortion was not as conspicuous as is often the case with 2,4-D.

Flax Diseases in Manitoba in 1957

W. E. Sackston and John W. Martens

The area sown to flax in Man. in 1957 was large, about 865,000 acres. Yield was disastrously low. Tentative estimates placed it at 5.2 bushels per acre, but provincial authorities believe it is closer to 4.0 bushels per acre.

Several factors were responsible for such low yields. The spring was late and wet, and seeding was delayed. There was serious flooding in some areas in s. Man. Drought affected yields adversely in the southwest. It was hot and dry in July, when the flax was in bloom and adverse weather conditions delayed harvesting in the fall.

Diseases also reduced flax yields. The most conspicuous and destructive disease in 1957 was aster yellows. Its severity was assessed by a survey of 60 flax fields at the end of July. Some indication of the relative importance of other diseases later in the season was obtained from inquiries.

Aster yellows (Callistephus virus 1). Only plants that showed typical flower or boll symptoms were considered to be infected with aster yellows. No distinction was made between infection of a few flowers or branches, and infection of the whole plant. As plants in many of the fields were stunted and failed to reach the flowering stage because of early infection by the virus, and were therefore not included in the infected class, the average figure for percentage infection was conservative. No field was seen free of the yellows disease. The following infection ratings were given: 11-1 to 5%, 27-6 to 15%, 14-16 to 25%, 5-26 to 35%, 3-45% /60 fields. The average infection rating for Man. was slightly over 15% and the yield loss due to aster yellows was estimated to be at least 15%. Observations indicate that plants infected fairly late, and showing relatively light symptoms, may produce less seed, and poorer quality seed, than healthy plants.

There was no definite pattern of distribution of heavy or light infection in various parts of the province. In areas with many fields of flax, late sown fields tended to be more heavily infected than earlier sown, and earlier maturing, fields. In areas with only isolated flax fields, infections seemed to be about as heavy in the earlier, more mature fields, as in the later, less mature stands. It is possible that the leafhopper vectors of the virus prefer the younger plants, but will feed on maturing flax in the absence of younger, succulent plants. Counts made in plots at Winnipeg and other locations showed no definite varietal differences in reaction to aster yellows infection.

Rust (Melampsora lini) was present in trace amounts, in 4 of the 60 fields examined, and affected about 10 to 15% of the leaf area in a fifth field. The practical disappearance of rust as a factor in flax production is directly attributable to the widespread use of resistant varieties.

Pasmo (Septoria linicola). Traces of pasmo infection were found in one field at the time of the survey. As it was still early in the season, stem lesions were scarce, but leaf infections were rated 2-5%, 1-10%, 1-15% /60 fields. Light stem infection was noted in a field examined in September. Heavy stem infections were seen in experimental plots at Morden, and were reported from fields in the Morden area late in the season.

Seedling Blight (Rhizoctonia solani, Pythium spp., Fusarium spp.). Seedling blight specimens were submitted, and the disease occurred in some experimental plots. Traces of seedling blight were found in three fields.

Wilt and Root Rot (Fusarium oxysporum f. lini) of adult plants was found in trace amounts in one field.

Heat Canker (physiologic) specimens were received from various districts during the hot weather in July. Traces of the disease were encountered in 4/60 fields surveyed.

Terminal Blight (physiologic). The terminal 1 to 2 inches of shoots were dead, brown, and bent over in a typical "shepherd's crook" on about 5% of the plants in 1 field, and about 25% in another field. The symptoms were not those of wilt or root rot. It is possible that the condition was induced by the excessive heat in July, which "cooked" tissues made succulent by the earlier excess of water.

Other Observations

ANTHRACNOSE (Colletotrichum linicola) infection was moderate on Wiera at St. Leon and Louiseville, Maskinonge area, Que. (D. Leblond).

WILT (Fusarium oxysporum f. lini) caused moderate damage at St. Leon, and Yamachiche, Que. (D. L.).

RUST (Melampsora lini). Only trace amounts were observed in 2/43 fields surveyed in s. Alta. (E. J. Hawn). Two fields s.-e. of Edmonton were both diseased: 1-tr. 1-sl. (W. P. Campbell).

BROWNING (Polyspora lini) occurred only in traces in 3/43 s. Alta. fields (E. J. H.).

SEEDLING BLIGHT (Rhizoctonia solani) affected 21/43 s. Alta. fields: 17-tr. 4-sl. (E. J. H.).

HEAT CANKER damaged 3/43 s. Alta. fields: 2-tr. 1-sl. (E. J. H.).

ASTER YELLOWS (Callistephus virus 1) occurred in trace amounts in 3/43 s. Alta. fields (E. J. H.). It was unusually widespread in Sask. (R. C. Russell). Slight damage was observed in Raja flax at C. E. Farm, Ottawa, Ont. (R. V. Clark).

RAPESEED

Rape Diseases in Saskatchewan in 1957

T. C. Vanterpool

The rape acreage for 1957 reached an all-time high of 535,000 acres with an average yield of 675 lb. per acre, about 25 lb. less than the yearly average. Diseases were less prevalent than in 1956 and, except in rare instances, did not affect yield appreciably. This favorable disease situation is attributed to the arresting influence of the dry, hot weather of midsummer. A build-up in some of the diseases occurred late in the season after the above-normal August rains, but did not cause significant damage.

Downy Mildew (Peronospora parasitica) was not as prevalent as in 1956, though widely distributed. Of 38 fields surveyed during the third week of August, downy mildew was found in 11 at tr. to 3% and 1 at 30%. The affected fields were mainly in the Spalding, Shellbrook and Prince Albert areas where rape has been grown for a long time and where there are large acreage concentrations. No seedling infections developed on plants grown from naturally or artificially infested seed, nor was any mildew observed on the inflorescences. This suggests that under natural conditions infection arises mainly from oospores in refuse from a previous crop.

White Rust (Albugo candida) A trace was seen in plots. It was found in 1 field associated with downy mildew, but is rarely severe on cruciferous crops on the prairies.

Leaf, Stem and Pod Spot (Alternaria spp.). A few late fields showed slight infections which were mostly superficial. Isolations from 1956 seed of rape and Brassica kaber var. pinnatifida yielded Alternaria brassicae and other pathogenic species of Alternaria as well as non-pathogens of the A. tenuis type.

Seedling Blight (Rhizoctonia solani). Traces were found in 2/6 fields surveyed near Saskatoon. The few specimens were stunted and sickly and were affected with the "wire-stem" phase of the disease. R. solani was isolated. Since R. solani damage was negligible on rape in a season when it was unusually severe on flax and potatoes, it does not appear that the disease on rape is of any concern at present.

Aster Yellows (Callistephus virus 1). During the August survey 27/39 affected fields were found. The disease was conspicuous in only 5 fields with infections ranging from 2 to 10%. Late growth following the August rains showed a high percentage of infection, but this was too late to affect the yield. The higher percentage of yellows on flax than on rape can probably

be explained by the greater host-preference for flax by the leafhopper vectors and also by the earlier seeding and earlier maturity of the rape.

Stem Rot (Sclerotinia sclerotiorum) occurred as traces only in two northern fields. It was virtually absent in the August survey.

Phoma lingam. This fungus has been isolated from several seed samples. It proved highly pathogenic on rape seedlings. Plants affected with P. lingam have not been collected in the field, but a careful watch should be kept for the presence of this parasite.

Rhizopus Seed and Pre-emergence Rot. Strains of Rhizopus (?) stolonifer were isolated from two samples of rape seed and one of Brassica juncea. All strains proved to be highly pathogenic to germinating rape seed when compared with well-known pathogens such as Rhizoctonia solani, Pythium ultimum, and Phoma lingam. R. stolonifer is a potential cause of the reduction in germination of rape seed.

Olpidium brassicae (Woron.) Dang. sporangia and resting spores were found in the roots of young plants grown in Regina Clay soil in the greenhouse.

Frost. Several early-sown rape fields especially in central Sask. were reported damaged by frost on 22 May. In fields examined near Saskatoon no more than 1 or 2 % of the seedlings were killed outright; the cotyledons on another few % were badly damaged and most of the remainder showed slight damage. The recovery was unexpected. It appeared that once the foliage leaves had begun to show, growth would usually continue even though the cotyledons were completely killed by the frost. Several fields 50 miles southwest of Saskatoon where there was about 10 degrees of frost, had to be resown.

Phosphorus Deficiency. Young plants in large areas in a field near Saskatoon were stunted with the lower leaves showing yellowish red, the next a purplish red, and the upper leaves a purplish green discoloration. In affected areas the soil was light-coloured and shallow. These symptoms suggest phosphorus deficiency.

Other Observations

BLACK SPOT (Alternaria brassicae) occurred in plots at Winnipeg, Man. but only late in the growing season (W. C. McDonald).

ROOT ROT (Fusarium sp. and Rhizoctonia solani) was found affecting a few plants in a field at Turin, Alta. The two fungi were isolated from diseased specimens (F. R. Harper).

ASTER YELLOWS (Callistephus virus 1). A trace occurred at Morden, Man. at the end of July. Later the disease became severe there and elsewhere in Man. (W. E. Sackston).

BLACK ROT (Xanthomonas campestris) was found on winter rape in plots at Winnipeg, Man. (W. C. McD.).

SAFFLOWER

ROOT ROT. Fusarium sp. and Pythium sp. were isolated from lesions on seedlings grown in the field at Lethbridge, Alta. (F. R. Harper).

SOYBEAN

Diseases of Soybeans in Ontario in 1957

A. A. Hildebrand

Again in 1957, as in 1956, a discussion of the diseases occurring on soybeans in s.-w. Ont., necessitates a consideration of the weather that prevailed in the area especially during the first half of the growing season. In the accompanying table a comparison is made between the average precipitation for April, May, June, July, and Aug., 1956 and 1957, and that for the same months during the 38-year period, 1917-1955.

Table 7. Average Monthly Precipitation (in.)

Period	Apr.	May	June	3-month period	July	Aug.	5-month total
1957	6.09	2.24	3.76	12.09	7.74	3.25	23.08
1956	3.30	4.54	4.13	11.97	1.74	5.67	19.38
1917-1955	2.65	2.40	2.95	8.00	2.10	2.30	12.40

From Table 7 it may be noted that in April, May, and June, of both 1956 and 1957, about 12 inches of rain fell in the Harrow area. Precipitation was equally high in most parts of Essex County. As a result much of the soybean acreage was subjected to water-logging and flooding for varying periods of time during the earlier part of the growing season. In 1957, July was an extremely wet month. On the 7th and 8th, 4.18 in. of rain fell, and from the 7th until the 12th the precipitation totalled 6.35 in. This meant further flooding, with plants standing in water in many fields for as long as three or four days. The condition described prevailed also on Pelee Island and in parts of Kent, Huron, Middlesex and Elgin counties.

Phytophthora Root and Stalk Rot (Phytophthora sp.). This disease was more widely prevalent this year than in any since 1954 when it was first observed. Whereas in 1956 the disease had greatly subsided by Aug. 1st,

this year it was indicated by survey on 13 Aug., to be still serious in many fields. The reasons for this are at least two-fold. In the first place an appreciably higher acreage of the extremely susceptible variety Harosoy was grown in 1957 (189,000 ac.) than in 1956 (173,700 ac.). In the second place the water-logging of the soil and the flooding of the fields, following the unusually heavy rains in the second week of July, must have been especially favourable for a phycomycetous pathogen.

Several observations not previously recorded were made on the Phytophthora disease this year. One of these was that the new variety Chippewa is susceptible to the disease. Plants of that variety growing in low spots were attacked and killed but the disease did not seem to spread so widely from such loci of infection as in corresponding situations in which the variety Harosoy was involved. It was also observed in a number of instances that when Harosoy and Harman happened to be growing contiguously in fields that had been flooded, the incidence of the disease was definitely lower in Harman than in Harosoy. A number of growers were so impressed by this apparent greater tolerance of Harman to "water damage" that next year they are going to grow only that variety. A third observation was that plants can be debilitated by the disease. In some areas in a number of fields that had been flooded by the early July rains, plants lacked vigor. They showed no other external symptoms of disease but were found upon removal from the soil to have depleted and necrotic roots. Also when the epidermal tissues were peeled from the stalk just above the ground level, the exposed cortical tissues showed streaks of brownish discoloration. From this discolored tissue and from lesioned roots, Phytophthora sp. was readily isolated.

It is difficult to estimate the loss in yield resulting from this disease. It becomes apparent from the surveys however, that the disease must in the aggregate be modifying yield appreciably. On Aug. 10th and 13th, 43 fields of soybeans were surveyed in some detail. Thirty of them lay across the southern part of Essex county, the other 13 being located on Pelee Island. Selected at random, the fields were composed according to variety as follows: Harosoy 36 (83.7%), Harman 4 (9.3%), Lincoln 2 (4.6%), and Hawkeye 1 (2.3%). In 21 (58.3%) of the 36 Harosoy fields the presence of the disease was evidenced by the dying of plants or by their debilitated condition. In 5 (23.8%) of the 21 affected fields, the disease was serious. In four of these seriously affected fields most of the killing was in patches, some of the devastated areas being up to one or two acres in extent. In these fields it was impossible to make counts but it was estimated that loss of yield might reach 25%. In the fifth seriously affected field, the disease occurred uniformly, and it was possible to make accurate counts of diseased and healthy plants at various locations in the stand. Dead plants averaged 18%. Enquiry disclosed that the yield for this field averaged close to 30 bu. per ac. It seems reasonable to assume that if the stand had not been depleted, the yield would have been increased by about 18% to 35.4 bu. per ac.

Calls from growers who were concerned about the presence of the disease in their fields continued from Jul. 4th until Sept. 9th. During the same period many diseased specimens were received at the laboratory for diagnosis.

Brown Stem Rot (Cephalosporium gregatum). As the 1957 season advanced this disease was observed in an increasing number of fields regardless of variety. The disease causes plants to become prematurely mature, and because of its widespread occurrence it must be a factor contributing appreciably to loss of yield.

Manganese Deficiency. This deficiency, more correctly a non-availability, of manganese was as prevalent as usual, and along with the Phytophthora disease and Brown Stem Rot, is believed to be of significance economically in modifying the yield potential of the soybean, especially in Essex county.

Minor Diseases encountered incidentally this year included: Stem Canker (Diaporthe phaseolorum var. caulivora); Brown Spot (Septoria glycines); Soybean Mosaic (Soja virus 1) and Bud Blight (virus of tobacco ring-spot group;)a bacterial leaf spot either Blight or Pustule); Root and Stem Rot (Pythium ultimum).

Of academic interest was the discovery this year for the second time of Charcoal Rot (Macrophomina phaseoli (Maubl.) Ashby) on soybeans in Ontario. The minute sclerotia of the fungus were found sub-epidermally in the lower stalk region of several unthrifty plants in one field on 9 Aug. For an account of the discovery of this disease see "Some studies on Macrophomina phaseoli (Maubl.) Ashby in Ontario", Hildebrand et al, Sci. Agr. 25:690-706. 1945.

Other Observations

BROWN STEM (? Cephalosporium sp.). The interveinal necrosis on leaves resembled frost damage but there was no internal necrosis of the stem (W. E. Sackston).

BACTERIAL BLIGHT (Pseudomonas glycinea) infection was light but uniform in 1 field at Portage la Prairie, Man. (W. A. F. Hagborg).

YELLOW MOSAIC (virus) was present in trace amounts in plots at Fort Garry, Man. (W. E. S.). Soybean varieties grown at C. E. Farm, Ottawa, Ont. were free of leaf spots but some plants had a rugose disorder of the upper leaves (R. J. Baylis).

BUD BLIGHT (? virus). Trace amounts were observed in plots at Fort Garry, Man. (W. E. S.).

SUNFLOWER

Sunflower diseases in Manitoba in 1957

W. E. Sackston

Estimates of sunflower acreage in Man. in 1957 varied from 18,000 to 28,000 acres grown for oilseed, and about 7,000 to 8,000 acres of large-seeded varieties, mostly Mennonite, grown for the confectionery trade. The hot dry weather of July and part of August induced rapid growth. Yields for the province averaged about 500 lbs. seed per acre.

Observations on diseases were made in 46 fields in the central and outlying sunflower areas September 8 to 12. Mr. John Hildebrand, of Cooperative Vegetable Oils, Altona, Man., assisted for two days during the survey.

Aster yellows was the most conspicuous and apparently the most destructive disease on sunflowers in 1957. It was found in more fields than was rust, which is usually the most widespread sunflower disease in Man. Although it attacked celery and other crops not susceptible to the eastern strain, it did not attack zinnias, which are susceptible to the California strain.

Aster yellows (Callistephus virus 1), possibly a variant of the California strain). Symptoms of aster yellows were found in 38/46 sunflower fields examined. There were traces in 12 fields, 1 to 5% in 11, about 10% in 8, 15% in 5, 25 to 0% in 2. Beacon was apparently more susceptible than Advance, and Advance was more susceptible than Mennonite. The disease was found in both the central and outlying areas. Differences in severity of infection on Advance and Beacon, in fields sown on different dates, were conspicuous southeast of Carberry. More aster yellows was found in fields of Beacon than in Advance, sown on the same date. Aster yellows infection was higher in a field of Beacon sown 7 May than in a field sown 1 May. Striking differences in varietal reaction were observed in plots at Winnipeg and Morden. Some selections were apparently free of the disease, although other selections in adjacent rows were severely attacked.

Rust (Puccinia helianthi). 1957 was not a "rust year", possibly because of the hot dry weather in July. Rust developed fairly well in inoculated plots at Winnipeg and Morden, but infections did not compare with those obtained in other years. Rust was found in 30 of the fields examined. There were traces of infection in 16 fields, 2 to 5% in 8, 10% in 2, 15% in 2, and 25% in 2 fields. Rust was absent or scarce in fields of Beacon.

Leaf Mottle (Verticillium albo-atrum) was extremely destructive on sunflowers in a nursery on heavily infested soil southwest of Winkler. It was not particularly conspicuous in farm plantings, although it was found in 28 fields. There were traces of the disease in 13 fields, 1 to 5% in 5, 10% in 3, 20% in 2, 50% in 1, and 90 to 95% in 4. The disease was not observed outside the main sunflower area. The heaviest infections were found in the Morden-Winkler area. Infection may have occurred late in the season in some fields; although symptoms were present on a high proportion of the plants, they were not particularly severe.

Stalk Rot (Various causes). Marked discoloration of sunflower stems was noted in 21 fields. Traces of the condition were found in 16 fields, 3 to 5% of the plants were affected in 3 fields, and 10% in 2 fields. In both fields with 10% of the plants attacked, and in some of the other fields, the stems of affected plants were black, the heads were small and flaccid, and the seeds were light. The internal tissues of the stem were green to black, and soft. The roots were black, small, and rotted. This "black jelly rot", described in 1951, but seen earlier, may be the final stage of a root rot. It is often associated with Verticillium leaf mottle. Similar symptoms were observed on sowthistle in one field.

Wilt and Root Rot (Sclerotinia sclerotiorum). Traces of wilt and root rot were found in 15 fields, 1 to 2% in 3 fields, and 10% in 1 field. Although Sclerotinia wilt was relatively light in farm fields, the disease developed very rapidly in plots at Winnipeg inoculated in August.

Downy Mildew (Plasmopara halstedii). Very little downy mildew was observed in 1957. There were traces of the disease in 3 fields, and 3% of the plants were attacked in 1 field. The disease was not seen in the outlying sunflower fields. Infections were very heavy in some of the plots at Morden.

Miscellaneous. Head Rot (Sclerotinia sclerotiorum) affected a few plants in 22 fields. Head drop was observed in 8 fields. Powdery mildew (Erysiphe cichoracearum) was present in plots at Portage la Prairie. Leaf spots of various sizes and shapes were present in most fields. Hail completely defoliated plants in several fields near Brandon.

Other Observations

BASAL STEM ROT (Sclerotinia sclerotiorum) was slight to moderate in Saskatoon plots. However, it was rarely found in rape, sweet clover and alfalfa during field surveys in Sask. (T. C. Vanterpool).

C. ROOT CROPS

SUGAR BEET

DAMPING OFF (Rhizoctonia solani). Seedlings had been killed and a large bare patch was left in a field at Fort Garry, Man. Some surviving, but poorly developed plants were used for isolations. Mycelium and sclerotia of R. solani were obtained from surface sterilized roots. As this patch was the only one of its type known to be present in Man. it was recommended that brome grass be seeded and left for several years (W. A. F. Hagborg). Moderate damage occurred in 1 field at St. Thomas d'Aquin. Several nearby fields were slightly affected. Slight infection was noted at St. Hyacinthe and St. Hilaire, Que. (R. Crete).

BLACK ROOT (various fungi) affected 54% of seedlings from 42 Alta. field samples. Ten % of the seedlings were severely lesioned or dead. Rhizoctonia solani was found in 31% of the fields, Pythium sp. in 45%, Phoma betae in 52% and Aphanomyces cochlicides in 5% (F. R. Harper).

BLACK HEART (Boron deficiency). One sample was received from Glengarry Co., Ont. (H. N. Racicot).

MANGEL

BLACK HEART (Boron deficiency). One sample was received from Glengarry Co., Ont. (H. N. Racicot). A 3/4-acre field of Frontenac had a few affected plants in Queens Co., P. E. I. (R. R. Hurst).

D. MISCELLANEOUS CROPS

BUCKWHEAT

ASTER YELLOWS (Callistephus virus 1) affected 5% of a crop at Winkler, Man. Damage became more severe later in the season (W. E. Sackston).

CANADA THISTLE

BASAL STEM ROT (Sclerotinia sclerotiorum) produced several sickly, stunted plants in a field at Saskatoon, Sask. Sclerotia were present within the base of the stem. It emphasizes the importance of weed control for crops like rape, sweet clover and sunflower (see above) (T. C. Vanterpool).

FIELD CORN

ROOT AND STALK ROT (Gibberella zeae). In October, 1957, a survey was made in the corn belt of s. Ont. to determine the extent of root

and stalk rot of hybrid field corn. Widely separated fields were surveyed in the following counties: Essex (6 fields), Kent (5 fields), Lambton (2 fields), Middlesex (3 fields), Elgin (3 fields). Root and stalk rot was present in all fields examined and ranged from 1 to 20%. The average for all counties was 5.5%. The disease was more common in Kent and Essex than in the other counties, especially Lambton, where the corn was later. Damage was sev. in a few fields in the Harrow district of Essex Co. but only sl. in other counties. Gibberella zeae was isolated consistently from the stalks of diseased plants from all five counties (N. J. Whitney).

MUSTARD

WHITE RUST (Albugo candida) damaged one stand slightly at Taber, Alta. (F.R. Harper). It affected 10/18 s. Alta. fields surveyed: 9-tr. 1-mod. (E. J. H.).

ROOT ROT (Rhizoctonia solani). Trace amounts were found in 13/18 s. Alta. fields (E. J. H.).

ASTER YELLOWS (Callistephus virus 1). A trace infection was found at Enterprise, Man. (W. E. Sackston).

PEPPERMINT

RUST (Puccinia menthae) caused heavy defoliation of all plants in a row at Kentville, N.S. in the middle of Aug. (K. A. Harrison).

TOBACCO

Tobacco Diseases

Z. A. Patrick and L. W. Koch

Seedbed Diseases

Blue Mold or Downy Mildew (Peronospora tabacina) was not observed in Ont. or Que. Growers are advised to continue the recommended program for blue mold control (P. D. S. 34: 95. 1954).

Damping-off or Bed Rot (Pythium spp. and Rhizoctonia solani) was the most common disorder in seedbeds. It occurred in a few small patches in the beds and did not cause much damage.

Yellow Patch (excessive nutrients) was the next most common seedbed trouble, especially in the burley tobacco area. This condition arises in most instances as a result of over-fertilization or from seeding too soon after steaming the soil.

Chemical Injury. There were a few cases of 2,4-D injury from the use of improperly cleaned sprayers or drift from weed control operations. Creosote toxicity were noted in a few new greenhouses where this wood preservative had been used.

Field Diseases

Leaf Spot (physiologic). Tobacco leafspot, mainly of the non-parasitic type, was the most common and most serious disorder of tobacco in Ontario in 1957; the loss is estimated to be 5,000,000 lbs. The disease appears to be caused by the interaction of certain nutritional and environmental factors. The exact causal factors are unknown.

Brown Root Rot is another disease which has increased in the last 5 years. The disease occurs in all the tobacco growing areas and at present is next in importance to leafspot. It is most severe on light sandy soils following a rye rotation where large populations of the root-lesion nematodes, Pratylenchus spp., are found. The diseases of tobacco listed below, although they occur each year, do not usually cause extensive damage. The damage from these diseases is, in most instances, confined to a few plants in the field.

Blue Mold (Peronospora tabacina) was not observed in Ont. and Que. fields.

Black Root Rot (Thielaviopsis basicola) was noted in a few fields. The tobacco varieties used in Canada are moderately resistant and damage is confined to low lying parts of the field or poorly drained fields.

Frenching (? soil toxins) was confined to fields where the soil type is unfavorable for growing tobacco. Symptoms usually appear in the upper leaves of the plant. The loss amounts up to 30% in affected areas.

Soft Rot (Pythium spp.) and Sore Shin (Rhizoctonia spp.). These diseases were confined mainly to transplants. Affected plants show brown or black discolored areas occurring on one side or entirely girdling the stem near the ground. Often only superficial tissues are involved and the plants recover under favorable growing conditions.

Angular Leaf-Spot and Wildfire (Pseudomonas angulata and P. tabaci) caused considerable damage to 2 fields in which up to 50% of the plants were diseased. In the other areas they were found on only a few plants.

Brown Spot (Alternaria longipes) caused sl.-mod. damage to flue cured tobacco. The lesions are large, circular and frequently marked by concentric rings.

Frogeye (Cercospora nicotinae) attacks maturing leaves. The lesions are small, one-fourth inch or less in diameter. The centers of the lesions become parchmentlike with a scattering of minute, black dots. Damage was sl. -mod.

Hollow Stalk (Erwinia carotovora and E. atroseptica). A few cases of "stalk soft rot", where the bacteria break down the parenchyma tissue of the stem, or "hollow stalk" where the pith of the stalk is broken down were noted. The disease is the result of topping damage and the use of suckering oils.

Mosaic (Tobacco mosaic virus). Injury from TMV was widespread throughout the burley and flue-cured tobacco growing areas of Ont. and Que. Only a few plants in each field were affected and the damage was not serious.

Etch (Tobacco etch virus) damage was sev. only on burley tobacco in the Leamington-Harrow areas where most of the fields were up to 60% affected. Some etch was also noted on flue-cured tobacco in this area but the symptoms on the flue-cured varieties were very mild.

Other Virus Diseases were present throughout the tobacco growing areas of Ont. and Que. Only a few affected plants were found in each field, and the losses were negligible. The ring spot virus, streak virus, vein banding virus and several of the cucumber mosaic viruses and the potato viruses were observed.

E. CULTIVATED AND OTHER GRASSES

AGROPYRON

Brittle Dwarf (? virus) damage was moderate to severe at Saskatoon, Sask. A. intermedium plants at plot margins were distinctly stunted and brittle (H. W. Mead).

White Heads (cause undetermined). A. cristatum plants produced white heads that did not set seed. This condition has been seen for several seasons (H. W. M.).

Purple Spot (cause undetermined) was observed on A. smithii at Lethbridge, Alta. (E. J. Hawn).

BROMUS

Ergot (Claviceps purpurea) caused slight damage in 9/18 Sask. fields; less than in 1956 (H. W. M.).

Leaf Blotch (Helminthosporium bromi) caused slight damage at Creston, B. C. (E. J. H.). In Sask. 6/18 fields were found to have slight infections. In experimental plots at Saskatoon different clonal lines differed in disease severity (H. W. M.). Brome grass on wooded headlands near oat plots at Kemptville, Ont. had severe infection. The perfect state Pyrenophora bromi was also present (R. V. Clark).

Leaf Spot (Selenophoma bromigena) was regularly found causing sl. damage on roadsides in s. Alta. Sl.-mod. damage was observed in 2 fields near Strathmore, and tr. infection occurred near Milk River (E. J. H.). Although Selenophoma leaf spot was evident at Lethbridge, H. bromi was the more serious parasite in the Edmonton district (R. A. Shoemaker). Selenophoma caused sl-mod. damage in 12/18 fields observed in Sask. It also occurred on brome growing on roadsides, and in plots at Saskatoon and Melfort. Some clonal lines had some resistance (H. W. M.).

Scald (Rhynchosporium secalis) caused slight damage to a few clonal lines at Saskatoon, Sask. (H. W. M.).

Bacterial blight (Pseudomonas coronafaciens) caused sl. damage to several clonal lines at Saskatoon. Bacteria oozed readily from the lesions when mounted in water (H. W. M.).

DACTYLIS GLOMERATA

Powdery Mildew (Erysiphe graminis) caused damage ranging from slight to severe at Lethbridge, Alta. (E. J. H.).

Purple Leaf Spot (Mastigosporium rubricosum) was found at Agassiz, B. C. Damage was slight. The pathogen was isolated and identified in culture (E. J. H.).

Brown Stripe (Scolecotrichum graminis) caused sl.-mod. damage to spaced plantings at Agassiz, B. C., and sl. damage at Lethbridge, Alta. (E. J. H.). In Nfld. in plots at St. John's 70-80% of leaves were affected and 50% of the leaves were killed. In plots near Cormac 90-100% of leaves were attacked and 60% were killed. In a field near Heatherton 20% of leaves were affected and damage was slight (O. A. Olsen).

ELYMUS CONDENSATUS

Ergot (Claviceps purpurea) was widespread around Kamloops, B. C. It affected at least 1 or 2 spikes of each plant (G. E. Woolliams).

FESTUCA

Snow mold (low-temperature basidiomycete). Trace infection was noted in 1 field examined at Edmonton, Alta. (J. B. Lebeau).

HORDEUM JUBATUM

Stripe Rust (Puccinia glumarum) was observed on a few plants at various points at Lethbridge in mid-June (W. C. Broadfoot).

LOLIUM PERENNE

Scald (Rhynchosporium secalis) was found on a specimen received from Saanichton, B. C. (E. J. H.).

PHLEUM PRATENSE

Eye Spot (Heterosporium phlei) occurred in trace amounts on Climax timothy at C. E. F., Ottawa, Ont. (R. J. Baylis). Heavy infection occurred on

80% of leaves in all 6 fields examined in Avalon Peninsula of Nfld. However, the damage to the leaves did not appear to extend beyond the limit of the small lesions (O. A. O.).

Brown Streak (Scolecotrichum graminis). Sl. infection was found on a few leaves of a crop grown on reclaimed bogland near Cabinet, Nfld. (O. A. O.).

Leaf Spot (Helminthosporium sp.) caused slight damage to plots at St. John's Nfld. (O. A. O.). Five species are known from timothy: H. giganteum, H. sorokinianum, H. triseptatum, H. victoriae and H. dictyoides var. phlei but only the first two mentioned cause leaf spots (R. A. Shoemaker).

POA PRATENSIS

Powdery Mildew (Erysiphe graminis) infection was sl. in plots at Lethbridge, Alta. (E. J. H.).

Melting-Out (Helminthosporium sp.) caused sev. damage to 1 field near Edmonton. Two other fields examined were not affected (J. B. L.).

Leaf Rust (Puccinia poae-nemoralis) caused sl. damage in plots at Lethbridge (E. J. H.).

Snow mold (low-temperature basidiomycete) ratings were: 1-mod. 1-sev./3 fields near Calgary (J. B. L.). Moderate to severe damage was done to lawns and a football field at U. of Sask., Saskatoon (H. W. M.).

TURF

Pink Patch (Corticium fusiforme). Lawns at Saanichton were damaged slightly. The pathogen was isolated from diseased specimens (R. Turley, E. J. H.).

Brown Patch (Rhizoctonia solani) damage was mod. in some lawns at Lethbridge, Alta. (E. J. H.).

Snow Mold (low-temperature basidiomycete). Lawns and golf greens at Lethbridge had small patches damaged by this disease (E. J. H.).

Discolored leaves of lawn grasses in Que. frequently were infected by a fungus tentatively identified as Vermicularia herbarum (D. Leblond).

III. DISEASES OF VEGETABLES AND FIELD CROPS

ASPARAGUS

RUST (Puccinia asparagi) was general throughout the Armstrong district of B. C. It affected practically all the plants in most commercial fields (G. E. Woolliams).

DIE BACK (cause undetermined) was seen on occasional plants in Queen's Co., P. E. I. Affected plants were sev. damaged (R. R. Hurst).

BEAN

Diseases of White Beans in Ontario in 1957

R. N. Wensley

Root rot of white beans was not prevalent in western Ontario in 1957. Moreover, where found, the disease was mild and was not a serious deterrent to plant development. An immature crop of the Slender Green variety of snap beans at Harrow developed sev. root rot caused by Fusarium and Pythium species in October under the prevailing wet conditions.

Bacterial blight was prevalent on the foliage but did not attack pods to any extent. Crop development was not affected.

Anthracnose was prevalent in Huron and Elgin counties and in part of Middlesex Co. Yield and seed quality of susceptible varieties were reduced. The variety Sanilac was the least affected by anthracnose.

The seed quality of late maturing and unharvested crops of white beans was reduced by a prolonged period of wet weather. The earlier varieties, such as Sanilac, escaped weather injury and proved profitable in many areas.

Other Observations

GRAY MOLD (Botrytis cinerea) was present on pole beans throughout the Lower Fraser Valley of B. C. following cool, wet weather at the end of June. There was some pod loss (H. N. W. Toms). There was a mod. infection on leaves and pods of Brittle Wax at Ste. Foy, Que. (D. Leblond). Gray mold was tr. on Lapin and Soldier at Millville, N. B. (S. R. Colpitts). A light infection occurred in a field at Berwick, N. S. The disease was less in 1957 than usual (K. A. Harrison).

ANTHRACNOSE (Colletotrichum lindemuthianum) was sev. in plots at St. Jean, Que. (R. Crete). It was sev. at St. Petronille and sl. at St. Michel, Que. on snap beans (L. J. Coulombe). In test plots at Fredericton and Millville, N. B. anthracnose was 100% on Charlottetown #80; 50% on Soldier; and tr. on Lapin (S. R. C.). Mod. -sev. infections on snap beans at Miscouche, P. E. I. caused mod. damage. Leaf, petiole, stem and pod lesions were evident (J. E. Campbell). Anthracnose was sev. in a few gardens in Kings Co., N. S. There were no reports of losses in commercial fields (K. A. H.).

HALO BLIGHT (Pseudomonas phaseolicola) was scattered through a field of beans grown for seed at Grand Forks, B. C. About 5% of the plants were affected (G. E. Woolliams). Little halo blight was seen in commercial plantings in N. S. but it was sev. in plots at Kentville where local seed was sown. Kenearly was 100% infected (K. A. H.).

SCLEROTINIA ROT (S. sclerotiorum) affected 20% of the pods of a snap variety at Canning, N. S. (J. F. Hockey).

RUST (Uromyces appendiculatus). Following a heavy infection in 1956 and with favorable damp, cool weather at the end of June, rust was again heavy on foliage in the Lower Fraser Valley, B. C. Damage was not assessed (H. N. W. T.). It was widely distributed throughout this area (W. R. Foster). Rust was tr. on Charlottetown #80 in test plots at Fredericton, N. B. (S. R. C.).

COMMON BLIGHT (Xanthomonas phaseoli). A sev. attack of blight was present on 16 Aug. in one group of navy bean plots at Portage la Prairie, Man. following a heavy rainfall accompanied by high winds. No infection was found in another group of plots several hundred yards from the first and said to have been sown with seed from the same source but at a later date. The circumstances suggest that the initial infection in the diseased plots was not seed-borne, but possibly had been introduced on a carrier agent earlier in the season and had spread rapidly during the period of hydrosis caused by the rain storm (W. A. F. Hagborg). A 10% infection at St. Laurent, Que. caused sl. damage (L. J. C.). The varieties Charlottetown #80 and Soldier in test plots at Fredericton, N. B. were 100% infected (S. R. C.).

MOSAIC (virus). Many late maturing fields of snap beans grown in the Harrow district for canning factories showed almost 100% infection with mosaic (C. D. McKeen). Mosaic was present in snap beans in many gardens in Kings Co., N. S. A plot of pole beans growing near gladiolus was 20% infected (K. A. H.).

BEET

LEAF SPOT (Cercospora beticola). Beets grown on the same 5-acre field at Ridgetown, Ont., for the third consecutive year were sev. defoliated by leaf spot. All plants were infected. A reduction in yield of at least 50% was estimated (R. W. Walsh). At Sherrington, Que. about 20% of a 15-acre field was affected, causing the death of older leaves. Mod. infections occurred in several home gardens at Hemmingford (R. Crete).

SCAB (Streptomyces scabies) was mod.-sev. in 6 small gardens in the Manuel's-Killigrews area of Nfld. Sl. infections were noted in 4 small plots at Clarke's Beach and in 2 at Harbour Main (G. C. Morgan).

BLACK ROOT (pathogen undetermined). A 4-acre field at Tilbury and another at Erieau, Ont. were rejected for processing because of the high incidence of black root. Over 50% of the roots at Erieau were infected. Flood conditions earlier in the season are believed responsible for the outbreaks (R. W. W.).

NEMATODES (Paratylenchus sp.) Two areas of poor growth, each about 50 ft. in diam. were observed in a 5-acre field at Ridgetown, Ont. An examination of the soil in the affected areas showed high populations of Paratylenchus sp. (R. W. W.).

BORON DEFICIENCY. A crop grown in the Montreal district was rejected at the canning factory due to internal black spotting caused by this disease. The incidence of internal symptoms was high (R. O. Lachance). A late planting of Detroit Dark Red at New Canaan N. S. destined for canning was badly deformed and blackened in the outer ring of flesh. The field was too severely affected to be harvested (K. A. Harrison).

BROAD BEAN

CROWN AND STEM ROT (Fusarium sp.). Several plants were affected in a garden in Queen's Co., P. E. I. (R. R. Hurst).

BLACKENING (physiologic). Stems, leaves and pods were affected at Ste. Foy, Que. Symptoms first appeared at the end of June and became progressively worse as the season progressed. No control was obtained with fungicide applications. Alternaria, Botrytis, Fusarium, Phytophthora and Verticillium spp. developed on pods in moist chambers (D. Leblond).

CABBAGE

LEAF SPOT (Alternaria sp.) was tr. on an unnamed variety in Queen's Co., P. E. I. (R. R. Hurst).

GRAY MOLD ROT (Botrytis cinerea) affected 1-2% of the heads of Golden Acre in a field at Upper Gullies, Nfld. It caused a moist, blackish rot of the outer leaves on the tops and sides of heads (O. A. Olsen), stored cabbage in cellars at Harbour Grace and Carbonear and in a warehouse at St. John's were sev. affected (G. C. Morgan).

YELLOWS (Fusarium oxysporum f. conglutinans). Sl. infections were seen in mid-July at Ste. Foy, Que. Cauliflower and Brussels sprouts were also affected (D. Leblond).

DOWNY MILDEW (Peronospora brassicae) was tr. on Golden Acre at Saanichton, B. C. (W. R. Orchard).

CLUB ROOT (Plasmodiophora brassicae). A few reports of club root were received from growers in the Lower Fraser Valley and in the Vancouver area, B. C. No heavy attacks were reported (H. N. W. Toms). Several fields in Kings Co., N. S. had sl. infections (K. A. Harrison). It was present in all areas of Nfld. (O. A. Olsen), it was sl. -mod. in 2 fields at O'Regans, 3 at Searston and 4 in the Robinson's-Cartyville area, all on the west coast. A sev. infection was seen in 2 fields at Codroy. It was sev. in 8 fields at Conception Bay and in 6 at Bonavista Bay, and sl. -mod. in many fields at Trinity Bay (G. C. Morgan).

BLACK ROT (Xanthomonas campestris) was present in many fields in the Burlington-Toronto area. Sev. loss was occasioned in one 3-acre field where rotation had not been practiced (E. F. Muir).

DAMPING OFF (pathogens undetermined) was quite general in the Burlington-Toronto area and sev. in 3 or 4 cases where the seedbeds had not been sterilized (E. F. M.).

BLACK LEAF SPECK (non-parasitic) was seen on cabbage received from a local market in Quebec City, Que. (D. L.).

CARROT

LEAF SPOT (Cercospora carotae). A 1-acre field of Gold Spike carrots at Grafton, N. S., was so sev. affected that the roots were only half-size when they had to be lifted. A number of growers report that growth of carrots has been poor because of this leaf spot. The disease is increasing in severity in N. S. (K. A. Harrison).

SCLEROTINIA ROT (S. sclerotiorum). Specimens were received from Les Ecureuils, Portneuf Co., Que. (D. Leblond).

BACTERIAL BLIGHT (Xanthomonas carotae) occurred on 1% of the plants in a field being grown for seed at Grand Forks, B. C. Infection occurred on leaves and umbels. Umbel infection was mostly sl. (G. E. Woolliams).

ROOT KNOT NEMATODE (Meliodogyne hapla). Sl. infections occurred on 20% of the roots in an 8-acre field on muck soil at West Dover in s. w. Ont. There were only a few knots per root and little distortion was seen (R. W. Walsh).

YELLOWS (Callistephus virus 1). Yellows was widespread and sev. in Sask. In a market garden in Saskatoon, inspected late in the season, about 90% of the carrots were affected, most of them severely (R. J. Ledingham). At Jeanette Creek in Kent Co., Ont. 10-15% of an 8-acre field was infected. Secondary organisms had caused a core rot of affected plants (R. W. W.). Aster yellows was the most serious disease in carrots in the Thedford and Grand Bend Marshes in 1957. Much of the infection apparently took place fairly late in the season. Infection was as high as 40% in some fields but losses from the disease were only around 10%. Even at that figure the loss would be over 300 tons. Carrots in this area are grown mainly for processing (J. R. Chard). The disease was less troublesome than usual in Kings Co., N.S. in 1957, averaging 3-5%. Infection occurred late in the season and consequently the carrots were not affected as severely as is usual (K. A. H.).

FROST INJURY. Heavy frosts the week of 22 Sept. caused considerable losses to the canning carrot crop in the Thedford and Grand Bend Marshes in Ont. Carrots with crowns exposed developed a breakdown of vascular tissues often followed by soft rot. Losses from freezing were variable depending on the location and the percentage of exposed crowns. Individual losses ran as high as 25% with an overall loss of about 15% (J. R. C.).

CAULIFLOWER

SOFT ROT (Erwinia carotovora) was present at Berwick, N.S. in a field which showed boron deficiency (K. A. Harrison).

CLUB ROOT (Plasmodiophora brassicae). Club root was less prevalent than usual in the Burlington-Toronto area in 1957. One sev. outbreak occurred in field-sown cauliflower grown on a farm which had been club-root free for 5 yrs. (E. F. Muir).

BORON DEFICIENCY. An estimated 15% of the heads in one field at Berwick, N.S. showed symptoms of boron deficiency (K. A. H.).

WHIPTAIL (Molybdenum deficiency). A sl. amount of whiptail occurred on a molybdenum deficient soil at York, P. E. I. Foliage sprays of sodium molybdate were applied too late to give maximum benefit (J. E. Campbell). A few plants in a small garden at Baxter's Harbor, N.S. were sev. affected by whiptail (K. A. Harrison).

CELERY

EARLY BLIGHT (Cercospora apii) was present in many fields in the Burlington-Toronto area but serious losses were prevented by spraying (E. F. Muir).

NEMATODES (Paratylenchus sp.). The pin nematode again caused sev. stunting to celery in the Thedford Marsh, Ont. Yield reductions of over 50% occurred in heavily infested fields. Plants attacked by nematodes appeared more susceptible to infection by early and late blights and also to showing symptoms of several minor element deficiencies. Fumigation has not proven a practical control on muck soil (J. R. Chard). One grower at Burlington, Ont. lost approximately 25% of his crop. Counts made by J. L. Townshend showed a population of Paratylenchus sp. of 4000 to 14,000 per lb. of soil (E. F. M.). This nematode is an ectoparasite. The roots of affected plants had numerous rusty-brown lesions (J. L. T.).

STEM MOLD (Pellicularia filamentosa). The Pellicularia stage of the fungus was growing up the stalks of celery at the Exp. Farm, St. John's West, Nfld. About 15% of the plants were affected but they appeared to suffer no particular damage (O. A. Olsen).

BACTERIAL BLIGHT (Pseudomonas apii) appeared late in the season in the Bradford-Thedford Marshes in Ont. (L. V. Busch).

LATE BLIGHT (Septoria apii) was noted on celery at Fort Vermillion, Alta. (E. W. B. Ward). Late blight was sev. in many fields in the Burlington-Toronto area. Several fields were totally lost. Copper dusts were less effective in control than copper sprays (E. F. M.).

YELLOWS (Callistephus virus ?) affected 10% of the plants of Utah #15 in the laboratory plots at St. Catharines, Ont. (G. C. Chamberlain). Yellows caused 5-10% loss of crop in some fields in the Burlington-Toronto area. Much of the infection appeared to have taken place either in the seed bed or soon after transplanting (E. F. M.). The disease in the Bradford-Thedford Marshes ran as high as 15% in some fields as compared with 1-2% in most years. The overall loss from aster yellows in celery was probably less than 10% (J. R. C.).

MAGNESIUM DEFICIENCY. Foliar applications of magnesium salts usually correct the deficiency. However, there appear to be varietal differences in this respect. Many growers in the Burlington-Toronto area are changing from Utah Salt Lake to Utah Dark Green which does not show the chlorotic effect (E. F. M.).

CHINESE CABBAGE

WHITE SPOT (Cercospora albo-maculans). A tr. infection was seen at Ste. Foy, Que. (D. Leblond).

CUCUMBER

LEAF SPOT (Alternaria sp.) was tr. at Saanichton, B. C. (W. R. Orchard). It was reported from Lulu Island, B. C. in association with root rot and wilting after cool, wet weather (H. N. W. Toms). Leaf spot was sev. on the Chicago Pickling variety in Queen's Co., P. E. I. where it caused considerable damage (R. R. Hurst). Alternaria leaf spot was recorded from many parts of the Annapolis Valley in N. S. (K. A. Harrison).

GRAY MOLD (Botrytis cinerea) was prevalent in many greenhouse crops in Essex Co., Ont. during the latter part of April and during May (C. D. McKeen). It was tr. in a greenhouse at Kingston, N. S. in March. A few plants had died (K. A. H.).

SCAB (Cladosporium cucumerinum) occurred in mod. amounts in a field at Carman, Man. (W. C. McDonald). In plots at the Que. Dept. of Agr. Plant Protection Sta. at Ste. Foy, Que. 15% of the cucumbers were scabbed at harvest (D. Leblond). At Ste. Anne de la Pocatiere, Que. 80-100% of the fruit of all varieties under test were sev. affected at an early stage of development. At St. Nicholas, Que. in Aug. 50% of the fruits were scabbed early in August. Small cucumbers were more affected than those of market size. The National Pickling variety was also sev. affected at Charlesbourg, Que. (L. J. Coulombe). Scab was especially sev. on cucumbers in N. B. in 1957. Control measures were rarely applied and the resistant varieties available were not used because of market preference for the older varieties (S. R. Colpitts). The disease was tr. in a home garden in Queens Co., (R. R. H.) and sev. in gardens at Kensington, P. E. I. (J. E. Campbell).

BACTERIAL WILT (Erwinia tracheiphila) caused the death of 3-4% of young plants set in many fields in Essex Co., Ont. in late May and early June (C. D. McK.). It caused losses of over 50% in 2/3 affected fields in the Burlington-Toronto area. No attempt was made to control the cucumber beetle (E. F. Muir). A tr. infection occurred at Woodside, N. S. (K. A. H.).

POWDERY MILDEW (Erysiphe cichoracearum). Infection was general but light on foliage in the greenhouse at the Vancouver, B. C. lab. (H. N. W. T.) Mildew appeared in a few greenhouses in the Leamington, Ont. district in late April and subsequently spread to all greenhouses. All cucumber crops in the field were affected. Karathane gave adequate control (C. D. McK.). Mod.-sev. infections occurred on Maine #2 in test plots at the Exp. Farm, Charlottetown, P. E. I. (J. E. C.). The disease was sl. in plots at the Exp. Farm, Kentville, N. S. (K. A. H.).

WILT (Fusarium solani) caused sl. damage in a field at Taber, Alta. (F. R. Harper).

FOOT ROT (Fusarium sp.) killed over 75% of the plants in a greenhouse in Mersa Twp., Ont. Cucumbers had been grown in the same soil every year for eight years without any sterilization (R. W. Walsh).

BLACK ROT (Mycosphaerella melonis). The Ascochyta stage of the fungus caused lesions on fruits at Ste. Foy, Que. (D. L.).

ANGULAR LEAF SPOT (Pseudomonas lachrymans) was present in the Osoyoos district of B. C. but was controlled by protective sprays (W. R. Foster). It was isolated from petioles of diseased plants in the Winnipeg, Man. district (W. L. Gordon, W. A. F. Hagborg). A 10% infection was seen in a field at Gagetown, N. B. (S. R. C.).

DAMPING-OFF (Pythium sp.) was found in one field in the Cranford district of s. Alta. (F. R. H.). Young plants set under paper in the Harrow, Ont. area suffered losses of up to 25%. The disease is always more destructive on soils of light texture (C. D. McK.).

FOLIAGE DECAY (Trichothecium roseum). Leaf infections occurred in a few greenhouses at Leamington, Ont. The fungus develops saprophytically on honey bee faeces on the upper surfaces of leaves and then becomes parasitic on adjacent healthy tissue often destroying 1/3 of the leaf. Regular application on Maneb gives fairly good control (C. D. McK.).

WILT (Verticillium albo-atrum) was sev. in a field of Wisc. S. R. 2 at Woodside, N. S. The field had grown a crop of Kennebec potatoes the previous year (K. A. H.).

MOSAIC (virus) was sev. at Rimouski, Que. (D. L.). The National Pickling variety was affected at Charlesbourg, Que. (L. J. C.). Tr. infections were observed on Long Green in Queen's Co., P. E. I. (R. R. H.). Sev. symptoms were observed in experimental plots at Kentville, N. S. No infection was seen in commercial fields (K. A. H.).

NECROTIC LEAF SPOT (virus). Since 1952 a virus which was earlier thought to be one of the ringspot group has appeared periodically during the fall, winter and early spring dropping seasons in 2 series of greenhouses in the Harrow-Leamington area of Ont. The virus, though showing certain characteristics of those of the tobacco necrosis group, is distinct and is being designated "Cucumber necrosis virus." It rendered unproductive one crop at Leamington in 1957 (C. D. McK.).

RING SPOT (virus). A strain of the tomato ringspot virus appeared in one greenhouse at Kingsville, Ont. in April. It destroyed 30% of the plants. (This is an unreported strain and a paper describing the virus and the symptoms it produces is being prepared) (C. D. McK.).

YELLOWS (Callistephus virus 1). Damage to cucumbers, attributed to the aster yellows virus, was widespread and sev. in Sask. in 1957. Yellowing and dwarfing of the plants was soon followed by wilting and death (R. J. Ledingham).

CHEMICAL INJURY. Copper sulphate, erroneously applied for copper-lime dust completely destroyed a planting of 1 1/2 acres at Narrows, N. B. (S. R. C.).

EGGPLANT

WILT (Verticillium albo-atrum). All fields in Essex Co. showed wilt varying from tr. -10% infection. Adequate irrigation on a fertile soil ensures a crop despite the presence of the fungus in the vessels of infected plants (C. D. McKeen). Wilt was again serious in many fields in the Burlington-Toronto area. Fumigation with Dowfume MC-2 appeared to give some control of the disease (E. F. Muir).

LETTUCE

GRAY MOLD (Botrytis cinerea) caused extensive damage to flower heads and seeds at Saanichton, B. C. (W. R. Orchard). It was sl. on University plots at Vancouver, B. C. (H. N. W. Toms). Infection varied from 10-20% in 3 half-acre fields at Leamington, Ont. in April and May. Infected plants failed to form heads (C. D. McKeen). Gray mold was seen on head lettuce in a retail store in Charlottetown, P. E. I. (R. R. Hurst).

ROOT ROT (Botrytis cinerea) caused serious losses in the Bradford and Thedford muck areas in Ont. Damage in many fields was in excess of 50%. This is one of the most serious diseases of head lettuce in the area (L. V. Busch). Botrytis, in association with Sclerotinia sclerotiorum and Rhizoctonia solani caused extremely sev. outbreaks of root rot in the Grand Bend Marsh of Ont. in the early part of the 1957 season. It was most sev.

on land cropped to lettuce the previous year and on newly broken land. In many such fields infection was 100% and losses ranged from 75 - 100% depending on weather conditions at heading time (J.R. Chard).

DROP (Sclerotinia sclerotiorum) was tr. in seed plots at Saanichton, B.C. (W.R.O.). It was sl. in seed fields at Grand Forks, (G.E. Woolliams), and in University plots at Vancouver, B.C. (H.N.W.T.). Drop was responsible for sev. injury to lettuce in a few gardens in Saskatoon, Sask. (R.J. Ledingham). The disease was less destructive than usual in N.S. in 1957 (K.A. Harrison).

YELLOWS (Callistephus virus 1). Yellows was less serious on lettuce in Sask. than in other crops (R.J.L.). This disease was widespread in s.w. Ont. Several crops grown in Aug. and Sept. in the La Salle area were a complete loss (C.D. McK.). In late July aster yellows infection built up to the highest level yet seen in the Grand Bend Marsh, Ont. All fields were infected, and coupled with the losses from root rot most growers considered themselves lucky to harvest 50-75 crates per acre as compared to a normal yield of 300 crates. It was impossible to control the vector when nearby fields and ditch banks were not sprayed or dusted (J.R.C.). Losses from aster yellows in the Bradford-Thedford areas of Ont. were much heavier than usual in 1957. The vector, the six-spotted leaf hopper was unusually prevalent. At the peak of the trouble in early July lettuce was wholesaling at $11.00 per crate against the normal $3.00. Many growers suffered 100% loss. Normal crops were harvested by two growers who applied DDT every 5-7 days to their entire acreage, including drainage-ditch banks (L.V.B). Yellows was mod.-sev. in most fields around Ste. Clothilde, Que. Losses ranged from 30-50% (R. Crete).

FLOWER DEFORMITY (? genetic). Deformation of flowers, virescence and phyllody, and fasciation of stems occurred in both 1956 and 1957 in the University plots at Vancouver, B.C. In a few cases only part of the inflorescence was affected (H.N.W.T.).

TIPBURN (physiological) was sl. in a market garden at Cornwall, P.E.I. Affected plants showed necrosis at the leaf margins and near the veins of the inner leaves (J.E. Campbell).

MELON

LEAF SPOT (Alternaria cucumerina). A heavy infection appeared in many fields in s. Essex Co., Ont. at mid-harvest (C.D. McKeen).

ANTHRACNOSE (Colletotrichum lagenarium) was sl.-mod. in a 3-acre field at Harrow, Ont. (C.D. McK.).

POWDERY MILDEW (Erysiphe cichoracearum). Mildew occurred in many fields in Essex Co., Ont. necessitating the application of Karathane. Good results were obtained where spraying was begun early (C. D. McK.).

FUSARIUM WILT (F. bulbigenum var. niveum). The growing of wilt-resistant varieties in s. w. Ont. is accompanied by a decrease in damage from this disease (C. D. McK.).

DAMPING-OFF AND ROOT ROT (Pythium irregulare). Melons started in non-heated sash frames developed considerable root rot. In some beds the disease was so sev. that the plants could not be set in the field. Low temperatures are conducive to root rot (C. D. McK.).

ONION

NECK ROT (Botrytis allii). Infection ranged from 5-50% in different locations in the Okanagan Valley, B. C. (G. E. Woolliams). A tr. infection was seen in a garden at Kentville, N. S. (K. A. Harrison).

PINK ROOT (Fusarium sp.). About 5,000,000 fall-planted seedling plants were imported into B. C. from Walla Walla, Wash. in 1957. Most plants grown from these sets were severely affected with pink root, whereas plants produced from locally grown sets were largely free of the disease. The affected plants were so devitalized that the bulbs were abnormally small and were produced at a loss. The continued importation of diseased plants into B. C. may eventually so infest Okanagan soils that production as a whole may be adversely affected (G. E. W.).

DOWNY MILDEW (Peronospora destructor). A tr. infection was seen in White Portugal at Saanichton, B. C. (W. R. Orchard). Mildew was present in only a few fields in the Grand Bend and Thedford Marshes in Ont. in 1957 and caused little damage (J. R. Chard). Two small fields in the Burlington-Toronto area suffered 50% loss. The overwintering crop was infected (E. F. Muir). Four sprays of Zineb gave good control in an infected field at Berwick, N. S. A field at Kentville sprayed only twice was killed down by mildew before maturity (K. A. H.).

NEMATODES (Pratylenchus penetrans and Paratylenchus sp.). Heavy populations of root lesion nematodes were found in association with a pink-root disease in onions grown in the Okanagan Valley, B. C. from imported seedlings in 1956. In 1957 nematode determinations showed tr. populations of P. penetrans in 2/13 samples collected in Wash., U. S. A.; 12 samples grown in virgin soil from imported seedlings were free of parasitic nematodes; 7/12 samples of mature onions from imported seedlings and 3/4 from domestic seedlings carried populations of P. penetrans and/or Paratylenchus.

One sample carried root-knot nematodes (Meliodogyne sp.). Pink-root symptoms were found in nematode-free samples, hence the Okanagan form of pink-root is not dependent on the presence of nematodes. The study suggested that the nematodes were present in growers fields before the onions were planted (J. Bosher).

Outbreak of the Bulb and Stem Nematode in Ontario

W. B. Mountain

In July, 1957, a sample of muck soil from the Leamington Marsh submitted to the Harrow Laboratory was found to contain large numbers of the bulb and stem nematode Ditylenchus dipsaci (Kuhn, 1857) Filipjev, 1936. This represents the first confirmed outbreak of this nematode on onion in Canada.

Onions grown in infested areas were found to be severely affected. Usually, within a month following emergence, the leaves became chlorotic, subsequently dying back from the tips, and frequently, by July, the plant had been killed. Damage to the onion bulbs included splitting and separation of the scales, splitting and doubling of the bulb and rotting which extended upwards from the base. It was learned that, in infested areas, practically no saleable onions are produced. As an example, one grower in the Leamington Marsh, whose farm is infested with the bulb and stem nematode harvested 200 pounds of onions from a five-acre field in 1957. Normal onion production for this field is approximately 75 tons.

In view of the potential threat of the nematode to onion production in Ontario, a preliminary survey of the other onion marshes in western Ontario (Erieau, Bradford, Thedford, and Janette's Creek) was carried out in September, 1957. Soil and onion samples from 20 fields in these marshes showed no trace of the nematode. A more detailed survey of these areas will be carried out in 1958.

An extensive survey of the Leamington Marsh was completed in the fall of 1957. During this survey, approximately 100 samples of soil or onion material were examined for the nematode. Included was a survey of all Dutch sets produced in the Leamington area for seeding in 1958. The collection of these sets was carried out by Inspectors of the Plant Protection Division and the Ontario Fruit Branch. The Dutch sets which were found to be infested by the bulb and stem nematode are being destroyed by the Provincial Department of Agriculture under the regulations of the Plant Diseases Act. The nematode has been found on 19 farms. Several other farms are believed to be infested but the nematode has not yet been recovered from these areas.

There is little doubt that the infestation is of recent origin. None of the growers had noticed the trouble before 1955 and few of them before 1956. Almost without exception, growers whose land is infested with the nematode had purchased Dutch sets for planting and it has been found that, in recent years, such sets were imported from Illinois. Since recent outbreaks in New York State have been traced to infested sets produced in Illinois it is assumed that our growers also received some of this infested material. However, it has not been possible to examine imported Dutch sets and therefore final proof of the source of the outbreak is lacking.

SMUT (Urocystis cepulae). A light infection was observed in commercial fields in sections of the Kelowna and Vernon areas, B.C. (G.E. Woolliams). There was less loss from smut in the Dutch set crop in the Thedford Marsh, Ont., than in any recent years (J.R.C.). Onion smut, though widespread in the Bradford-Thedford areas, caused little damage since most growers treated their seed with 1 or 3/4 lb. of 50 or 75% thiram per lb. of seed. Some untreated plantings had as much as 90% smut (L.V. Busch).

YELLOWS (Callistephus virus 1). A light infection occurred at Morden, Man. in Foundation seed plots (W.C. McDonald). Tr. infections occurred in Ont. Infected plants were yellow, stunted, twisted, and failed to form a bulb (J.R.C.).

PARSNIP

LEAF SPOT (Ramularia pastinacea) was mod. on all plants in a seed plot at Morden, Man. (W.C. McDonald).

YELLOWS (Callistephus virus 1). At Morden, Man. 3/4 of the plants in a seed plot were mod. infected (W.C. McD.).

PEA

The Incidence of Leaf and Pod Spot of Peas Caused by Ascochyta pisi in the Ottawa Valley

V.R. Wallen

Four fields of Sterling field peas and three fields of the variety Arthur grown in the Renfrew and Shawville districts were inspected twice during the summer of 1957 for the incidence of leaf and pod spot caused by Ascochyta pisi. The Sterling peas were inspected because screening tests, conducted in co-operation with the Cereal Crops Division, showed that variety to be more resistant to A. pisi than the varieties Chancellor and Arthur commonly

grown in this area. The field inspections showed no A. pisi infection in the Sterling variety while all three fields of Arthur were infected slightly.

Seed from two of the fields of Arthur and from the four fields of Sterling was examined in the laboratory for the presence of pathogenic fungi. The two fields of Arthur contained four and five per cent Ascochyta infection respectively. Seed lots from two of the Sterling fields were free of A. pisi, one lot contained 1 per cent, while the other sample contained 4 per cent A. pisi. An examination of the sample containing 4 per cent infection showed it to be a mixture of Sterling and small seeds from a foreign source.

Other Observations

LEAF AND POD SPOT (Ascochyta pisi). A sl. infection was seen on Lincoln at Saanichton, B.C. (W.R. Orchard). Sl. infections also occurred on Pioneer and Perfection at Creston and on Thomas Laxton at Grand Forks, B.C. All were grown for seed. Infection was confined largely to the lower leaves (G.E. Woolliams). Infection was sl. occurring as patches in a field at Portage la Prairie, Man. (W.A.F. Hagborg). Seed-borne infection was tr.-sl. with no secondary spread in a 65-acre field of Arthur at Cobden and in another field at Douglas, Ont. (V.R. Wallen). Sl. infections occurred in Thomas Laxton in Queens Co., P.E.I. (R.R. Hurst).

FOOT ROT (Ascochyta pinodella) was sl. on Lincoln at Saanichton (W.R.O.), and seen in 2 fields at Creston, B.C. (W.C. Broadfoot). It was sl. in a 1-acre field of garden peas at Aylmer, Que. (V.R.W.).

GRAY MOLD (Botrytis cinerea) was tr. at Ste. Foy, Que. Infection appeared to be initiated from fallen floral parts on the leaves (D. Leblond).

POWDERY MILDEW (Erysiphe polygoni). Sl. infections were seen in a 15-acre field of Pioneer at Creston, B.C. (G.E.W.). Mildew was sev. on all varieties with the exception of Thomas Laxton and Onward at Charlottetown, P.E.I. (R.R.H.). Heavy infections developed late in the season on Fenland Wonder at Kentville, N.S. Yields did not seem to be affected (K.A. Harrison).

NEAR WILT (Fusarium oxysporum f. pisi (Linford) Snyder and Hansen race 2.). The presence of this organism in Ont. has now been confirmed, and isolations from plants collected throughout the canning crop areas indicate that race 2 is rather widely distributed. Infection was sl. in most of the fields sampled although a mod.-sev. infection occurred in a 10-acre field near Troy, Wentworth Co. This disease is a potential threat to the pea industry since the majority of the canning pea varieties are of Perfection parentage and offer no resistance to this pathogenic strain of Fusarium (B.H. MacNeill).

MYCOSPHAERELLA BLIGHT (M. pinodes). Sl.-mod. infections occurred in a field at Portage la Prairie, Man. (W.A.F.H.). One of 2 fields of Sterling examined at Shawville, Que. showed a sl. infection of blight (V.R.W.).

DOWNY MILDEW (Peronospora pisi) was tr. on Lincoln at Saanichton, B.C. (W.R.O.). It was seen in all fields on the Creston Flats, B.C. Infection was present on most plants but was confined to the lower, shaded leaves. It did not appear to be causing appreciable damage (G.E.W.).

BACTERIAL BLIGHT (Pseudomonas pisi). A mod. infection was recorded in experimental plots at Portage la Prairie, Man. (W.A.F.H.).

LEAF BLOTCH (Septoria pisi). The lower leaves of Arthur were mod. infected in a field at Douglas, Ont. (V.R.W.).

RUST (Uromyces fabae). Sl.-sev. infections were present in seed plots at Fredericton, N.B. (S.R. Colpitts). Rust was tr. on American Wonder, Thomas Laxton and Little Marvel at Charlottetown, P.E.I. (R.R.H.). Late infections caused little damage at Kentville, N.S. (K.A.H.). Tr. infections recorded in a garden at St. John's,Nfld. (O.A. Olsen).

ROOT ROT (various pathogens). Fusarium sp. caused a tr. of root rot in Lincoln at Saanichton, B.C. (W.R.O.). Many canning crop fields were affected in Ont., as in previous years. Yields were undoubtedly reduced in the more sev. cases (J. Cutcliffe). Mod. infection of root rot, with Aphanomyces and Fusarium spp. and R. solani involved were noted in fields at St. Jean, St. Edouard and Napierville, Que. (R. Crete). Infections ranging from tr.-20% occurred in garden plots at Fredericton and Gagetown, N.B. (S.R.C.).

MOSAIC (virus). A 10% infection on Lincoln at Saanichton, B.C. caused sl. damage (W.R.O.). Late planted peas in a garden at Kentville, N.S. were 100% infected. Aphid infested commercial fields in Kings Co. showed appreciable infection in the last few leaves on the vines late in the season (K.A.H.).

STREAK (virus). Mod.-sev. infection occurred in a field near Troy, Ont. (B.H. MacN.).

STUNT (virus). Typical symptoms of Wisconsin pea stunt were observed in a hybrid pea nursery at Portage la Prairie, Man. Affected plants were stunted, the upper portion showed a tight rosette of leaves, stipules and blossoms, no pods had formed and vein clearing had occurred in the leaves. The diseased plants were readily observed because of the dwarfed, upright growth beside prostrate plants bearing pods (W.C. McD.).

PEPPER

ROOT ROT (Rhizoctonia solani and Fusarium sp.). These two organisms were isolated from affected plants in a commercial planting at Medicine Hat, Alta. (F.R. Harper).

WILT (Verticillium albo-atrum). Two 4-acre fields near Harrow were sev. affected by wilt. Symptoms were most pronounced after the plants became infected with an aphid-borne virus (C.D. McKeen).

BACTERIAL SPOT (Xanthomonas vesicatoria) was not as prevalent in s.w. Ont. as in 1956, but it was sev. in a small number of crops. When the disease appeared in plants before they were set in the field the crop was a total loss. The new variety Liberty Bell is the most susceptible of the sweet varieties being grown in the area (C.D. McK.).

DAMPING OFF (pathogens undetermined) was noticeable in cold frames and seed beds in the Burlington-Toronto area, especially where the soil had not been sterilized (E.F. Muir).

MOSAIC (virus). All pepper crops in the Harrow, Ont., area were seriously affected by aphid-borne viruses. Tobacco etch, Potato Y, and cucumber mosaic viruses were identified. The viruses occurred singly and in combination (C.D. McK.).

BLOSSOM END ROT (physiological). Foliage was poor and irrigation did not appear to check the disease which affected 30% of the plants in a field at Berwick, N.S. (K.A. Harrison).

POTATO

The data in Tables 8 to 10 on Seed Potato Certification were submitted by the Plant Protection Division, Production Service.

Potato acreage entered for inspection and the acreage passed were both slightly greater than in 1956. Bacterial ring rot was the most important cause of rejection, being responsible for 30% of the total rejections. It appeared in seed fields in all provinces but Sask. and B.C. Black leg was again prevalent in P.E.I. and Que. Fewer fields were rejected in 1957 because of mosaic. Sebago again accounted for over one third of the total certified acreage. Increased plantings of Sebago, Kennebec and Irish Cobbler accounted for much of the increased acreage.

GRAY MOLD (Botrytis cinerea) caused a stalk rot in tr. amounts at Dunstaffanage, P.E.I. (D.B. Robinson, J.E. Campbell). It also caused a leaf spot in tr.-sl. infections at St. John's West, Nfld. (O.A. Olsen).

Table 8. Seed Potato Certification
Fields and Acres Inspected and Passed, 1957

Province	Number of fields Inspected	Passed	Fields Passed %	Number of Acres Inspected	Passed	Acres Passed %
P. E. I.	6,146	5,457	88.7	30,991	27,503	88.7
N. S.	216	206	95.4	411	382	92.9
N. B.	2,505	2,283	91.1	15,698	13,099	83.5
Que.	1,017	636	62.5	4,059	2,121	52.3
Ont.	576	470	81.6	1,606	1,230	76.5
Man.	110	96	87.2	826	760	92.0
Sask.	69	59	85.5	127	116	91.3
Alta.	222	188	84.6	1,556	1,271	81.6
B. C.	556	484	87.0	2,393	2,106	88.0
Total,						
1957	11,417	9,879	86.5	57,667	48,588	84.2
1956	11,440	9,575	83.7	53,926	44,398	82.3*
1955	12,003	10,239	85.3	51,627	42,173	81.7
1954	13,783	11,959	86.8	59,360	50,687	85.4
1953	14,411	11,875	82.4	60,173	47,706	79.3

*The figures shown herein are final figures submitted by the Plant Protection Division for fields and acres entered and passed in 1956 and differ from those published in P. D. S. 36: 68, 1957.

EARLY BLIGHT (Alternaria solani) was reported as follows: 145-sl. 23-mod. 4-sev./556 fields inspected in B. C. It caused serious economic losses only in the Grand Forks area. In many areas of the Interior it caused yield reductions through hastened maturity (N. Mayers). Sl. -mod. infections observed in some table stock fields in s. Alta. (R. P. Stogryn); present in sl. amounts in most fields inspected in n. Alta. (E. C. Reid); not observed in Sask. (A. Charlebois). Sl. -mod. on most early varieties in Man. (D. J. Petty); tr. at Carman, Man. (W. L. Gordon). Sl. in 2 fields in n. w. Ont., tr. in districts 1 and 2, (J. T. McKercher, W. L. S. Kemp), but sev. on Irish Cobbler and Keswick in district 3 (H. W. Whiteside), infection 36-sl. 8-mod./56 fields in e. Ont. (E. H. Peters). Observed 220-sl. 87-mod. 8-sev./1017 fields in Que., mostly confined to Chicoutimi and Lake St. John district (B. Baribeau). Sl. in N. B. generally (C. H. Godwin), but sev. on Warba at Gagetown (S. R. Colpitts); sl. -mod. in P. E. I. (H. L. McLaren, D. B. Robinson, J. E. Campbell); sev. in 2 fields of Irish Cobbler in Colchester Co., N. S. and mod. in 1 field of Warba in Kings Co. (R. C. Layton); tr. -sev. at the Exp. Farm, St. John's, Nfld. (O. A. Olsen).

Table 9. Seed Potato Certification
Acreage Passed by Variety and Province - 1957

Variety	P. E. I.	N. S.	N. B.	Que.	Ont.	Man. -Alta.	B. C.	Total
Sebago	19,950	34	219	134	280	10	3	20,630
Katahdin	1,382	16	6,326	131	407	5	12	8,309
Kennebec	1,484	111	3,273	251	25	125	95	5,364
Irish Cobbler	3,348	37	507	120	122	129		4,263
Netted Gem	14	30	1,019		2	1,260	1,580	3,905
Green Mountain	718	36	256	1,381	52	6	30	2,479
Red Pontiac	184	8	678			166		1,036
Keswick	164	12	183	86	87		3	535
Russet Rural	21		365		20			406
Pontiac		4	183		1	40	50	278
Warba	7	9	7	5	12	95	107	242
Chippewa	4	1	29		144	1		178
Canso	170	5	14		2			191
White Rose							134	134
Cherokee	28	19	29	7	1	23		107
Columbia Russet					2	81	6	89
Huron	1	1	2		72			76
Others	28	30	9	6	1	206	86	366
Total	27,503	382	13,099	2,121	1,230	2,147	2,106	48,588

Table 10. Seed Potato Certification
Fields Rejected on Field Inspection - 1957

Province	Leaf Roll	Mosaic	Ring Rot in Field	Ring Rot on Farm	Black Leg	Wilts	Adjacent Diseased Fields	Foreign Variety	Misc.	Total
P. E. I.	18	65	23	63	213	22	18	198	150	770
N. S.	1	3	5	6	1	5		4	1	26
N. B.	1	20	87	53	13		8	33	10	225
Que.	10	44	197	70	71		10	23	10	435
Ont.	15		21	21	15	6	3	13	11	105
Man.	4		2	5					3	14
Sask.					1	3		1	5	10
Alta.			3	9	14			1	6	33
B. C.	27	1			5	2			37	72
Total	76	133	338	227	333	38	39	273	233	1,690*

*The discrepancy between the total given herein and the total rejections calculated from the data in Table 8 is explained as follows:
The figures in Table 10 include lots which were rejected at shipping and bin inspection whereas the figures in Table 8 refer to field inspections only (D. W. C.).

Rejection as a percentage of fields:

Inspected	0.7	1.2	3.0	2.0	3.0	0.3	0.4	2.4	2.1	14.8
Rejected	4.4	7.8	20.0	13.4	19.7	2.2	2.3	16.5	13.7	100.0

BLACK DOT (Colletotrichum atramentarium). The organism was isolated from diseased tissue from Morden, Man. (W. L. Gordon). It was tr. on Irish Cobbler in Queens Co., P. E. I. (R. R. Hurst). Isolated consistently from dying stalks of Keswick at Kentville, N. S. (K. A. Harrison).

BACTERIAL RING ROT (Corynebacterium sepedonicum). B. C. continues to be virtually free of ring rot. It was found in tr. amounts on 3 farms in the Fraser Valley as compared with 20 in 1956 (W. R. Foster), no B. C. seed stocks were found infected (N. Mayers). Ring rot was found in 3/105 fields inspected in s. Alta. and was responsible for the rejection of 9 other fields on the same farms. All 3 farms concerned were infected in 1956 (R. P. Stogryn); it was not found this year in n. Alta. (E. C. Reid).

Infected tubers were received from 6 growers in Sask. (R. J. Ledingham), and ring rot was found in Columbia Russet in that province (A. Charlebois). It was found in 2/110 fields inspected in Man. Five other fields were rejected because of ring rot on the farm (D. J. Petty). One field of Katahdin was infected at Strathroy, Ont. (J. T. McKercher). The crops of 6 fields in District 2 were rejected in the bin because of ring rot (W. L. S. Kemp). In District 3 ring rot was the most troublesome disease encountered in 1957; 20/369 fields were infected and a further 20 fields rejected because of ring rot on the same farm. The high incidence of the disease is blamed on the use of custom planters in the districts most affected (W. H. Whiteside). The 15th annual ring rot survey in Ont. in 1957 revealed the presence of the disease on 191 farms as compared with 92 farms in 1956. Conditions for the detection of ring rot were optimum, and the absence of frost until late fall permitted the completion of the survey (D. S. MacLachlan).

Ring rot caused the rejection of 197/1017 fields inspected in Que. Another 20 lots were rejected at harvest and bin inspection. Rejections were up over 150% from the 1956 total of 73 fields. Much of the increase is attributed to the general use of custom planting and digging equipment and of poorly disinfected second hand bags. The Provincial Dept. of Agriculture is intensifying its ring rot control program (B. Baribeau). It was common in the Lake St. John and Saguenay districts of Que. (D. Leblond). The disease increased slightly in N. B. due partly to infection in imported seed of Red Pontiac. 87/2505 fields were rejected as diseased and a further 53 fields were turned down due to the proximity of infected table stock fields (C. H. Godwin). In P. E. I. 23/6146 fields were infected; 63 more fields were

rejected as contact cases (H.L. McLaren). No infections were detected in the field in N.S., but post harvest inspections revealed ring rot in Cherokee from 5 fields. It was also detected in potatoes from 5 table stock fields, 3 of Cherokee and one each of Katahdin and Kennebec. All infected Cherokee crops could be traced to 1 lot of seed imported from Maine in 1953 (R.C. Layton). No ring rot was seen on the west coast of Nfld. (G.C. Morgan).

BLACK LEG (Erwinia atroseptica) was 102-tr. 2-mod. 4-sev./556 fields inspected in B.C. It has increased slightly over the 1956 totals. The use of whole seed appears to be of some help in controlling this disease (N. Mayers). It occurred in 84/105 fields in s. Alta. (R.P. Stogryn), and in 62 (53%) of the fields inspected in n. Alta., causing the rejection of 14. Black leg continues to be a serious threat to seed stocks in Alta. (E.C. Reid). It was tr. in 13% of Sask. fields inspected and caused the rejection of 1 field (A. Charlebois). Tr.-sl. infections were observed in 16% of Manitoba fields, but was of no consequence in n.w. Ont. (D.J. Petty). Sebago, Katahdin and Irish Cobbler were infected at Scotland, Waterford and Strathroy, Ont. (J.T. McKercher). It caused the lowering of grade of 4 fields to Certified in District 2 (W.L.S. Kemp). In District 3, 61 fields were infected and 13 (3.6% of fields inspected) were rejected (H.W. Whiteside). 21/56 fields in e. Ont. were infected and 2 totalling 3 acres were rejected (E.H. Peters). In Que. 564/1017 fields showed infection; 71 fields were rejected. The disease was much less prevalent in N.B. than in 1956. Only 13/2505 fields were rejected (C.H. Godwin). It was sev. in many Sebago fields in P.E.I. (J.E. Campbell), and caused the rejection of 213/6146 fields inspected in the province (H.L. McLaren). Black leg was reported in 53/216 fields inspected in N.S. (R.C. Layton). Tr. infections were seen on Irish Cobbler at St. John's West, Nfld. (O.A. Olsen). Infection was sl.-mod. in 75% of the fields visited on the west coast of Nfld., particularly in the Cormac area. Sl. infections occurred in many east coast fields and mod.-sev. infections were seen in 3 fields at Clarke's Beach, in 8 in the Bonavista Bay and 4 in the Trinity Bay areas (G.C. Morgan).

SOFT ROT (Erwinia carotovora). A car of Katahdin potatoes from N.B. was found to be sev. affected by soft rot on arrival at Leamington, Ont. in Jan. (C.D. McKeen). Little soft rot was observed in Ont. district 3 in 1957 (H.W. Whiteside).

DRY ROT (Fusarium spp.) was more prevalent than usual in the 1956 crop in Que. and the loss sustained in some bins was 2-6% (B. Baribeau). There was little dry rot in the stored 1956 crop in N.B. (C.H. Godwin). It was sl. in P.E.I. (H.L. McLaren).

WILTS (Fusarium oxysporum, Verticillium albo-atrum) were 7-tr. 2-sev./556 fields in B.C. Pontiac seems quite susceptible (N. Mayers). Wilts were present in 87/105 fields in s. Alta., but it was probable that other conditions were partially responsible (R.P. Stogryn). They were sl. in n. Alta. (E.C. Reid). Wilts were widespread in sl. amounts in s.w. Ont. (J.T. McKercher). Three Kennebec, 2 Cherokee and 1 Chippewa fields were rejected because if wilts in Ont. district 2 (W.L.S. Kemp). Wilts were present in most fields in district 3 (H.W. Whiteside), and were sl. in 11 fields in e. Ont. (E.H. Peters). Sixty-one/1017 fields inspected in Que. showed sl. infections, principally on Kennebec (B. Baribeau). No fields were rejected in N.B. though 64/2505 fields showed sl. infections (C.H. Godwin). A sl. decrease in wilts was recorded in P.E.I. where 22/6146 fields were rejected (H.L. McLaren). In N.S. wilts occurred in 41/216 fields inspected. Five fields were rejected (R.C. Layton).

SILVER SCURF (Helminthosporium atrovirens = Spondylocladium atrovirens) appears to be increasing in Ont. district 3 (H.W. Whiteside). Seed potatoes examined in the spring of 1957 revealed that in most cases Foundation, as well as Certified seed stock was infected with silver scurf regardless of source. In addition, table stock from N.B. in retail stores in Ont. was infected. Potatoes growing on the Bradford Marsh were infected in early Aug. and the diseases was prevalent at harvest (L.V. Busch). Silver scurf was seen on a few lots of Green Mountain at bin inspection in Que. (B. Baribeau). Sl. infections were noted in N.S. (R.C. Layton).

RHIZOCTONIA (Pellicularia filamentosa (R. solani) was unusually sev. in B.C. in 1957 and caused appreciable losses in most areas. Infections were 320-sl. 170-mod. 22-sev./556 fields inspected (N. Mayers). In s. Alta. it was recorded as 28-sl. 63-mod. 9-sev./105 fields. Tuber infection was less than normal (R.P. Stogryn); elsewhere in Alta. it caused considerable trouble on some wet soils, attacking early shoots with resulting misses and weak plants. The variety Early Ohio seemed particularly subject to attack (E.C. Reid). The disease was unusually sev. in Sask. (A. Charlebois), many fields and gardens in the Saskatoon area had 5-20% of the plants affected. The same condition was observed at Indian Head, Swift Current and Scott (R.J. Ledingham, T.C. Vanterpool). It was sl. in most fields in Man. and n.w. Ont. (D.J. Petty), and of no consequence in s.w. Ont. (F.J. Hudson). Rhizoctonia was particularly sev. in the Grand Bend Marsh area. Sebago, the principal variety grown, seems to be very susceptible. Up to 10% of the plants in some fields were sev. attacked and formed aerial tubers. Sclerotial infections were high and only a small portion of the Grand Bend Marsh area crop was suitable for washing (J.R. Chard). The organism is present in most soils in the Guelph area where Common Scab is also a problem (W.L.S. Kemp). It was sev. in many fields in Dufferin Co., and the incidence on tubers was

high in the northern parts of Ont. district 3, especially Cochrane and Temiskaming (H.W. Whiteside). Rhizoctonia was 18-sl. 2-mod./20 fields inspected in e. Ont. (E.H. Peters). Infection was noted in 112/1017 fields inspected in Que., mostly in the northwestern districts. Tuber infection was 253-sl. 35-mod. 12-sev./300 lots at bin inspection (B. Baribeau). Sl. infections were seen at two points in Chateauguay Co. (R. Crete), and mod. infections in a field in Kamouraska Co., Que. (H. Genereux). Infections were sl. in a few fields in N.B. (C.H. Godwin). It was sl. on Sebago at Cornwall, P.E.I. (J.E. Campbell). Rhizoctonia was not important in the field or in bins in N.S. in 1957 (R.C. Layton). Sev. infections on Arran Victory and Irish Cobbler were recorded at Upper Gullies, Nfld. (O.A. Olsen). It was general on plants in the O'Regan's, Cartyville, Robinson's and McKay's areas on the west coast of Nfld. Infection was mod.-sev. in 5 fields at Cormac. Though generally lighter on the east coast than in 1956, sl.-mod. infections were seen in 12 fields at Conception Bay, in 8 at Bonavista Bay, and in 4 at Trinity Bay (G.C. Morgan).

LATE BLIGHT (Phytophthora infestans) was present in all districts of B.C. Tuber infection was fairly high in some fields but the greatest loss came from reduced yields due to early defoliation. Dry weather from mid-Aug. on prevented heavier losses. Infections were 118-sl. 56-mod. 16-sev./556 fields inspected (N. Mayers). The disease appeared late in 1 field in n. Alta. (E.C. Reid). It was not seen in Sask. in 1957 (A. Charlebois). Sl.-mod. infections were seen in Man. in the Winnipeg, Portage la Prairie and Carman districts, with parts of some fields at Carman sev. attacked. Tuber losses in some cases at Carman and Portage la Prairie were 10-15%. Cherokee in the latter area remained free of blight although adjacent fields were affected (D.J. Petty).

Some late blight was seen in s.w. Ont. during the third field inspection, but comparatively few tubers showed any sign of the disease in the bin (J.T. McKercher). The disease was late in appearing in Ont. District 2 and affected only late planted crops, particularly Katahdin (W.L.S. Kemp). In District 3 it was sev. in a field of Russet Rural in Dufferin Co., but did not seriously affect Huron planted in an adjacent field. Most fields in Simcoe and Dufferin Counties showed sl. infections. Dry weather and the use of vine killers kept the disease at a minimum. Tuber infection was generally light throughout the district (H.W. Whiteside). Late blight appeared early in the Thedford Marsh, being evident on 17 June. Infection appeared to come from volunteer potato plants which were numerous in fields cropped to potatoes the previous year. Dry weather in July and Aug. checked disease development. By mid-Sept. there was considerable leaf infection, but the advent of heavy frosts killed the tops well in advance of harvest and little tuber infection occurred (J.R. Chard). Blight was not serious in the Burlington-Toronto area (E.F. Muir). Tubers

from an unsprayed field at Orleans, Ont. were affected (H.N. Racicot). Irish Cobbler was infected in 2 fields near St. Bernardin, Prescott Co., Ont. (E.H. Peters).

Late blight was first recorded in Que. on 10 July on Irish Cobbler near Notre Dame de la Paix, Papineau Co., over 2 weeks earlier than in 1956. Spread was not as rapid as usual, but by 19 Aug. sl.-mod. infections were recorded in most counties of the province, Matane, Matapedia and Papineau being exceptions. Nearly all unsprayed crops were affected to the extent of 10-25%. In seed fields infections were 412-sl. 148-mod. 29-sev./1017 fields inspected. Bin inspections revealed 255-sl. 21-mod. 9-sev./285 (56.5%) of bins examined (B. Baribeau). A sl. infection was seen in a 100-acre field at Napierville, Que. Tuber infection was light. Unsprayed fields in Chateauguay and Napierville counties showed mod.-sev. infections in many cases (R. Crete). One blight resistant seedling was 100% infected at Ste. Clothilde, Que., apparently due to planting infected tubers (D.S. MacLachlan). Unsprayed Green Mountains yielded 35% infected tubers at Ste. Foy, Que. (D. Leblond). Sev. infections on Irish Cobbler at St. Roch, and mod infections on Irish Cobbler and Katahdin at Charlesbourg were observed (L.J. Coulombe).

Late blight was first reported in N.B. in the Hartland area on Rural Russet on 15 July. The disease gained rapid headway in these fields and the foliage was mostly killed by early Aug. These sev. affected fields had not been adequately sprayed. Elsewhere in the province late blight developed very slowly. Continued dry weather in Aug. arrested disease development and at no time did it reach epidemic proportions. Ideal weather prevailed during the harvest season and tuber rot was scarcely observed in the crop, nor has it been a problem during the fall shipping season (C.H. Godwin).

The 4th annual survey to determine the races of late blight occurring in Canada was conducted by the Fredericton Laboratory. By 18 Nov., 1957, 98 collections from 8 provinces were examined and 150 isolates identified as to race. The collections were in the form of potato leaves, tubers and seed balls and tomato fruits. The results of the survey are given in Table 11.

Table 11 Distribution by Provinces of Physiologic Races of *Phytophthora infestans* in Canada in 1957.

Physiologic Race	P.E.I.	N.S.	N.B.	Nfld.	Que.	Ont.	Man.	B.C.	Total
0	2							3	5
1	1	1			1		1	6	10
2		1							1
3	3	4	4		5	2	1	15	34
4	16	5	10	3	7	3	1	34	79
1,3		1	1						2
1,4		3	4		3				10
2,3								1	1
2,4		1			1				2
3,4		1			1			3	5
1,2,4		1							1
	22	18	19	3	18	5	3	62	150

The results are based mainly on a single determination on the differential hosts. As in previous years, race 4 seems to predominate, but this may be due to the masking of race 0. Race 3 is the second most prevalent race having displaced race 1,4 from this position (J.L. Howatt).

Late blight was a serious problem in 1957 in P.E.I. despite a lower than average precipitation for the July-Sept. period. The first lesions were found on plants in a cull pile on 17 July and the first field symptoms were observed 22 July. Infection was general soon after 1 Aug. The initial outbreak and spread of the epiphytotic were forecast from a study of the rain-temperature-humidity pattern. A succession of showery days beginning 13 July and a 4-week period of high humidity favored a rapid development of the disease. Unsprayed fields were seriously threatened. A second outbreak occurred early in Sept. but properly sprayed fields were not seriously affected. Losses through late blight tuber [illegible], except in unsprayed or rarely sprayed fields, were light in 1957 (L.C. Callbeck).

Late blight was first reported in N.S. from the Hall's Harbor area of Kings Co. on 7 Aug. about 2 weeks later than in 1956. In most areas of the province infections were sl.-mod. The only sev. outbreak occurred in Digby and Yarmouth Counties about mid-Aug. No sev. losses from late

blight tuber rot were reported in 1957 (R.C. Layton). Blight was sev. on seedlings and named varieties under test at the Exp. Farm, St. John's West, Nfld. Up to 50% tuber losses were recorded (O.A. Olsen). Losses on the east coast were generally light and no infections were seen on the west coast. The only sev. infections seen were in 4 fields of Green Mountain at Bonavista Bay. Thirty % of the tubers were affected (G.C. Morgan).

LEAK (Pythium ultimum) occurred in 4/25 storage bins inspected in the Pemberton area of B.C. and nearly all crops in s.e. B.C. showed traces of the disease (N. Mayers). Tr. infections were observed in a few lots of Kennebec at shipping inspection in Que. in the spring of 1957 (B. Baribeau), and a sl. infection occurred in a 5-acre field at Ste. Anne de la Pocatiere (H. Genereux). Specimens were received from three areas of Kings Co., N.S. (K.A. Harrison).

POWDERY SCAB (Spongospora subterranea) was tr. in 1 table stock field in the lower Mainland of B.C. (N. Mayers). It was present as infections of up to 3% in crops in the Cochrane district, Ont. (H.W. Whiteside). Powdery scab was less prevalent in Que. than in 1956 and occurred as sl.-mod. infections in a few bins in the lower St. Lawrence area (B. Baribeau), and as a sl. infection in a 5-acre field at Ste. Anne de la Pocatiere, Que. (H. Genereux). No infections occurred in seed crops in N.B. or in P.E.I. (C.H. Godwin, H.L. McLaren). Four lots with average infection of 6% were reported from the Hall's Harbor, N.S. district (R.C. Layton). Infections ranging from 5-100% were observed on Fredericton seedlings at St. John's West, Nfld. (O.A. Olsen). Sl. infections were seen in the wart plots in the Conception Bay area. Powdery scab was sl.-mod. in 3 fields at Clarke's Beach and 6 fields in the south shore district (G.C. Morgan).

COMMON SCAB (Streptomyces scabies) was prevalent in the Interior of B.C. where it caused considerable damage to the white-skinned varieties (N. Mayers). It did not present any appreciable problem in s. Alta. (R.P. Stogryn). Elsewhere in Alta. 1 or 2 seed stocks of Netted Gem had sufficient scab to require close grading (E.C. Reid). Dry, hot weather in July tended to increase the incidence and severity of scab in Sask. (R.J. Ledingham). The disease was sl. in about half of the fields inspected in s.w. Ont. (J.T. McKercher). It is well established in most soils in district 2. The average loss from sl. scab averaged 20-25% and from sev. scab 10-15% (W.L.S. Kemp). Scab was somewhat more prevalent than usual in district 3. It was observed on the scab-resistant variety Huron in the Lafontaine area (H.W. Whiteside). In e. Ont. it was quite prevalent in many bins of seed potatoes. Huron and Rural Russet were only slightly or not at all affected (E.H. Peters). Infections were

239-sl. 30-mod. 35-sev./1017 fields inspected in Que. Scab was mostly confined to the lower St. Lawrence districts where infections as high as 25-80% were recorded in a few fields (B. Baribeau). Mod. infections occurred at Ste. Foy (D. Leblond), and in the Gaspe Peninsula and at Ste. Anne de la Pocatière, Que. (H. Genereux). The disease was less prevalent in N.B. than in recent years (C.H. Godwin). It was mod.in seed crops in P.E.I. (H. McLaren). Sl.-mod. infections were seen at bin and shipping inspections in N.S. Two lots of table stock were sev. scabbed (R.C. Layton). Sev. infections occurred in test plots at St. John's West, Nfld. (O.A. Olsen). It was widespread and mod.-sev. in intensity in the Conception Bay area. Very heavy infections were noted at Manuel's, Bay Roberts, Clarke's Beach and Searston (G.C. Morgan).

WART (Synchytrium endobioticum). Conditions in Nfld. in 1957 were favorable for wart development. Heavy infections developed on the susceptible varieties Arran Victory and Irish Cobbler in the Conception Bay and Trinity Bay areas. Crop losses were generally light to mod. but losses as high as 75% occurred in some garden plots devoted to continuous or near continuous potato culture (O.A. Olsen). Arran Victory, Bliss Triumph, Green Mountain, Irish Cobbler, Kerr's Pink and Warba were sev. affected in most wart infected areas. Keswick and Canso were sl.-mod. affected and sl. infections were seen in 2 fields of Kennebec. Sebago again showed high resistance to wart. Wart infection on the west coast of Nfld. is mostly confined to the St. George's area and to several settlements on the extreme west coast. It was sev. in 2 plots of Early Rose and 2 of Early Fortune in the St. David's area. No infection was noted at Searston or Codroy (G.C. Morgan).

CALICO (virus) was tr. on Kennebec at the Exp. Farm, St. John's West, Nfld. (O.A. Olsen).

LEAF DROP STREAK (virus). The variety Huron showed 2% infection at Smithfield, Ont. It appeared to be caused by a strain of potato virus X. (D.S. MacLachlan).

LEAF ROLL (virus) was reported from all provinces with the exception of Sask. and caused the rejection of seed fields in all provinces except Sask., Alta. and Nfld. A few of the reports are given below (D.W.C.).

In the north Okanagan district of B.C. leaf roll continues to be the greatest problem in seed potato production with 49% of the fields inspected visibly affected. Little net necrosis has occurred in seed fields but table stock growers are suffering severely. The high degree of infection in some crops could result in 100% tuber necrosis. Infections in seed stocks for the province as a whole were 134-tr. 11-sl. 8-mod. 9-sev./556 fields

inspected (N. Mayers). In Ont. District 3 the disease was present in 117/369 fields inspected and caused rejection of 13. Cherokee, Keswick, Warba and Chippewa were the varieties most affected (H.W. Whiteside). Ten fields were rejected in Que., as compared with 5 in 1956 (B. Baribeau). Leaf roll continues to be of minor importance in N.B. (C.H. Godwin), and has decreased in 1957 in P.E.I. (H.L. McLaren). In N.S. though found in 115/216 fields inspected, only 1 field was rejected (R.C. Layton). Tr. infections were seen in several varieties at St. John's West, Nfld. (O.A. Olsen). It was sl.-mod. in most fields visited in Nfld. (G.C. Morgan).

MOSAIC (virus), though generally distributed throughout the potato growing districts of Canada was less prevalent in seed fields than in 1956. In 1957, 133/11,417 or 1.16% of the fields entered were rejected for mosaic as compared with 294/11,470 or 2.8% in 1956. A few reports only will be mentioned (D.W.C.).

Mosaic was found in 7 fields in e. Ont. A plant infected by Spanish rosette was collected in a field of Sebago near Kemptville. The Huron variety showed a sev. mosaic (leaf drop and streak) (E.H. Peters). It was recorded in 332/1017 fields in Que. and caused the rejection of 44 fields. In 1956, 116 fields were rejected (B. Baribeau). The incidence of mosaic in N.B. was much the same as in 1956 (C.H. Godwin). Only half as many fields as in 1956 were rejected in P.E.I. (H.L. McLaren). In N.S. 104/216 fields inspected showed mosaic and 3 fields were rejected. An extremely sev. infection occurred in one field of Keswick (R.C. Layton). Mosaic infection was widespread in the Cormac area of Nfld. with the varieties Arran Victory, Keswick and Bliss Triumph being the most sev. affected (G.C. Morgan).

PURPLE TOP (virus) was seen in 26/105 fields in s. Alta., principally on red-skinned varieties (R.P. Stogryn), and in 59% of the fields inspected in n. Alta. (E.C. Reid). It was widely prevalent in Sask. in 1957. Owing to the severity of Rhizoctonia, critical examination was necessary to separate the two diseases (R.J. Ledingham, A. Charlebois). This disease was common in commercial fields and sev. on many varieties in plots at Brandon and Morden, Man. (W.C. McDonald). Most Man. and n.w. Ont. fields showed 1-5% purple top. Infection in 4 fields was 6-8%. This is the highest incidence of the disease in many years (D.J. Petty). One field in the Algoma district of Ont. was 50% affected and rejected for certification. Katahdin, Sebago and Russet Rural were the most sev. affected varieties in District 3 (H.W. Whiteside). Most fields in the Grand Bend and Thedford Marshes showed tr. infections with little loss (J.R. Chard). Twenty-five % infection occurred in a 5-acre field planted between affected carrot and celery crops in the Bradford Marsh (D.S. MacLachlan). Three fields of Huron were infected in e. Ont. (E.H. Peters). It was tr. in a few fields

in N.B. (C.H. Godwin) and on Sebago at Cornwall, P.E.I. (J.E. Campbell), and in a few fields in N.S. (R.C. Layton).

SPINDLE TUBER (virus). Tr. infections were found in 2 Man. fields of Columbia Russet and Kennebec (D.J. Petty). It was reported from Ont. District 3 in Katahdin, Sebago and Huron. All lots of Huron grown in the District were affected (H.W. Whiteside). Tr. amounts were observed on Sebago and Huron at bin inspection in e. Ont. (E.H. Peters). It occurred in a few fields of Kennebec and in 4/451 bins inspected in Que. (B. Baribeau). Spindle tuber was slightly more prevalent in N.B. in 1957, particularly in Kennebec and Netted Gem (C.H. Godwin), while in P.E.I. the disease showed a slight decrease from the 1956 incidence (H.L. McLaren). Sl. infections occurred in Irish Cobbler, Sebago and Kennebec in N.S. (R.C. Layton). Sev. infections in Arran Victory and sl. infections in Green Mountain and Katahdin occurred in the Cormac area, Nfld. (G.C. Morgan).

WITCHES' BROOM (virus) was 17-tr. 1-sl./18 fields inspected in B.C. (N. Mayers). It was tr. in 1 field of Netted Gem in s. Alta. (R.P. Stogryn) and tr. in n. Alta (E.C. Reid).

YELLOW DWARF (virus). A few affected plants were found in 1 field of Katahdin near Komoka, (J.T. McKercher), and in a small plot of Keswick in n. Simcoe Co., Ont. (H.W. Whiteside).

Some Recent Findings in Potato Virus Research

R.H. Bagnall

Resistance to virus Y in the potato:

Results obtained in field and greenhouse experiments during the past six years show that a number of American potato varieties are field resistant to a strain of virus Y commonly found in Eastern Canada. This resistance was correlated with necrotic response to infection. Included amongst the resistant varieties are the widely grown Katahdin, Kennebec, and Warba. Varieties reacting with rugose mosaic, such as Canso, Green Mountain, Irish Cobbler, and Keswick were relatively susceptible to field infections with virus Y. On the basis of necrotic response to virus Y, it is probable that the following varieties are also field-resistant to the common strains of virus: Canus, Cherokee, Chippewa, Earlaine, La Salle, Marygold, Norkota, Saco, Seneca, and White Cloud. (See: Bagnall, R.H. and R.H.E. Bradley. Resistance to virus Y in the potato. Phytopathology 48: 121-125. 1958).

Uncommon viruses in potatoes imported for breeding:

Studies of the reactions of different potato varieties to the common viruses have indirectly uncovered a number of unsuspected viruses in the material being tested. Several stocks of the variety Albion received from different sources in Canada and the United States were found to carry symptomlessly a virus resembling potato virus F (Clinch, Loughnane and Murphy). Similarly, several stocks of the variety Thorbecke carried a virus resembling potato virus C (Bawden), a non-aphid-transmitted strain of virus Y. It would appear that the original stocks of these varieties imported for breeding purposes, were infected with the respective viruses. These varieties have been maintained at various Experimental Stations for more than twenty years. Neither virus F nor virus C has ever been reported from Canadian or United States seed growing areas and it is improbable that they are now of serious consequence. Nevertheless if the viruses could go undetected for so long by specialists, it is doubtful if field inspectors or even plant pathologists could identify them by visual means. Several other viruses, as yet unidentified, have been found in imported potato stocks.

Early and late-maturing Irish Cobbler potatoes correlated with strains of virus X:

The Irish Cobbler potato variety has long been known to be entirely infected with virus X. During greenhouse eye-indexing tests of different stocks of this variety, selections were made of plants showing distinct foliar mottling and others appearing entirely healthy. Sap inoculations to Datura tatula and Nicotiana tabacum (var. White Burley) indicated that the mottled Irish Cobbler harbored a relatively "severe" strain of virus X, while the "healthy" Irish Cobbler harbored a relatively "mild" strain of the virus. All stocks of Irish Cobbler so far tested, have been found infected with virus S, but in the present instance, no viruses other than S and X could be demonstrated. Tubers from the Irish Cobbler selections were regrown in the field for multiplication, the progeny of each original selection being kept separate. During 1956 and 1957, replicated trials were run to determine the growth habit and yielding ability of the various selections. The results showed that the plants appearing mottled in the greenhouse gave rise to large, upright, dark-green, comparatively late-maturing field plants which blossomed profusely and set two or three seed-balls per plant. The "healthy" greenhouse plants on the other hand, gave rise to comparatively small, spreading, light-green, and early-maturing field plants which developed few blossoms and set no seed. There appeared to be no difference in yielding ability between the early and late maturing types when they were top-killed 90 days after planting. Yields in 1957 averaged 398 and 405 bu. per acre, respectively, at this stage. The early maturing plants top-killed more readily however, and were more easily harvested. When the two types of Irish Cobbler were left 110 days before top-killing,

yields of the late maturing type were significantly higher, averaging 503 bu. per acre against 436 for the early maturing type. As a result of these selections, we have two distinct types of Irish Cobbler potato. It is probable that the extremes can be widened still further by selection amongst the individual tuber-lines. There is reason also, to believe that similar results could be obtained with other potato varieties. With one variety, earliness may be of prime importance, while yield at a later date would be the main consideration with another. It is therefore suggested that some fresh thought should be given to what is actually being accomplished by the extensive eye-indexing programs. These, after all, are conducted under artificial greenhouse conditions.

HAYWIRE (? virus). Thirteen affected plants were seen in 6 fields in B.C. Eleven of these were in 1 field of 60 acres in the Pemberton district (N. Mayers). It was tr. in 2/105 fields in s. Alta. (R.P. Stogryn), and tr. in 7% of the fields inspected in n. Alta. (E.C. Reid).

FROST INJURY was tr. in the n. Okanagan and s.e. B.C. (N. Mayers). In n. Alta. low temperatures during the harvesting season rendered tubers unduly brittle and subject to bruising or cracking (E.C. Reid). It caused quite extensive losses in some parts of Sask. (A. Charlebois). Sl. damage occurred in the Guelph district (W.L.S. Kemp) and in e. Ont. (E.H. Peters). Frost injury in Que. was confined to the n.w. portions of the province where frost occurred in late Sept. (B. Baribeau). Some injury occurred on the west coast of Nfld. (G.C. Morgan).

BLUE SPOTTING (physiological) was economically important in Netted Gem tubers grown in the lower Fraser Valley, B.C. in 1956 and in the dry, southern interior of B.C. in 1957. It has been identified as a disease previously described in Holland, Great Britain and the U.S.A. as "blue spotting", "black spotting" and "internal black spot". The direct cause is an enzymatic reaction probably involving polyphenoloxidase which is incited in susceptible tubers following handling bruises. Predisposing factors are those which contribute to flaccidity in tubers such as potash deficiency, soil moisture shortage, or low humidity in storage. Insufficient soil moisture during the month preceding maturity is believed to be the principal predisposing factor in B.C. (N.S. Wright). see P.D.R. 41: 608-611. 1957. (D.W.C.).

BROWN EYE (cause unknown). This disease was noted for the first time in P.E.I. in 1957. It occurred in tr. amounts in Sebago. A similar disease called "pink-eye" has been reported in Maine and Connecticut where it has sometimes caused sev. damage. Wherever found, brown-eye has occurred in Verticillium infected fields but it is apparently only indirectly associated with wilt. Verticillium has not been

recovered from brown-eye lesions but Pseudomonas bacteria are often present in great abundance (D.B. Robinson).

HOLLOW HEART (physiological) was encountered in a number of fields in B.C., but was rarely serious (N. Mayers).

GIANT HILL was present in trace amounts in 20 fields in s. Alta. (R.P. Stogryn). Symptoms of the disease were observed in a few fields in the Dufferin district on Ont. (H.W. Whiteside). It was seen in 9/216 fields in N.S., particularly in Netted Gem, Green Mountain and Irish Cobbler (R.C. Layton).

STEM END DISCOLORATION (non-parasitic) was reported in 5% of the bin lots inspected in Que. One lot of Green Mountain with 60% of the tubers affected was rejected (B. Baribeau).

MAGNESIUM DEFICIENCY was sev. causing interveinal necrosis and brown lesions on the foliage of Irish Cobbler and Katahdin and to a lesser extent on Green Mountain at Ste. Foy, Que. (D. Leblond).

In August, 1957, Mr. H. Genereux made a survey of potato fields and home gardens in communities on the north shore of the St. Lawrence from Riviere au Tonnerre in Quebec to Forteau Bay in Labrador. He reports the following diseases in the Quebec communities.

Early Blight (Alternaria solani) was sev. in 1/12 fields at Riviere au Tonnerre, in 1/17 at Magpie and in 2/11 at Longue Pointe de Mingan; sl.-sev. in 8/45 at Hâvre St. Pierre; sl. in 7/43 at Ile à Michon and in 2/14 at Natashquan; tr. in 5/56 at Aguanish.

Bacterial Ring Rot (Corynebacterium sepedonicum) was found in tr. amts. in 2/43 fields at Ile à Michon.

Black Leg (Erwinia atroseptica) appeared in tr. amts. at Riviere au Tonnerre, Magpie, Riviere St. Jean and Tête à la Baleine. It was also tr. in 6/45 fields at Hâvre St. Pierre, 3/26 at Aguanish, 4/40 at Ile à Michon, and 6/17 at Lourdes de Blac Sablon.

Rhizoctonia (Pellicularia filamentosa (R. solani) was sl. in 1/45 fields at Hâvre St. Pierre and tr. in 1/14 at Natashquan.

Late Blight (Phytophthora infestans) was sl.-mod. in 3/45 fields at Hâvre St. Pierre and sl. in 1/11 at Longue Pointe de Mingan.

Powdery Scab (Spongospora subterranea) was present in 1/17 fields at Lourdes de Blanc Sablon.

Common Scab (Streptomyces scabies) was present in most fields at Riviere au Tonnerre, Longue Point de Mingan, and at St. Augustin; 9/22 fields at Ile à Michon had sl.-sev. scab; 7/37 fields at Hâvre St. Pierre, 8/26 at Aguanish, and 10/14 at Natashquan showed tr. amts. of common scab.

Leaf Roll (virus) was tr. in 1/43 fields at Ile à Michon.

Mosaic (virus) was the predominant disease at Riviere au Tonnerre; it was sev. on Green Mountain at Magpie; a few sev. affected plants were found in 16/26 fields at Aguanish, 12/43 at Ile à Michon, 1/14 at Natashquan and 1/17 at Lourdes de Blanc Sablon; a tr. of mosaic was observed at Tête à la Baleine and St. Augustin.

In the 3 Labrador communities surveyed these diseases were recorded.

Black Leg (Erwinia atroseptica) was sl. in 5/10 fields at Forteau Bay and tr. in 5/14 at Pointe Anse Eclair.

Mosaic (virus) was seen in 1 field at Pointe Anse Eclair and in 1/10 at Forteau Bay.

PUMPKIN

POWDERY MILDEW (Erysiphe cichoracearum) was general on all varieties of pumpkin foliage late in the season in the Okanagan Valley, B.C. (G.E. Woolliams). It was prevalent in several fields in Essex Co., Ont. on pumpkins grown for canning. Foliage was prematurely destroyed in Sept. (C.D. McKeen).

RADISH

WHITE RUST (Albugo candida) infected greenhouse-grown radishes at Beauport, Que. (D. Leblond).

RHUBARB

RING SPOT (virus) sev. affected a single plant in a planting at Charlottetown, P.E.I. (R.R. Hurst).

SPINACH

WILT (Fusarium oxysporum). A 20% infection of wilt was seen at Les Saules, Que. (D. Leblond). At Ste. Anne de la Pocatiere, Que., 25% of the plants in one field were infected (L.J. Coulombe).

SQUASH

POWDERY MILDEW (Erysiphe cichoracearum) was prevalent during late Aug. and during Sept. on all squash crops in Essex Co., Ont. Premature defoliation resulted (C.D. McKeen).

LEAF SPOT (Septoria cucurbitacearum). A sev. outbreak developed in Aug. in a garden plot at Kentville, N.S. The vines lost their foliage early and an estimated 20% decrease in yield was sustained (K.A. Harrison).

SWEET CORN

STEWART'S WILT (Bacterium stewartii). At Anderson, Essex Co., Ont. 5% of the plants in a 1/2 acre section of a 15-acre field were infected with bacterial wilt. This portion of the field had not received an application of D.D.T. (R.W. Walsh).

SMUT (Ustilago maydis). Specimens were received from Corning, Sask. (T.C. Vanterpool), and from two widely separated districts in Sask. The disease is comparatively rare in the province (R.J. Ledingham). Specimens were received at the Kentville laboratory from scattered points in N.S. It is not important in commercial fields (J.F. Hockey).

LEAF SCORCH (physiological). Plants at La Prairie, Que. showed leaf scorch due to a water deficiency (R. Crete).

TOMATO

Diseases of Canning Tomatoes in Southwestern Ontario in 1957

W.G. Benedict

Anthracnose (Colletotrichum sp.) continues to be the most important disease of the canning tomato crop. Field experiments on anthracnose control were conducted in 1957 using two different spray schedules on many of the locally grown varieties and some anthracnose-resistant varieties. The data obtained indicated that bimonthly applications of Manzate at the rate of 3 lbs. per acre beginning early in July and continuing until the second

week in Sept. gave satisfactory control of the disease in early maturing varieties. Differences in yields from sprayed and unsprayed plots of varieties ripening in mid-season or later were small at the peak of the harvest season about 30 Aug. However, during the following weeks almost twice as many disease-free fruits were picked from sprayed than from unsprayed plots. Where the second spray was delayed until ripe fruit appeared, slightly lower yields resulted. There are at present a few high-yielding tomato varieties that are resistant to anthracnose under local conditions on soil types and in areas where anthracnose is most prevalent.

Late Blight (Phytophthora infestans) appeared in 1957 for the first time in nearly a decade. The disease was confined to certain districts across the northern part of Essex Co. and caused considerable losses in isolated fields in late Aug. and early Sept.

Root lesioning and Damping off (Rhizoctonia solani) occurred again in 1957 where tomato plants were transplanted into non-steamed compost soil and placed in an A-type greenhouse to grow until planting time. Varietal differences in susceptibility to this fungus were evident. In the Harrow variety 66/250 plants were killed in comparison with 10/250 plants of the variety Valient. Few Harrow plants in the test lacked extensive root lesions during the early stage of attack by the fungus. The plants which survived were retarded but later developed normally.

Other Observations

EARLY BLIGHT (Alternaria solani) was sl. in the early basket crop in s. Essex Co., Ont. A higher incidence of disease was observed in several unsprayed canning crops throughout the county (C.D. McKeen). It was present in most fields in the Burlington-Toronto area. A potentially serious outbreak was checked by a combination of sprays and better weather conditions (E.F. Muir.) Traces of early blight were present in many fields in Hastings and Prince Edward Counties, Ont. but in contrast to 1956 did not cause serious defoliation (J. Cutcliffe). Early blight was widespread in fields in Queens and Sunbury Counties, N.B., but did little damage (S.R. Colpitts). Sl. infections were seen on Bonny Best (R.R. Hurst), and on Monarch, with some fruit lesioning at Charlottetown, P.E.I. (J.E. Campbell). Sev. outbreaks developed on all varieties in Kings Co., N.S. during the summer and defoliation was heavy. An estimated 15% of the crop was unmarketable because of fruit spotting (K.A. Harrison). Fifty % of the fruit of Valnorth was affected with rot at the Exp. Farm, St. John's West, Nfld. (O.A. Olsen).

GRAY MOLD (Botrytis cinerea) was general throughout the fall greenhouse tomato crop in Essex Co., Ont. In many instances sev. foliage infections prevented the proper sizing of fruit. By early Dec. the most

seriously affected crops were nearly defoliated (R.W. Walsh). Gray mold rot, which caused serious losses to a grower at Berwick, N.S., in 1956, was kept well under control on the same farm in 1957 by the use of Thylate in the spray program. Losses were estimated at 5%. At Kentville, N.S. in replicated plots of the variety Stokesdale, 27% infection was recorded. Results obtained in spraying experiments at Kentville in 1956 and 1957 indicate strongly that Botrytis on field tomatoes is favored by the application of carbamate sprays (K.A.H.).

LEAF MOLD (Cladosporium fulvum) occurred in the greenhouse at Fort Vermillion and in Edmonton, Alta. (W.P. Campbell). The disease appeared in four large greenhouses at Harrow, Ont. in the spring crop and yield was reduced by one-third. Since leaf mold is seldom troublesome at this time completely susceptible varieties are often grown in the spring crop greenhouses. High atmospheric humidities in the spring of 1957 favored leaf mold development (C.D. McK.). A. sl. attack developed in March in a greenhouse at Kingston, N.S. (K.A.H.).

WILT (Colletotrichum atramentarium). The development of a wilt condition in a 10-acre field near Burgessville, Oxford Co., Ont. resulted in the entire field being affected by harvest time. Sev. affected plants showed marked vascular discoloration. Isolations and infection tests indicate that C. atramentarium is involved in this disturbance, which, in the field resembles Fusarium wilt (B.H. MacNeill). (see MacNeill, B.H., P.D.R., 41:12, 1032, 1957). (D.W.C.).

ANTHRACNOSE (Colletotrichum spp.). In general, anthracnose was much less serious in 1957 in canning crops in Essex Co., Ont. than it has been for several years. The cool, wet summer may not have favored the disease (C.D. McK.). Tr. infections were noted in Hastings and Prince Edward Counties (J. Cutcliffe). Commercial fields in N.S. showed very little anthracnose, but some gardens and plots on the Exp. Farm, Kentville where tomatoes are raised year after year were mod. affected (K.A.H.).

Tomato Anthracnose in Ontario

W.I. Illman and R.A. Ludwig

A survey was made of the tomato anthracnose organism as it affects the canning crop in Ontario. For this purpose infected fruits were collected from cannery trim lines by cooperating field-men and sent to the London Laboratory for examination. The affected fruits thus obtained were representative of the entire tomato growing area. A total of 105 isolations were made in 1956 and 169 in 1957. These, with one exception, were

sclerotium forming types, showing only minor cultural variations and agreed in all characteristics with von Arx' s description (1) of Colletotrichum atramentarium (Berk. & Broom) Taubenh. A typical culture was subsequently sent to Dr. J.A. von Arx who confirmed this identification (2). The single exception mentioned was a culture of Colletotrichum dematium isolated from one of several lesions on a fruit sent in from Ridgetown in 1957.

Isolates received during 1957 from affected field-grown fruits in Wisconsin, Ohio, Pennsylvania, New Jersey, Delaware and Nova Scotia, all proved to be C. atramentarium. A conidial strain of Glomerella cingulata (Stonem.) Spauld. & v. Schrenk (Colletotrichum gloeosporioides Penz.) was isolated in Maryland and one producing spores of similar size and shape was recovered from a fruit collected September 5, 1957 on a field excursion to Essex County, Ontario.

Cultures isolated from potato tubers were obtained from Nova Scotia, the Netherlands and Quebec. All were morphologically indistinguishable from the tomato fruit isolates. The Nova Scotia and Netherlands potato isolates produced typical anthracnose lesions on tomato fruits following artificial inoculation with aqueous spore suspensions.

(1) Arx, J.A. von, Die Arten der Gattung Colletotrichum Cda. Phytopath. Zeits. 29 413-468, 1957.

(2) Arx, J.A. von, Personal communication.

Pantidou and Schroeder (Phytopath. 45: 338-345, 1955), found that some fruit rotting isolates of Colletotrichum spp. were able to infect tomato roots and stems, and one isolate from tomato roots was highly pathogenic to tomato fruits. The inference is strong that they may have had a strain of C. atramentarium which has been shown by various authors to be the cause of a root rot, and more recently, (MacNeill, B.H., P.D.R. 41: 12, 1032, 1957), a wilt of tomatoes.

The presence of C. gloeosporioides Penz. (C. phomoides Chester) as well in the anthracnose complex in Ont., as shown by Illman and Ludwig, confirms the earlier findings of Richardson (P.D.S. 36: 92. 1957). Both authors have isolated from rotted fruit the conidial stage of Glomerella cingulata.

The implications of the findings of Illman and Ludwig and those of MacNeill reported above are far reaching. They will necessitate a re-examination of our concepts of the etiology of some of our most important disease problems in field-grown tomatoes (D.W. Creelman).

BACTERIAL CANKER (Corynebacterium michiganense) was seen on greenhouse plants in the Lower Fraser Valley (H.N.W. Toms), and affected 10-20% of the crop in fields at Cranston and Kamloops, B.C. Early affected plants succumbed (G.E. Woolliams).

PHOMA ROT (Phoma destructiva) caused up to 10% loss of fruit in plots at Ste. Foy, Que. (D. Leblond). Tr. infections occurred on Stokesdale at Kentville, N.S. (K.A.H.).

LATE BLIGHT (Phytophthora infestans). Initial infection was sev. in test plots at the University, Vancouver, B.C. by the end of July following cool, moist weather. By mid-Sept. 25% loss of fruit was recorded. Varying amts. of foliage blight developed on the Ottawa blight-resistant strains 056-723-1, 056-701-1, 056-701-5, and 056-701-12, but in no case was the fruit attacked (H.N.W. Toms). In n. Essex Co., Ont. late blight appeared in a field near Tilbury on 22 July, and in three other widely separated fields in the n. and w. portions of the county before mid-Aug. All these outbreaks were in fields set with Georgia-grown plants. During Sept. blight became widespread in n. Essex and caused 50-60% loss in some fields. Well sprayed fields suffered insignificant losses. Late blight entered several greenhouses at Leamington causing a total crop loss in some and considerable defoliation and some fruit infection in others. Damage was also sev. in many canning crops in Kent Co. A greenhouse crop at Ridgetown was destroyed (C.D. McK.). Blight was not serious in the Burlington-Toronto area. At the most, 2 or 3 fields suffered 10% damage (E.F.M.). In Hastings and Prince Edward Counties blight was first observed in fields set with southern-grown plants. Since blight has not been prevalent in the district during the past 5 or 6 years it is strongly suspected that the disease accompanied the imported plants. Generally dry weather and the use of fungicides held the overall loss at less than 10% (J.C.). Specimens were received from Dresden, Ont. (H.N. Racicot). In check plots at Ste. Foy, Que. 75% of the tomatoes were blighted (D.L.). Mod. losses were incurred at Charlesbourg (L.J. Coulombe), and 25% loss of the late crop occurred at Ste. Anne de la Pocatiere, Que. (H. Genereux). Late blight caused little loss in Queens, York, and Sunbury Counties, N.B. (S.R.C.). Mod. infections were fairly general on unsprayed crops in P.E.I. (J.E.C.). Late blight did not appear in fields in Kings Co., N.S. until mid-Sept. Two growers who had not sprayed their fields lost their late crops. The standard spray programs gave good control (K.A.H.). Foliage infection at St. John's West, Nfld. was 10-20%. No fruit infection occurred (O.A. Olsen).

BACTERIAL SPECK (Pseudomonas tomato). Fruits from one field in Leamington, Ont. bore speck lesions (C.D. McK.). Specimens were received from the Montreal and Quebec regions. P. tomato was confirmed

by M.D. Sutton (H.N.R.). Speck was quite general in several fields in Ste. Hyacinthe and Ste. Martine, Que. (R. Crete). It was observed at Ste. Foy, Que. on Asgrow. This is the first observation in the district for 10 yrs. (D.L.).

STORAGE ROT (Rhizopus nigricans). Tomatoes at the retail level from Jonquiere, Que. had R. nigricans growing in growth cracks (D.L.).

SEPTORIA LEAF SPOT (S. lycopersici) sev. defoliated most of the early tomato crop in s. Essex Co., Ont. soon after the beginning of harvest. Many growers had gambled on weather conditions and had omitted protective sprays. Adequately sprayed fields produced clean crops and good yields (R.W.W.). A few fields in Hastings and Prince Edward Counties showed sl. infection. The variety Ferguson appeared quite susceptible. The disease was less prevalent than in 1956 (J.C.). Leaf spot was sev. at St. Pierre les Becquets, Que. (D.L.).

SCLEROTINIA ROT (S. sclerotiorum). Tr. infection developed at the Exp. Farm, Kentville, N.S. A few fruits were destroyed and adjacent stems killed by the disease (K.A.H.).

VERTICILLIUM WILT (V. albo-atrum) was widely distributed and caused marked reductions in yields in many fields in B.C. (W.R. Foster). Approximately 40% infection occurred in commercial fields in B.C.'s Okanagan and Thompson Valleys (G.E. Woolliams, E.M. King). Up to 20% damage was suffered by a few growers in the Burlington-Toronto area (E.F.M.).

BACTERIAL SPOT (Xanthomonas vesicatoria). Specimens were received at the Ottawa laboratory from Chatham, Ont. The causal organism was verified by M.D. Sutton (H.N.R.). Mod. damage was caused by a 30% infection on Bounty at Deschambault, Que. (L.J.C.).

DAMPING-OFF (pathogens undetermined) was widespread in greenhouses in N.B. and caused a loss of 10% of the plants at Mampstead (S.R.C.).

BLOTCHY RIPENING (? virus), with varying amounts of browning of the vascular tissues was common in the spring crop of greenhouse tomatoes at Kingston and Falmouth, N.S. The plants had sev. mosaic symptoms. The disease was also found in most commercial fields in Kings Co. during the summer but was not serious enough to cause the culling out of affected fruits (K.A.H.).

BLACK CORE (? virus). A few affected fruits were obtained from one field in Essex Co., Ont. Tobacco mosaic virus was isolated from the fruits (C.D. McK.).

BROWN WALL (Tobacco mosaic virus) was less prevalent than usual in the early basket and canning crops in Essex Co., Ont. It was reported to be serious in Norfolk and Simcoe Counties in s. Ont. It affected the fruit on 1 or 2 trusses of the variety Vinequeen in several fall crops (C.D. McK.). Losses ran as high as 12% in many fall greenhouse crops in s.w. Ont. (R.W.W.).

MOSAIC (virus). The fall greenhouse crops in the Leamington, Ont. area showed a higher incidence of infection than usual (C.D. McK.). Most commercial plantings in Hastings and Prince Edward Counties, Ont. contained some mosaic, though infection was only tr.-sl. (J.C.). Mosaic affected 4% of 7000 Red Cloud plants at Gagetown, N.B. (S.R.C.). Mosaic was sev. in greenhouse crops in Kings and Hants Counties, N.S., but did not appear until quite late in the summer in commercial fields (K.A.H.).

PURPLE TOP (Callistephus virus 1) was widely prevalent on tomatoes in Sask. in 1957. Usually 5-10% of the plants were diseased and these showed very sev. symptoms (R.J. Ledingham). Purple top was common in all parts of Man. (W.C. McDonald). Affected plants were found scattered through many canning crop fields in Essex and Kent Counties, Ont. (C.D. McK.).

STREAK (virus). Single virus streak appeared first affecting about 80 plants in a large greenhouse at Leamington, Ont. in mid-Sept. It later spread throughout the entire greenhouse causing sev. foliage and stem injury. Some fruits developed black lesions rendering them unmarketable (C.D. McK.). Streak was seen in 2 greenhouses in the Burlington-Toronto area with 1 grower suffering 10% loss from the disease (E.F.M.). A sev. outbreak occurred in a commercial field near Burgessville, Oxford Co., Ont. Infection experiments with juice from diseased plants indicate that the tomato spotted wilt virus as well as tobacco mosaic virus and potato virus X may be involved as a complex causing the type of necrosis commonly known as streak (B.H. MacN.). Double virus streak appeared late in the season in a field in Kings Co., N.S. An adjacent potato field was the probable source of one of the viruses (K.A.H.).

BLOSSOM-END ROT (physiological) was not seen in the University or laboratory plots at Vancouver, B.C. (H.N.W.T.). It was more sev. in Sask. than for several years. Some cases of heavy losses, up to 25%,

were reported. Extremely dry, hot weather prevailed for a period in late July followed by rain and cool weather in Aug. (R.J. Ledingham). Enquiries regarding the disease were received at Saskatoon following hot weather late in July (T.C. Vanterpool). Blossom-end rot was less serious than usual in Kent and Essex Counties, Ont., probably because of the wet, cool summer (C.D. McK.). It was present in a field near Leamington, Ont. (W.G. Kemp). The condition was not serious in the Burlington-Toronto area in 1957 (E.F.M.), but was quite prevalent in Hastings and Prince Edward Counties, particularly on fruit of the first trusses. In the most sev. cases 75% of the fruits of the first picking were affected. Rains in early Sept. checked its development on later pickings. The varieties Manitoba, Sioux, Glamour and Moreton Hybrid showed considerable tolerance to the disease while John Baer appeared very susceptible (J.C.). Specimens on Ball's Extra Early were received from a greenhouse crop at Ville la Salle, Que. The grower stated that this variety was more susceptible than others in the crop (H.N.R.). It was tr. in a garden in Queens Co., P.E.I. (R.R.H.). Blossom-end rot was serious in the Annapolis Valley, N.S. early in the season, but later rains checked its development (K.A.H.).

CHEMICAL INJURY. Injury from 2,4-D ester sprays was extensive on many tomato crops in s.w. Ont. Evidence was obtained to show that the application of low volatile esters within 1/2 mile of a tomato crop may damage it considerably (C.D. McK.). At Leamington, Ont. one greenhouse crop was injured following the application of the hormone N-M-tolylphthalamic acid (Duraset 20W) at the rate of 200 ppm. The chemical is used to increase bloom. Injury was typical of 2,4-D injury. Affected plants required about 4 weeks to recover (R.W.W.).

GROWTH CRACKS. Intermittant rains during the harvest of the canning crop in s.w. Ont. caused many otherwise sound fruit to split. Invasion of secondary rot organisms such as Alternaria, Rhizopus and Penicillium caused a further loss. Some growers lost up to 50% of their marketable fruit from these causes (R.W.W.). Showery weather resulted in many growth cracks on fruit in Sunbury and Queens Counties, N.B. Loss was as high as 15% in some fields (S.R.C.).

DROWNING. As the result of torrential rains in early July several acres of tomato plants were destroyed in low-lying areas in s. Essex Co., Ont. (C.D. McK.). A leaf rolling condition, due to excessive soil moisture was sl.-mod. in several fields in Missisquoi Co., Que. (R. Crete).

TURNIP

SOFT ROT (Erwinia carotovora) caused sl. damage in a 1-acre field in Queens Co., P.E.I. (R.R. Hurst). Sev. infections developed in 2 carloads stored at St. John's; in 300 bogs at Lethbridge and in 750 bags at Clarenville, Nfld. (G.C. Morgan).

BLACK LEG (Phoma lingam). A specimen was received from Cumberland Co., N.S. The grower reported that the disease was causing serious damage (K.A. Harrison).

CLUB ROOT (Plasmodiophora brassicae) was sev. at Les Saules, Neuville and St. Romuald, Que. (D. Leblond), and was observed at Natashquan, on the n. shore of the Gulf of St. Lawrence (H. Genereux). A few isolated cases of sev. club root infection in swedes were noted in P.E.I. in 1957 in contrast to the widespread and destructive outbreaks in 1956. Relatively low moisture levels following seeding in 1957 were not favorable for infection (G.W. Ayers). Club root was reported from all areas of Newfoundland where turnips are grown. Damage varied from sl.-sev. (O.A. Olsen), mod.-sev. infections were evident in the low lands of Clarke's Beach, the south shore and in the Bonavista Bay area. Infections in several small plots at Trinity Bay were 75-100%. It was mod.-sev. in 8 commercial fields on the west coast and sl.-mod. in 12 others (G.C. Morgan).

SCAB. (Streptomyces scabies). Considerable scab developed on a limed plot at Charlottetown, P.E.I. (J.E. Campbell).

BLACK ROT (Xanthomonas campestris) appeared to be widely scattered throughout P.E.I. in 1957 in the Laurentian variety. At Guernsey Cove infection was 2% and at Brackley it was 1% (G.W.A.). Tr. infections were seen in Laurentian at Torbay, Nfld. (O.A.O.).

STORAGE ROTS (various organisms). Specimens received from Beauport West and St. Laurent, Que. yielded Ascochyta sp. Botrytis cinerea. Oospora lactis, Rhizopus nigricans and Erwinia carotovora (D.L.).

BROWN HEART (boron deficiency) occurred at Beauport West, St. Laurent and Giffard, Que. (D.L.). It was tr. on a limed plot at Charlottetown, P.E.I. (J.E.C.). Specimens were received from several localities in Colchester Co., N.S. (K.A.H.).

CHEMICAL INJURY. Drift of 2,4-D from brush spraying ruined a 12-acre field of turnips at Bird's Hill, Man. (W.L. Gordon).

WATERMELON

ALTERNARIA ROT (A. cucumerina) caused the loss of 30% of the melons in a small plot at Nepean, Ont. (V.R. Wallen).

ANTHRACNOSE (Colletotrichum lagenarium). A mod. infection was noted in a garden near Harrow, Ont. (C.D. McKeen).

FUSARIUM WILT (F. bulbigenum var. niveum) caused wilting and death of 75% of the plants in a half-acre planting near Harrow, Ont. (C.D. McK.).

IV. DISEASES OF FRUIT CROPS

A. POME FRUITS

APPLE

STEM-END ROT (Botrytis cinerea) was sev. on McIntosh in cold storage at St. Pierre, Orleans Island, Que. in Feb. 15/19 fruits examined had stem-end lesions and 4/19 had blossom-end lesions (D. Leblond).

CANKER (Cytospora sp.) was sev. following fire injury to the base of one tree at St. Aubert, Que. The Tubercularia stage of a Nectria was also present (J.A. Parmelee).

LEAF SPOT (Entomosporium maculatum) was mod. on apple seedlings growing near infected pears at Ottawa (J.B. Julien). This organism is rarely reported on apple, and the present report is the first to the Survey (D.W.C.).

FIRE BLIGHT (Erwinia amylovora) continues to be a major problem in apples and crab apples in Sask. Specimens were received from 6 gardens in Saskatoon (R.J. Ledingham). At the Morden, Man. Exp. Farm a 3-year control program was initiated. Two applications of weak Bordeaux were made, the first at the early blossom stage. Twig infections were not found until after hold-over cankers had become active late in May, after which new spur and terminal twig infections multiplied rapidly. Beads of exudate were common. Attempts at eradication by the removal of cankers were ineffective because of the large number of infections (W.A.F. Hagborg). For the first time in several years fire blight caused noticeable injury on apple in s. Essex Co., Ont. About 10% of the trees in an orchard at Harrow had 1 or more large limbs killed by the organism (R.W. Walsh). Infection in Hastings Co., Ont. was light in 1957. Apparently much of the heavy infection seen in 1956 was killed out during the cold winter of 1956-57 (J. Cutcliffe). Fire blight was sl.-mod. in the Hemmingford-Franklin district of Que. It was more prevalent on Yellow Transparent, Fameuse and Golden Russet than on McIntosh (R. Crete). Specimens were received from five counties in Que. (D. Leblond).

RUST (Gymnosporangium spp.) In Prince Edward Co., Ont. G. juniperi-virginianae was much less prevalent in commercial orchards than in the previous two years (J. Cutcliffe). Fifty % of the fruit of one tree was heavily infected with G. clavipes at St. Aubert, Que. Nearby clumps of Juniperus communis had been found infected in May (J.A. Parmelee). Tr. infections of G. clavipes were found on Red Delicious and Wagner at Clarence, N.S., (J.F. Hockey).

POWDERY MILDEW (Podosphaera leucotricha) has increased very little in the Okanagon Valley, B.C. from the low level of incidence following the severe winter of 1955 (D.L. McIntosh). It was generally less prevalent in the laboratory orchard, St. Catharines, Ont. than in 1956. It appeared more sev. on trees sprayed with organic fungicides. The addition of a small amount of sulphur to the organic fungicides was beneficial in checking the disease. The occurrence of mildew on the variety Cortland was reported from the St. Catharines district (G.C. Chamberlain). Powdery mildew was common throughout the Niagara Peninsula on susc. varieties including Delicious and McIntosh (R. Wilcox, W.S. Carpenter). Infection was light in a nursery at Rougemont and tr. at St. Jean Baptiste, Que. (J. Ringuet).

BROWN ROT (Monilinia laxa) occurred in tr. amounts on the variety Newtown at Queen's Bay in the Kootenay district of B.C. (L.E. Lopatecki).

SCLEROTINIA ROT (Sclerotinia sclerotiorum). The calyx-end rot of apple caused by S. sclerotiorum, reported in 1956 (P.D.S. 36: 99. 1957), was again observed in the same orchard as well as 3 other orchards in the Coldbrook-Cambridge area of N.S. (J.F. Hockey).

SILVER LEAF (Stereum purpureum) affected half of one Jonathan tree at Cambridge, N.S. (R.G. Ross).

PINK MOLD ROT (Trichothecium roseum) caused sl. damage on the variety McIntosh on the market at Charlottetown, P.E.I. (R.R. Hurst).

SCAB (Venturia inaequalis) was general on unsprayed trees and particularly sev. on McIntosh on Vancouver Island (W. Newton). Losses in the Salmon Arm district of B.C. were particularly heavy, running to 100 per cent in some orchards of McIntosh. Prolonged rainy weather, prior to and just after bloom, favored scab development; made difficult the operation of spray equipment in many orchards; and prevented the application of necessary sprays at critical periods. Rainy weather during June and July aided the development of foliage scab in some districts of the Okanagan but fruit losses, except in a few orchards, were negligible. Scab was recorded for the first time in the Keremos district (D.L. McIntosh). It was observed at Vandura, Sask. (T.C. Vanterpool). Apple scab was mod.-sev. in orchards in s. and central Ont. Unsprayed trees in plots at St. Catharines had 100 per cent scabby fruit and the foliage was overrun with lesions. Scab in sprayed plots ranged from 0-41% (G.C. Chamberlain). Unprotected orchards in the Niagara Peninsula were heavily infected from a primary infection period 10, 11, 12 May. McIntosh was in full bloom at the time (R. Wilcox, W.S. Carpenter). There were several sev. infection periods in the Lambton-Huron area of Ont. just before and during bloom.

Some growers were forced to use full strength eradicant (mercury) during bloom. Foliage scab was general by mid-June but fruit infection was generally light. Weather conditions from mid-July on were favorable for controlling scab (J.R. Chard). In the Burlington-Toronto area infection periods occurred 10, 11, 12 May, 15 May, and 17-20 May; the last being the heaviest of the season. Scab was heavy early in the season but by careful spraying most growers produced a relatively clean crop of fruit. Severely affected orchards had 25% or more scab, but generally it was less than 10% (E.F. Muir). In Hastings and Prince Edward counties infection periods were more numerous and more sev. than in 1956. Two sl. infection periods occurred after the green tip stage in late April followed by 2 mod. and 3 heavy during May. Eradicants were used extensively with good results where properly applied. Approximately 5% of the crop, mostly from poorly sprayed blocks, showed scab infection at harvest time (J. Cutcliffe). In s.w. Que. sev. scab infections occurred on 9-10 May at the pre-pink stage, 14-15 May at early bloom, 22-23 May at late bloom and on 25-26 and 29 June. Light infections were recorded on 2 and 12 June. Scab lesions were evident about 1 June. Unsprayed orchards were heavily infected but most blocks were kept reasonably free of scab by frequent well-timed fungicide applications. Dry weather in Aug. helped check scab development and little pin-point scab was evident (L. Cinq-Mars). Scab was sl.-mod. even in unsprayed orchards of Fameuse, McIntosh, Melba and Lobo at Cap St. Ignace and L'Islet, Que. (L.J. Coulombe). Generally speaking, scab was well controlled in N.B. One grower, through poor timing of sprays, had an 80% infection on McIntosh (S.R. Colpitts). Ascospores matured early in N.B. but the first discharge was delayed until 15 May. There were 3 subsequent infection periods. Well sprayed orchards were clean but otherwise much early and considerable late pin-point scab developed (J.L. Howatt). Scab was unusually light in P.E.I. in 1957. Bright, dry weather prevailed during the bloom period (G.W. Ayers). A heavy infection was seen on Snow apples in Queen's Co., P.E.I. (R.R. Hurst). In N.S. infection periods were sufficiently far apart in 1957 to enable orchardists who used eradicant fungicides to save 2 spray applications before bloom. The development of a non-phytotoxic eradicant fungicide that could be used after bloom would save growers both time and money in spraying. The material Cyprex (n-dodecyl guanidine acetate) appears to hold some promise in this regard under N.S. conditions judging from preliminary tests (J.F.H.). Scab was sev. on fruit at St. John's and Bloomfield, Nfld. Trees on the Exp. Farm, St. John's, were sprayed regularly with captan and remained scab-free (O.A. Olsen). Unsprayed trees in the Bonavista Bay area and on the west coast were heavily infected (G.C. Morgan).

MOULDY CORE (saprophytic fungi) developed in the cores and calyx tube cavities of many abnormally large Delicious apples at Naramota, B.C. (D.L. McI.). About 15% of the crop of one 15-acre block of Delicious in the

Burlington-Toronto area was similarly affected. The affected applies, about 1 Aug., showed more color than others. When cut open they disclosed a blue mold, probably Penicillium sp. in the core (E.F. Muir).

COLLAR ROT (cause undetermined) killed 11 trees in an orchard at Gagetown, N.B. The bark was dead and the trees completely girdled at ground level (S.R. Colpitts).

STEM PITTING (virus) was identified in B.C. in 1955 in Virginia Crab and Robin hardy frameworks. It was suspected, in mild form in Robusta V frameworks and in the Golden Delicious variety. Surveys in 1957 included additional trees of Golden Delicious on Robusta V and all varieties on Haralsen frameworks, the framework now recommended for colder parts of the Okanagan Valley. Mild pitting was found in Robusta V and in Golden Delicious on this framework. No pitting was found in Haralsen (M.F. Welsh).

MINERAL DEFICIENCES. The most common deficiency in Okanagan orchards in B.C. was zinc. Orchards deficient in boron, magnesium, manganese and iron were also observed. Iron chelate sprays, particularly Sequestrine 330, appear promising in controlling iron deficiency, the most difficult to control (W.R. Foster). Boron deficiency was seen on the variety Wealthy in three orchards in the Burlington-Toronto area, Ont. (E.F. Muir). Magnesium deficiency symptoms were observed on vigorously growing young apple trees at St. Jean Baptiste, Que. (J. Ringuet).

SPRAY INJURY. Glyodin and lime applied during a very warm period caused leaf spotting and some flecking of fruit on McIntosh at Gagetown, N.B. (S.R.C.).

FROST INJURY. Frost damage caused heavy russeting and cracking on Astrachan at Stoney Creek, Ont. There were no marketable fruit from 20-25 trees (G.C. Chamberlain). Freezing temperatures on 16 and 17 May in the Oakville and Waterdown districts of Ont. caused 60% losses in localized areas, though frost damage generally was light (E.F.M.).

SCALD (non-parasitic) was seen on Lobo in storage at Quebec City (D.L.).

STORAGE BREAKDOWN (non-parasitic) was sev. on McIntosh and Cortland in storage at Ste. Petronille and Orleans Island, Que. (D.L.).

WINTER KILLING. Abnormally low temperatures during Jan. resulted in widespread injury to fruit trees throughout the orchard districts of s.w. Que. It is estimated that 10-15% of the apple trees have died or will die as a result of low temperature injury (L. Cinq-Mars). Symptoms

similar to silver leaf occurred quite generally in the affected orchards. The cause has not been determined (R. Crete).

PEAR

LEAF SPOT (Entomosporium maculatum) was sev. on pear root stocks in a nursery at Rougemont, Que. (J. Ringuet, D. Leblond).

FIRE BLIGHT (Erwinia amylovora) affected 10% of the blossom-bearing spurs at Penticton, B.C. Sev. infections occurred in pear orchards on the east side of Osoyoos Lake and in other parts of the Osoyoos, Oliver and Penticton districts, and the disease was recorded for the first time in the Keremos district. Rainy weather occurred during bloom and outbreaks of blossom blight were reported (W.R. Foster, D.L. McIntosh). It was more serious in Essex Co., Ont., than it had been for some time. About 5 per cent of the trees in two orchards at Harrow and Ruthven had to be destroyed and many others required sev. pruning. Antibiotic sprays at bloom gave varying degrees of control (R.W. Walsh). At Port Dalhousie, Ont., about 40 infection centers caused mod. damage to blossoms and spurs on the variety Bosc. A few branches were involved (G.C. Chamberlain). Fire blight was generally less prevalent in the Niagara district than in 1956 (R. Wilcox, W.S. Carpenter). Only two small plantings were seriously affected in the Burlington-Toronto area. Both cases were a result of a carried-over source of infection (E.F. Muir).

RUST (Gymnosporangium clavariaeforme) caused sl. damage at Pickering, Ont. (G.C.C.).

SOOTY BLOTCH (Leptothyrium pomi) was commonly seen on specimens received from Kent and Essex Counties, Ont. (R.W.W.). It was less prevalent in the Niagara district than in 1956 (R. Wilcox, W.S. Carpenter).

COLLAR ROT (Phytophthora cactorum). At Kelowna, B.C. 90% of the Anjou trees, 5 years of age, showed at least a tr. of infected tissue. Ten % of the trees of this age were girdled above ground (D.L. McI.).

PHYTOPHTHORA FRUIT ROT (P. cactorum) was tr. at Summerland, Peachland and Oliver, B.C. (D.L. McI.).

RHIZOPUS ROT (R. nigricans). A high percentage of Bartlett pears were affected in storage at Oliver, B.C. (D.L. McI.).

LEAF SPOT (Septoria pyricola). An epidemic of Septoria leaf spot occurred in a nursery at Poplar Hill, Ont. The varieties Bartlett and Bosc were sev. affected and Anjou and Clapps to a mod. degree. Duchess, Keiffer and Flemish Beauty were only sl. affected. Some 13,000 3-5 yr. old trees were involved (B.H. MacNeill).

SCAB (Venturia pirina) was common on unsprayed trees in s.w. Ont. (R.W.W.). It caused sev. fruit blemishes on 50-75% of Bartlett fruit in several orchards in the Vineland district. At St. Catharines 25% of fruits of Flemish Beauty and 20% of those of Howell were conspicuously scabbed. No infection occurred on neighbouring Beurre Bosc, Anjou, Duchess or Bartlett (G.C.C.). Scab was quite sev. on Bartlett in the e. end of the Niagara Peninsula even where control measures were applied. Dormant lime sulphur applied as a dilute spray gave better control than where applied in concentrated form. A concerted effort will have to be made to control this disease in 1958 (R.W., W.S.C.).

STONY PIT (virus). Pitting of Anjou pears has been recorded annually for several years in some orchards in the Okanagan-Similkameen valleys of B.C. The symptoms vary from scattered shallow pits without formation of stone cell tissue beneath, to sev. fruit distortion with abundant stony tissue in the flesh. In some forms there is browning to the core. Symptoms were unusually sev. in most affected orchards in 1957. An attempt is being made to distinguish between transmissible and non-transmissible forms (M.F. Welsh). All the fruit from two Anjou trees at St. Catharines, Ont. was badly malformed and pitted (G.C.C.).

FROST INJURY. Frost at bloom caused conspicuous russet banding around the calyx end of 90% of Bartlett fruits at Stoney Creek, Ont. About 30% of Keiffer pears in an orchard at Niagara-on-the-Lake were similarly affected (G.C.C.).

DROUGHT. Many pear trees on shallow soils in the Niagara Peninsula were scorched due to lack of moisture (R.W., W.S.C.).

STORAGE SCALD (non-parasitic). Scald was seen on pears in a retail store at Jonquiere, Que. (D. Leblond).

CHEMICAL INJURY. Injury following the application of parathion and malathion was found during hot weather and during sev. drought (R.W., W.S.C.).

B. STONE FRUITS

APRICOT

JACKET ROT (Botrytis cinerea) affected 10% of the fruit of Moorpark in May at Summerland, B.C. (D.L. McIntosh).

CORYNEUM BLIGHT (Clasterosporium carpophilum) caused sev. spotting on 75% of the fruit of 6 trees of an unknown variety at St. Catharines, Ont. (G.C. Chamberlain). This disease is becoming more prevalent as surface infection on fruit throughout the Niagara Peninsula. Little attempt has been made to control it. Growers will be encouraged in 1958 to use ferbam in the dormant and bloom period sprays (R. Wilcox, W.S. Carpenter).

BLOSSOM AND TWIG BLIGHT (Monilinia fructicola). Blossom blight was prevalent and sev. on several isolated trees in home orchards near Harrow, Ont. The fungus later advanced into the twigs causing cankers and dieback (C.D. McKeen).

PHYTOPHTHORA FRUIT ROT (P. cactorum) occurred on a small percentage of the fruit of some trees in the Summerland, Peachland and Oliver districts of B.C. (D.L. McI.).

RING POX (virus) (See Cherry twisted leaf).

CHERRY

CROWN GALL (Agrobacterium tumefaciens) was found on the roots of a mature Montmorency tree at St. Catharines, Ont. The tree was affected with crown rot (G.C. Chamberlain).

BLACK KNOT (Dibotryon morbosum) was observed as a sev. infection on one sour cherry tree in Kings Co., P.E.I. (R.R. Hurst).

LEAF SPOT (Higginsia hiemalis). A mod. infection caused partial defoliation of Montmorency at Port Dalhousie, Ont. The disease was present in many orchards in the St. Catharines district (G.C.C.). Leaf spot appeared later than usual in the Niagara area. It caused, however, considerable defoliation, particularly where air-blast machines were used and coverage was not adequate on the tops of trees. Extra post-harvest sprays were necessitated in many instances (R. Wilcox, W.S. Carpenter). The disease was less prevalent than usual in Hastings and Prince Edward Counties, Ont. It was well controlled by 4 or 5 pre-harvest sprays (J. Cutcliffe). Sl.-mod. infections in most orchards in the Lambton-Huron area. Little defoliation occurred until late in the season (J.R. Chard).

BROWN ROT (Monilinia fructicola) substantially reduced crops in the Interior of B.C. Regular pre-harvest spraying reduced losses. Both M. fructicola and M. laxa were involved in a blossom blight outbreak on Bing, Van and Lambert in the Renata and Boswell districts of B.C. (D.L. McIntosh). Brown rot continues to be a problem in the Kootenays and Arrow Lake districts of B.C. (W.R. Foster). The twig blight phase was prevalent on unsprayed trees in Essex Co., Ont. (R.W. Walsh). At St. Catharines, brown rot of mature fruit was of minor importance, mostly secondary to wind and bird damage or excessive cracking (G.C.C.). Heavy rains at picking time caused considerable splitting of sweet cherries in the Lambton-Huron area of Ont. Brown rot followed (J.R.C.) Specimens of blossom blight were received from Tracadie, N.B. (H.N. Racicot).

POWDERY MILDEW (Podosphaera oxyacanthae) caused sl. damage on 3-year old Montmorency trees at Louth, Ont. (G.C.C.). Powdery mildew has become quite prevalent in many Niagara Peninsula orchards causing early defoliation in some blocks. Some concern is felt as to the extent it may be affecting yields (R.W., W.S.C.).

WITCHES' BROOM (Taphrina cerasi) is present every year on old home garden and farmyard trees in the lower Fraser River Valley of B.C. (H.N.W. Toms).

WILT (Verticillium albo-atrum) is a serious factor in a 3-year old planting at St. Catharines, Ont. causing a wilting and drying up of foliage. Twenty % of the trees are likely to die (G.C.C.).

DECLINE (Nematodes). Xiphinema americanum was found at Saanichton, B.C. in large numbers in the root zone of a Bing cherry tree showing leaf yellowing, early leaf drop and many dead twigs associated with root injury (J.E. Bosher). An orchard at Louth, Ont., has developed slowly with trees about half normal saize for their age. Screening of five 1-lb. soil samples revealed the following nematode populations: Pratylenchus sp., 80-648; Paratylenchus sp., 40-200; Xiphimena sp., 8-104; Criconemoides sp., 0-8 (J.L. Townshend).

LAMBERT MOTTLE (virus) is less apparent in the Summerland area of B.C. than it was a few years ago. This is due to winter damage and tree removals in the older affected orchards. Small numbers of new infections are appearing in various parts of the area (T.B. Lott).

LITTLE CHERRY (virus) still remains unreported in the Okanagan and Similkameen Valleys of B.C. (T.B.L.). Symptoms were sev. and the disease caused considerable reduction in the tonnage of fruit shipped from the Kootenays, B.C. It was especially sev. on Lambert (J.M. Wilks). Symptoms were more sev. in the Creston Valley in 1957 than in the previous year (W.R.F.).

NECROTIC RING SPOT (virus) was quite noticeable in early June in varying degrees in a number of orchards throughout the Niagara Peninsula (R.W., W.S.C.).

TWISTED LEAF (virus). Twisted leaf of sweet cherry and apricot ring pox continue to appear in new localities in B.C. and show sl. local spread. The two diseases frequently occur naturally together. Experimental work has shown that twisted leaf can often be obtained from ring pox inoculum and vice versa. It appears that the two diseases are caused by two distinct viruses which usually occur together (T.B.L.).

YELLOWS (virus). The development of yellowing symptoms with leaf drop was quite sev. in all areas of the Niagara Peninsula in 1957. High temperatures in March and April and cool temperatures at petal fall favored symptom expression (R.W., W.S.C., G.C.C.). It was more prevalent than usual in the Lambton-Huron district. The great amt. of defoliation caused concern among growers (J.R. Chard). Most orchards in the Hastings-Prince Edward area contain yellows-infected trees (J. Cutcliffe).

T.B. Davidson and J.A. George report as follows on virus diseases of sour cherry in Ontario.

Surveys are conducted annually in 12 orchards with a total of 4,500 trees. The 1957 survey revealed that a larger number of yellows-infected trees showed symptoms and symptom expression was more sev. than in 1955 or 1956. However, the number of necrotic ring-spot-infected trees showing etching was lower, and the symptoms expressed less sev. than in the 2 previous years.

In new orchards propagated from virus-free bud wood, indexing of a total of 2,200 one year-old trees in 1955 and 1956 revealed that 1-8% were diseased. Presumably some of the root-stock used was carrying virus.

Two orchards, the 260-tree Troup orchard and the 305-tree Rittenhouse orchard were planted with virus-free trees in 1953. The Rittenhouse orchard is well isolated from any diseased trees while the Troup orchard is not. After 4 complete seasons no infection has occurred in the Rittenhouse block while 34 trees (13%) have become infected in the Troup orchard. Twenty-five of the 34 trees became infected during the fourth season.

DROUGHT. Many cherry trees in the Niagara district on shallow soils suffered sev. injury from lack of moisture (R.W., W.S.C.).

FROST INJURY. Spring frosts caused injury in pockets in the Burlington-Toronto area, losses ranging from 10-100%. The overall loss in the area was not great (E.F. Muir). Temperatures as low as 26°F on 17 May caused sev. blossom injury in Hastings and Prince Edward Counties. Combined with winter injury during -22°F. temperatures in January, it resulted in a cherry crop only 20% normal size (J.C.).

WINTER INJURY was responsible for the loss of 50% of young trees in an orchard planted at St. Catharines, Ont. in 1956. (G.C.C.). One plantation in the Toronto-Burlington area suffered a 5% loss of trees and considerable twig injury when winter temperatures dropped to -20°F. (E.F.M.). Sub-zero winter temperatures in Kings and Annapolis Counties, N.S. caused a 50% loss of the cherry crop (C.O. Gourley).

CHEMICAL INJURY. A number of instances of captan injury on the variety Schmidt were reported in the Niagara district of Ont. (R.W., W.S.C.).

PEACH

CROWN GALL (Agrobacterium tumefaciens). Three/20 young Elberta peach trees received from a nursery at St. Catharines, Ont., had gall infection (G.C. Chamberlain). Thirty/200 trees set out in 1956 in the Lambton-Huron were mod.-sev. infected with crown gall. Half of them were sufficiently sev. affected to cause death of the trees (J.R. Chard, C.B. Kelly).

DIE-BACK (Cytospora leucostoma) occurred in tr. amounts at Canard and Grand Pre, Kings Co., N.S. The fungus is considered to be a saprophyte on winter-killed wood (C.O. Gourley).

BLACK KNOT (Dibotryon morbosum). Mature perithecia and ascospores were found in 2 knots at Canard, N.S. in May. The Hormodendrum stage of the fungus was found fruiting at Grand Pré in Aug. (C.O.G.).

BLOSSOM BLIGHT and BROWN ROT (Monilinia fructicola). Blossom blight was negligible in the Niagara district in 1957 and brown rot became a factor only during the Elberta harvest season (R. Wilcox, W.S. Carpenter). Losses occasioned by brown rot in s.w. Ont. in early and mid-season varieties were sl.-mod. Late season varieties, such as Elberta are principally processing varieties, and for this purpose the processors insist on a greater degree of maturity than the firm ripe stage acceptable at the markets. Picked fruit is held in crates to ripen. In 1957 as much as 50-60% of stored Elberta peaches were destroyed by brown rot

and Rhizopus rot during a 2-day damp period. Losses were much lower where growers had left the fruit on the trees over this period. Cold storage of fruit was effective in reducing losses (G.C.C.). The situation was similar in the Lambton-Huron district of Ont. Losses of fruit awaiting processing at the canning factory at Forest were quite heavy (J.R. Chard).

PHYTOPHTHORA FRUIT ROT (P. cactorum) affected a small percentage of fruit on some trees in the Summerland, Peachland and Oliver districts of B.C. (D.L. McIntosh).

RHIZOPUS ROT (see BROWN ROT)

LEAF CURL (Taphrina deformans) occurred in a few home gardens in Vancouver, B.C. (H.N.W. Toms). Mod. infections occurred on newly planted Elberta trees in Niagara and Louth Townships, Ont. Leaf curl was not seen in any mature commercial orchards which had received a dormant fungicide spray either in the fall or spring (G.C.C.).

WILT (Verticillium albo-atrum). Exceptionally warm weather early in the growing season followed by a cold, wet period predisposed peaches and sweet and sour cherries to show symptoms of Verticillium wilt in the Niagara district in 1957. Many peach trees recovered later in the season but mortality was noted in some cherry orchards (R. Wilcox, W.S. Carpenter). Two/15 trees were affected in a young planting at Niagara-on-the-Lake (G.C.C.).

BACTERIAL SPOT (Xanthomonas pruni) was common on Victory peach foliage in the Niagara district. Fruit infection was not a problem in 1957 (R.W., W.S.C.). Moderate leaf drop and spotting occurred on Elberta in several orchards at Niagara-on-the-Lake (G.C.C.).

WESTERN X-DISEASE (virus). Fifteen % of the trees in a large block in the Niagara district showed prominent symptoms of this disease. Numerous choke cherries similarly affected were noted within 500 yards of the orchard (R.W., W.S.C.).

WINTER INJURY. Sub-zero temperatures to about -14°F. in some areas, 15-16 Jan., caused sev. bud damage in localized parts of the Niagara Peninsula. Dead wood was common. Vedette appeared to be the hardest hit (R.W., W.S.C.). Mid-winter temperatures of -22°F. were responsible for the complete failure of the 1957 peach crop in Kings and Annapolis Counties, N.S. (C.O.G.).

CHEMICAL INJURY. Spray injuries to peach foliage were noted early in June in the Niagara district. Various combinations of materials

were involved including captan, malathion and DDT; paste sulphur and parathion; and microfine sulphur and parathion. There appeared to be no reason for these injuries other than the possibility that the sev. cold weather in Jan. 1957 predisposed the trees to injury. The foliage appeared to be very tender (R.W., W.S.C.).

PLUM

DIE BACK (Cytospora leucostoma). The organism is considered in N.S. to be primarily a saprophyte on winter killed wood (C.O. Gourley).

BLACK KNOT (Dibotryon morbosum). It is an exception to find a plum tree in the Hastings and Prince Edward area of Ont. which is not infected with black knot. No commercial acreages are involved and few attempts are made to control it (J. Cutcliffe). Black knot was sev. in a block of 25 trees at Rougemont, Que. (R. Crete). It is widespread in N.B., mostly in home gardens (S.R. Colpitts). Black knot was seen at Charlottetown and other localities in Queens Co., P.E.I. (R.R. Hurst, J.E. Campbell). A 2-acre block at Grand Pre, N.S. was completely destroyed by black knot. Although the trees were not dead, it would be impossible to prune out all the knots and still save the trees. Infections ran as high as 75% in other parts of Kings Co. (C.O.G.). The disease has reached epidemic proportions within 2 years of its first appearance in the South East Placentia area of Nfld. Six/7 orchards in the district were heavily infected (O.A. Olsen), and heavy infections were seen on plums and cherries at Bonavista Bay and Grand Falls (G.C. Morgan).

BROWN ROT (Monilinia fructicola) caused a 60% loss of crop at Brentwood, Vancouver Island, B.C. It was general in all areas of the Island and caused heavy losses except where spray programmes were strictly followed (W. Newton). A tr. was seen at South East Placentia, Nfld. (O.A.O.).

PLUM POCKETS (Taphrina pruni). Tr. infections were seen at 3 localities in Sask. (T.C. Vanterpool). Specimens were received from the Thunder Bay and Russell districts of Ont. (H.N. Racicot). Specimens seen from Woodstock, Ont., on the variety Assiniboine. Infection was said to be confined to 1 of several trees in a home garden (G.C. Chamberlain).

WILT (Verticillium albo-atrum). Five/50 trees in a 3-year old planting of Golden Early at Niagara-on-the-Lake, Ont. were infected. Affected trees show pronounced wilt, especially on 1 side of the tree. Several trees are likely to die (G.C.C.).

BACTERIAL SPOT (Xanthomonas pruni). Four affected Burbank trees seen at Niagara-on-the-Lake, Ont. The foliage showed considerable spotting and shot-holing, but fruit infection was sl. (G.C.C.).

DIE-BACK AND GUMMOSIS (cause undetermined) was mod. on plums at Rimouski, Que. Defoliation of trees and gummosis at the stem-end of fruit was observed (D. Leblond).

CHEMICAL INJURY. A mixture of captan, malathion and DDT in the curculio sprays caused injury to several varieties of plums in 1 orchard in the Niagara Peninsula. Injury occurred at the blossom end where spray droplets accumulated (R.H. Wilcox, W.S. Carpenter).

PRUNE

CROWN GALL (Agrobacterium tumefaciens). Sl. infections were seen on Stanley prune stock brought from Ont. and planted at Kentville, N.S. (C.O. Gourley).

RUST (Tranzchelia pruni-spinosae var. discolor). Four prune trees near Saanichton, B.C. were sev. defoliated by rust. It also occurred on two trees at Sidney. The I stage was found on leaves of Anemone coronaria in the same garden (W. Newton). Examination of infected leaves showed that the rust was the variety discolor (see Dunegan, Phytopath. 28: 411-427, 1938) (D.W.C.).

RUSSET (physiological). Russet, probably caused by cold checking early in the season caused 10-25% of Italian prune fruit in the St. Catharines district to be discarded before deliveries were accepted for processing (G.C. Chamberlain).

C. RIBES FRUITS

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola). Mod. infection on red currants at Clearwater Bay, Ont. (W.L. Gordon). Sev. infections were seen in garden plantings of black currant at Ottawa and Carp, Ont. (H.N. Racicot, H.S. Thompson). Blister rust infections ranged from 33-100% in 5 nurseries in Que. Both black and red currants were affected (J. Ringuet). It was mod. and caused sl. damage to black currants at Springfield, P.E.I. (J. E. Campbell). A 20% infection caused 5% defoliation of black varieties at Kentville, N.S. (C.O. Gourley). A tr. was recorded on captan-sprayed bushes of the variety Kerry on the Exp. Farm, St. John's, Nfld. (O.A. Olsen).

RASPBERRY

CROWN GALL (Agrobacterium tumefaciens) was observed in 3/26 nurseries inspected in Que. Infections were 2, 3, and 25% respectively (J. Ringuet). Nine/20 plants in a garden at Moncton, N.B. were killed by crown gall (S.R. Colpitts). A sev. infection was observed at Keppoch, P.E.I. (J.E. Campbell). Crown gall was tr. on Newburg in a planting at Melvern Square, N.S. (C.O. Gourley).

GRAY MOLD (Botrytis cinerea) was sev. on twigs and berries of Viking and Newburg at Ste. Foy, Que. The infection apparently came from a nearby heavily infected strawberry patch (D. Leblond).

GRAY MOLD WILT (Botrytis cinerea) was sev. on sawdust mulched plants at the Exp. Farm, Kentville, N.S. Counts made in late season showed the following percentages of canes affected: Willamette 47, Trent 38, Newburg 35, Malling Promise 34, Walfried 28, Viking 28, Early Red 21, Milton 18. An adjacent row of Viking in clean cultivation showed approximately 2% affected canes (J.F. Hockey).

SPUR BLIGHT (Didymella applanta) was prevalent in most plantings in the Niagara Peninsula, Ont. (R. Wilcox, W.S. Carpenter). It was observed in many garden patches and in unsprayed commercial plantings in Hastings and Prince Edward Counties, Ont. (J. Cutcliffe). Spur blight was mod. on Newburg and sev. on Viking at Ste. Foy, Que. It was also observed at Grande Baie and Levis (D.L.). A mod. infection caused sl. damage at Keppoch, P.E.I. (J.E.C.). Sev. outbreaks appeared late in the season on a number of varieties in Kings Co., N.S. (K.A. Harrison).

ANTHRACNOSE (Elsinoe veneta) was sev. in an inadequately sprayed commercial planting in Mersa Twp., Ont. Many young canes were girdled and killed (R.W. Walsh). Several plantings of Taylor at St. Catharines, Ont. had mod. infections resulting in crumbly berries of poor size. All parts of the canes were affected (G.C. Chamberlain). Anthracnose was prevalent in most patches in the Niagara Peninsula (R.W., W.S.C.). It was common in unsprayed plantings on both red and purple varieties in Hastings and Prince Edward Counties. Most growers achieve commercial control by applying a delayed dormant and a pre-bloom spray (J.C.). Mod. on Viking and sev. on Newburg at Ste. Foy, Que. (D.L.). A sl. infection was seen on nursery stock at York, P.E.I. (J.E.C.). A number of yellow fruited seedlings at Kentville, N.S. were sev. attacked. It was not sev. on standard varieties where control measures had been carried out (K.A.H.) Five-10% of the canes of Trent and Madawaska were infected at the Exp. Farm at St. John's, Nfld. (O.A. Olsen).

CANE BLIGHT (Leptosphaeria coniothyrium) was tr. in 2 plantings at Saanichton, B.C. (W. Newton).

YELLOW RUST (Phragmidium rubi-idaei) was light in the lower Fraser Valley, B.C. There were no reports from home gardeners in the Vancouver area (H.N.W. Toms).

LATE LEAF RUST (Pucciniastrum maericanum) was sl. in 6/26 Que. nurseries (J. Ringuet). A mod. infection was seen in a certified raspberry plantation at York, P.E.I. (J.E.C.). Infections on leaves and fruit were not as sev. in 1957 as usual in Kings and Yarmouth Counties, N.S. (K.A.H.).

POWDERY MILDEW (Sphaerotheca humuli). A mod. infection on Viking at Niagara Falls, Ont., caused stunting of tip growth of new canes (G.C.C.). Mildew was seen in 1/26 nurseries inspected in Que. (J. Ringue). Sl. infections were seen on Latham in Queens Co., P.E.I. (R.R. Hurst).

WILT (Verticillium albo-atrum). Wilt infected plants were received from the Exp. Farm, Melfort, Sask. (R.J. Ledingham). Black raspberries were mod. infected by wilt and bluestem symptoms were evident in 10% of the canes of Viking at St. Catharines, Ont. (G.C.C.).

ROOT NEMATODES (various species). Pratylenchus penetrans, Paratylenchus sp. and Xiphinema americanum were found in significant numbers in the root zone of three plantings showing weak growth on Vancouver Island, B.C. (J.E. Bosher).

LEAF CURL (virus). A 1-2% infection occurred in scattered areas in a 5-year old planting at Niagara Falls, Ont. Plants were unproductive and new shoots greatly stunted (G.C.C.). Leaf curl affected 20% of the variety Golden Queen in 1/26 Que. nurseries (J. Ringuet).

MOSAIC (virus). Ninety % of the canes in a 5-yr. old planting of Viking at Niagara Falls, Ont. were infected. Production was greatly reduced (G.C.C.). Mosaic is present in most plantings in Prince Edward Co., Ont. Some growers keep the disease down by rogueing (J.C.). It was seen in 15/26 Que. nurseries. Infections ranged from 0.2-4% (J. Ringuet). A 5% infection was seen at Moncton, N.B. (S.R.C.). Two/100 plants of Viking set out in 1926 showed mosaic at Charlottetown, P.E.I. Careful rogueing has kept this planting free from virus and the patch remains highly productive (R.R. Hurst).

ROOT SUFFOCATION. The plants in two patches on Vancouver Island, B.C., were killed out as the result of a high water table (W.N.).

WINTER INJURY. A number of plantings in the Niagara district, Ont., were badly killed back by sev. low temperatures in January 1957 (R. Wilcox, W.S. Carpenter).

E. OTHER FRUITS

BLUEBERRY

CROWN GALL (Agrobacterium tumefaciens) affected 1% of the stems of Cabot at Centerville, Kings Co., N.S. (C.L. Lockhart).

RED LEAF (Exobasidium vaccinii). Fields at Canaan Road and Half-Way River, Cumb. Co., N.S. showed 18 and 25% infection respectively. The av. infection in blueberry fields in N.S. was about 0.3% (C.L.L.). Red leaf occurred as a few scattered patches in fields at Avondale, Nfld. (O.A. Olsen).

CANKER (Fusicoccum putrefaciens) was present in many highbush blueberry plantings in the lower Fraser Valley, B.C. Damage was sl. (H.N.W. Toms). A 1% infection was observed on seedlings at the Exp. Farm, Kentville, N.S. Canker is also prevalent in a commercial field at Centerville, Kings Co., N.S. Heavy pruning in an effort to control the disease resulted in a 25% reduction of potential fruiting stems (C.L.L.).

POWDERY MILDEW (Microsphaera alni var. vaccinii). Tr. infections of mildew occurred on lowbush blueberries at Steam Mill, N.S. (C.L.L.).

TWIG AND BLOSSOM BLIGHT (Monilinia vaccinii-corymbosi). In general only tr. infections were found in first crop fields in N.B. and N.S. About 40% of the crop of a second crop field at Grafton, N.S. was lost as the protective dust was applied too late. Apothecia were found in fields at Steam Mill, N.S. and in a field in Cumberland Co. early in May. These had been previously unobserved in N.S. Observations indicate that the cultural burning is very effective in destroying mummy cups and aids blight control by supplementing the fungicidal dusts. Apothecia were also found in highbush plantings at Kentville and Aylesford, N.S. Good control was obtained by disturbing the mummy cups by cultivation. Tr. infections of blight were seen at Kentville (C.L.L.).

DIEBACK (Phomopsis vaccinii). Eleven/68 tagged blueberry stems at Steam Mill, N.S., failed to set fruit due to dieback. Counts in a second crop field at Steam Mill and one at Cross Roads, Cumb. Co., N.S., showed 37.3 and 26.6 % of the twigs affected respectively. This represented a 7.5% loss of crop. No losses occurred in first crop fields as P. vaccinii appears on twigs only after they have produced a crop. The conidial stage of Valsa delicatula was found associated with Phomopsis dieback at Steam Mill, N.S. (C.L.L.).

WITCHES' BROOM (Pucciniastrum goeppertianum) was a tr. on lowbush blueberries at Avondale, Nfld. (O.A. Olsen).

LEAF RUST (Pucciniastrum vaccinii). Infection was sev. on some clones in Cumberland, Colchester and Kings Counties, N.S. Some defoliation of lower leaves occurred though damage was only sl. due to the lateness of infection (C.L.L.).

LEAF SPOT (Vermicularia sp.). First seen on herbarium material collected at Upper Island Cove; Nfld. in 1955. Tr. infections were seen at Glen Haven, Halifax Co., N.S. (C.L.L.).

MOSAIC (virus) was found on one highbush plant at the Exp. Farm, Kentville, N.S. Mosaic was described by E.H. Varney, Phytopathology, 47: 307-309. 1957. (C.L.L.).

WINTER INJURY. Flower buds were damaged in most fields in N.B. and N.S. averaging 5% loss of buds. The heaviest damage seen was at Advocate, N.S., where counts in one field showed 24.9% of the buds affected. (C.L.L.).

GRAPE

DEAD ARM (Fusicoccum viticola) is common in many vineyards of 10 years or more of age in the Niagara district. It is responsible for the death of parts or all of some vines (G.C. Chamberlain).

BLACK ROT (Guignardia bidwellii). A 10% infection on the variety Diamond was seen at St. Catharines, Ont. This disease is rarely encountered in the Niagara Peninsula. Diamond seems particularly susceptible (G.C.C.).

DOWNY MILDEW (Plasmopara viticola) was general on the foliage of Delaware, Salem, Fredonia and Agawam in the Niagara district. Some vines, especially Salem were sev. affected. Fifteen % of the fruit clusters

in an unsprayed portion of a Fredonia planting were affected (G.C.C.). Downy mildew was seen on Fredonia, Van Buren and Agawam about 2 weeks after bloom. Many straggly fruit clusters resulted (R. Wilcox, W.S. Carpenter). The disease was serious in the Burlington-Toronto area in vineyards where no sprays or only one spray was applied (E.F. Muir).

CHEMICAL INJURY. The grape is extremely susceptible to injury from 2,4-D vapor and each year injury occurs in the form of stunting of terminal growth and malformation of leaves as a result of roadside spraying for weed control. One serious case of damage was observed in the St. Catharines area in 1957. The vines showed a marked foliage wilting and drying up with extensive defoliation in mid-July. It is considered doubtful that the vines will recover (G.C.C.). Several vineyards in the Niagara district were affected by 2,4-D. One planting of 14 acres near Thorold, Ont., was a complete loss (R.W., W.S.C.).

FROST INJURY. Temperatures as low as 23°F. on 4 and 5 May in some areas of the Niagara district caused extensive bud injury to grapes. Further injury occurred on 17 May when temperatures dropped to 26°F. Considerable russeting also occurred (R.W., W.S.C.).

MANGANESE DEFICIENCY. Several isolated cases of manganese deficiency were reported shortly after growth started (R.W., W.S.C.).

STRAWBERRY

Strawberry Disease Survey in Ontario - 1957

A.T. Bolton

A disease survey of strawberry-growing areas in Ontario was made during the late summer and fall of 1957. Many strawberry plantations throughout these areas were found to be in poor condition.

In Norfolk county, about 100 acres of strawberry plants were observed. Premier plantings in particular showed lack of vigor, and many plants failed to produce runners. Several other varieties showed much better growth and runner production, although these also produced fewer runners than normal. Other varieties examined included Pocahontas, Catskill, Sparkle, and Empire. The new variety, Redcoat, introduced by the Central Experimental Farm, Ottawa, showed good vigor.

Other areas surveyed in Western Ontario included the Niagara district, and an area near Leamington. In these areas, the plants showed the same lack of vigor. In two fields of Premier near Leamington, constituting

about 12 acres, runners produced were about 25% of normal. In most plantations throughout Western Ontario runner production was less than 60% of normal. Premier plantings were usually below 40%. One field of Premier near Simcoe where only selected plants had been set out showed normal vigor and runner production.

In the central and eastern parts of Ontario, the same conditions were encountered, but to a lesser degree. Most Premier plantations were about 60% normal as far as number of plants was concerned. Other varieties in these areas showed much more vigor than Premier. One exception to this was a field of Temple near Port Hope which showed very poor vigor.

Most of the trouble could be more or less directly associated with climatic or weather conditions during 1956-57. Late planting in 1956 was made necessary because of a late spring. These plants were not as far advanced as usual when they entered dormancy during the winter of 1956-57. Consequently, in the spring of 1957, plants used for setting out new plantations did not have suitable root systems, and the plants remained in the ground for some time before beginning to grow. Much replanting was necessary since as high as 50% of the first plants set out died. A hot, dry summer in 1957 further added to the poor growth of the new plants so that expectations are for a very light crop in 1958.

It seems quite probable that if more care had been taken by growers and nursery men to select better plants, much of the trouble could have been avoided. However, since many other varieties subjected to the same conditions survived much better than Premier, and since, in experimental plots at Ottawa, the latter has failed to show normal vigor during the last five years, it would seem that other factors are involved which also contribute to this lack of vigor in this variety. This condition could be attributed to any one of several factors, or a combination of two or more. Virus disease is perhaps the first factor to be considered since no virus-free Premier has been found in Canada to date. The fact that selected vigorous plants produced the normal number of runners during a year when unselected plants grew so poorly is a definite indication of the presence of virus disease.

Plants from 11 different locations were examined for nematodes. The highest population of Pratylenchus penetrans found was 290 per gram of air-dried roots. It is very doubtful if this population would have any effect on the plants.

Premier has for many years been observed to be very susceptible to black root rot. The plants examined included many with black roots. Isolations made from these roots yielded only fungi which are generally considered to be saprophytic.

Other diseases encountered during the survey include leaf spot, leaf blight, and leaf scorch. Leaf spot was quite severe on many of the imported virus-free United States varieties such as Catskill, Pocahontas, and Premier, and on the recently introduced Central Experimental Farm selections in the Norfolk county area. Leaf scorch was severe in plantations of Pocahontas and Catskill in Norfolk county. Leaf blight was found on Catskill.

Other Observations

GRAY MOLD (Botrytis cinerea) caused a loss of 10-25% of the crop in several garden plots in the Harrow-Leamington area of Ont. (C.D. McKeen). It was seen on a few ripening berries in a large heavily mulched plantation at McNab, Ont. (G.C. Chamberlain). Gray mold was sev. in a number of plantings in the Niagara district during the fruiting period. Where captan was used in a close schedule, wastage was minimized (R. Wilcox, W.S. Carpenter). The only serious losses in the Burlington-Toronto area were suffered by growers who got behind in picking over the wet 1 July weekend. Most growers in the area now follow a captan spray program (E.F. Muir). Sev. on Senator Dunlop at Ste. Foy, Que. (D. Leblond). Tr.-30% losses occurred in all areas of N.B. (S.R. Colpitts).

LEAF BLIGHT (Dendrophoma obscurans) was sev. in a 1/5 acre planting at Hemmingford, Que. (R. Crete).

LEAF SCORCH (Diplocarpon earliana) was sl. in Aug. in Queens Co., P.E.I. (R.R. Hurst). Seventy-five % of the foliage of Stelemaster and Surecrop was infected at Mavailette, N.S. Two % of the total leaf area was destroyed (C.O. Gourley).

LEAF BLOTCH (Gnomonia fructicola) infected 10% of the plants of Jessie at Chebogue, Yarmouth Co., N.S., causing a reddening of the calyx and fruit pedicels (C.O.G.).

LEAF SPOT (Mycosphaerella fragariae). The Valentine variety was heavily spotted at McNab, Ont., but the plants were very vigorous and produced a heavy crop. Sparkle and Premier alongside were not affected (G.C.C.). Leaf spot was sev. in a garden at Hemmingford, Que. (R. Crete). It was widespread and ranged from tr.-100% on Senator Dunlop and Sparkle in Queens and Sunbury Counties, N.B. (S.R.C.). Leaf spot was very light in Queens Co., P.E.I. (R.R. Hurst). There was up to 10% infected foliage on most all commercial varieties in Kings Co., N.S. (C.O.G.). Forty % of the leaves of several varieties on the Experimental Farm, St. John's West, Nfld., were affected (O.A. Olsen).

TAN ROT (Pezizella oenotherae (Patellina fragariae) caused V-shaped brownish lesions with purple margins at the leaf tips on Senator Dunlop at Ste. Foy, Que. The fungus was fruiting sparsely (D. Leblond).

LEAF SPOT (Septoria aciculosa). Isolations from affected plants from Belmont, N.S. yielded this organism (G.O.G.).

POWDERY MILDEW (Sphaerotheca humuli). Mildew caused more damage than ever previously observed in the Fraser Valley of B.C. On Vancouver Island, where the weather is usually more favorable for mildew development, the disease was well controlled by lime-sulphur, wettable sulphur or sulphur dust. Preliminary results with Karathane were promising (W.R. Foster). It was sl. in a small planting at Essextown, Ont. (R.W.W.). Specimens were received from Levis, Montmorency and Montmagny Counties, Que. (D. Leblond). Mildew was tr. on Senator Dunlop, Sparkle and Louise in Queens Co., P.E.I. (R.R. Hurst). At the Exp. Farm, Kentville, N.S. 100% of the fruit of several seedling varieties was affected. The mildewed fruit had an off flavor. The only mildew observed on fruit in commercial plantings was in one field at Wittenburg (C.O.G.).

WILT (Verticillium albo-atrum) was general in the Niagara Peninsula and sev. in some instances on land where previous crops of susceptible plants had been grown. Wilt is becoming a major problem (R.W., W.S.C.). A 1-acre planting of Louise in the Burlington-Toronto area was 75% loss. One row of Sparkle planted down the middle of the field was affected to a lesser extent. Many new plantings did badly in 1957, and some, but not all of the blame could be attributed to Verticillium (E.F. Muir). Typical wilt symptoms developed to a mod. degree in a small field of strawberries at Woodside, N.S. following a crop of Kennebec potatoes (K.A. Harrison).

GANGRENE (various pathogens). Plants showing symptoms of gangrene from Iberville, Montmagny, Montmorency and Megantic Counties, Que. yielded Botrytis cinerea, Cylindrocarpon sp., Fusarium sp. and Verticillium sp. (D. Leblond).

ROOT ROT (various pathogens). At Niagara-on-the-Lake, Ont., 15% of the plants in a field of Premier were stunted and drying up. Many complaints of this condition were received as the season progressed and fruit began to size (G.C.C.). Root rot was sl. in a young planting of Senator Dunlop at Charlesbourg, and mod. in a 3-yr. old field of an unknown variety at Ste. Petronville, Que. (L.J. Coulombe). It was sev. under drought conditions in many areas of N.B. Generally the crop was only 2/3 the 10-year average (S.R.C.).

GREEN PETAL (virus) was observed in the variety Regina on Vancouver Island, B.C. (W. Newton). It was also recorded as affecting several varieties in Kamouraska and Bellechasse Counties, Que. The disease in Que. was more common than anticipated (R.O. Lachance). Green petal caused considerable loss of crop in Senator Dunlop, Premier and Sparkle at Narrows, Queens Co., N.B. It seems to be prevalent in nearly all newly imported plants during the first bearing year (S.R.C.). Approximately 2% of Senator Dunlop in fields at Blomidon and Yarmouth, N.S. were affected (C.O.G.).

YELLOWS (virus). A sev. infection on 0-484 at Ste. Anne de la Pocatiere, Que. caused a mod. decrease in yield (L.J.C.).

JUNE YELLOWS (genetic breakdown). Three plants in a small field of Sparkle in Queen's Co., P.E.I. were affected. The symptoms had disappeared by mid-August (R.R. Hurst).

MAGNESIUM DEFICIENCY was evident in 40% of the plants in a field at Oromocto, N.B. (S.R.C.).

FROST INJURY occurred in pockets in the northern portions of the Burlington-Toronto area, reducing crops in some fields by 25%. Less than 10% of the growers were affected (E.F. Muir).

LOW TEMPERATURE INJURY continues to be one of the major hazards to strawberry growing in B.C. The damage is greater in areas exposed to the wind (W.R. Foster).

V. DISEASES OF TREES AND SHRUBS

ABIES - Fir

Witches' Broom (Melampsorella caryophyllacearum) was observed on 15 trees of A. balsamea in Queens Co., P.E.I. (R.R. Hurst).

ACER - Maple

Twig Canker (Coryneum negundinis). Specimens on A. negundo were received from Lancaster and Chatham, N.B. through Dr. A.G. Davidson who reported this fungus to be common and apparently the cause of very evident cankers (J.A. Parmelee).

Anthracnose (Gloeosporium apocryptum), particularly on A. palmatum, caused defoliation in Essex, Harrow and Windsor, Ont. Three applications of an organic fungicide (unspecified) at 2-week intervals, beginning when the leaves unfold, gives good control (R.W. Walsh).

Coral Canker (Nectria cinnabarina) infected 4 trees of A. platanoides at Boischatel, Que. following winter injury. It is probable that the trees will die (D. Leblond).

Leaf Spot (Phyllosticta acericola). Mod.-sev. infections were found in a planting of 5000 trees of A. saccharinum in a nursery at Bowmanville, Ont. (H.S. Thompson).

Tar Spot (Rhytisma acerinum) was mod. in a small plantation of A. platanoides near Kingsville, Ont. It had not been observed in s.w. Ont. in several years (R.W.W.). It was mod. on A. saccharinum at Charlesbourg and Lachute, Que. (J. Ringuet).

Frost Injury. Frost damaged the unfolding leaves of A. platanoides in Essex Co., Ont. resulting in a ragged appearance of the fully expanded leaves (R.W.W.).

AESCULUS - Horsechestnut

Leaf Blotch (Guignardia aesculi) caused mod.-sev. damage to A. hippocastanum planted as shade trees in Brockville and Prescott, Ont. (D.W. Creelman).

BERBERIS - Barberry

Leaf Spot (Phyllosticta berberidis) was collected on B. thunbergii in Quebec City, Que. (D.L.).

Rust (Puccinia graminis) was heavy on seedlings and young transplants of B. vulgaris var. atropurpurea in a nursery near Joliette, Que. (J. Ringuet).

BETULA - Birch

Leaf Curl (Taphrina carnea) was sev. on B. lutea near the Montmorency River in Que. (D.L.).

Frost Injury. Specimens of leaves of B. lutea received from Kingston, Ont. had been damaged by frost in May (H.N. Racicot).

CATALPA

Coral Canker (Nectria cinnabarina) was seen on Catalpa in a nursery at St. Hilaire Station, Que. (H.S.T.).

Verticillium Wilt (V. albo-atrum). Several cases of wilt were observed in Essex Co., Ont. On smaller trees the disease often proved fatal, but on larger trees most large limbs made a partial recovery and produced new foliage (R.W. Walsh).

CHAMAECYPARIS - Cypress

Root and Collar Rot (Phytophthora lateralis and P. cinnamomi), has increased greatly on C. lawsoniana in recent years in B.C. (W.R. Foster).

CORNUS - Dogwood

Canker (Cytospora sp.) was sev. on specimens of Cornus sp. received from a nursery at Charlesbourg, Que. (H.S.T.).

Winter Injury. Native dogwoods (C. nuttalli) in home gardens and in natural conditions in Vancouver, B.C. injured in the 1955 November freeze continued to die throughout 1957 (H.N.W. Toms).

COTONEASTER

Leaf Spot (Phyllosticta sp.) caused sl. damage to C. acutifolia in a nursery at Neuville, Que. (D.L.).

ILEX - Holly

Pin and Ring Nematodes (Paratylenchus sp. and Criconemoides sp.) were found in association in the root zone of a tree of I. aquifolium showing pale, thin foliage and yielding a persistently poor berry crop. Other trees of normal growth in the plantation were either free or carried very small populations of nematodes (J.E. Bosher).

JUGLANS - Walnut

Leaf Spot (Marssonina juglandis) was mod. on specimens received from Beaurepaire, Que. (H.S.T.).

LABURNUM

Canker (Cucurbitaria laburni) followed winter injury to trees at Charlottetown, P.E.I. (D.B. Robinson, J.E. Campbell).

PLATANUS - Plane tree

Anthracnose (Gnomonia veneta). Both leaf and twig blight was sev. on a plane tree at Merriton, Ont. Partial defoliation had occurred and twigs and some small branches had died back. Fruiting structures were found in abundance on the twigs and on small branch cankers. The disease was affecting the entire tree (W.G. Kemp).

POPULUS - Poplar

Scab (Pollacia radiosa) was tr.-10% on P. grandidentata causing sl. damage at Kentville, N.S. (D.W.C.).

Yellow Leaf Blister (Taphrina populina). Light infections occurred on P. canadensis var. eugenei in a nursery at Unionville, Ont. (H.S.T.).

PRUNUS - Flowering Cherry

Black Knot (Dibotryon morbosum) was sev. on 1 tree of Prunus padus var. commutata at Masham, Que. (H.N. Racicot).

PYRUS - Mountain Ash

Rust (Gymnosporangium cornutum). An extremely heavy infection occurred on the leaves of P. decora at Clearwater Bay, Ont. There was no infection on P. aucuparia in close proximity to the native species (W.L. Gordon). Rust was general on P. americana at St. John's and Placentia, Nfld. (O.A.O.).

QUERCUS - Oak

Anthracnose (Gnomonia veneta) was common on Q. alba in Colchester Twp. in s.w. Ont. Defoliation was up to 15% and few leaves escaped infection (R.W.W.).

Leaf Blister (Taphrina caerulescens). All oaks on Hay Island, near Gananoque, Ont. were heavily infected. The trees do not appear to suffer much from this disease (D.W.C.).

Wilt, apparently caused by too deep soil over the roots and around the trunk sev. affected a tree of Q. macrocarpa on a lawn at Fort Garry, Man. (W.E. Sackston).

RHAMNUS - Buckthorn

Coral Canker (Nectria cinnabarina). A 50-foot hedge of R. dahurica in Ottawa, Ont. was sev. affected for about 1/4 its length (H.S.T.).

Crown Rust (Puccinia coronata). Light infections occurred on R. cathartica at Summerside and Charlottetown, P.E.I. (J.E. Campbell). Both R. cathartica and R. frangula in Kings Co., N.S., bore light rust infections (D.W.C.).

RIBES - Flowering Currant

Anthracnose (Drepanopeziza ribis) was heavy on young R. alpinum transplants in a nursery at Sheridan, Ont. (H.S.T.), and in a nursery near Ottawa (J.A. Parmelee). It was mod. on the same host in 6 nurseries near Montreal and Quebec City, Que. (J. Ringuet).

ROSA - Rose

Crown Gall (Agrobacterium tumefaciens). Single plants of Blaze and Dorothy Perkins were heavily infected at Charlottetown, P.E.I. (R.R. Hurst). It was sev. on 2 plants in a Kentville, N.S. rose garden (J.F. Hockey).

Canker (Cytospora ambiens) was sev. on roses in Quebec City, Que. (D.L.).

Black Spot (Diplocarpon rosae) appeared late in the Harrow, Ont. district but some varieties were defoliated by mid-Aug. where spraying was neglected (R.W. Walsh). The disease was sev. in the Niagara Peninsula. At St. Catharines both hybrid teas and floribundas were partially defoliated by early Aug. Hybrid teas sprayed with either Captan 50 W Micronized, Captan 50 W, or Phaltan showed little infection throughout the season (W.G.K.). Heavy infections caused defoliation at Charlottetown, P.E.I. (R.R.H.). Black spot was sev. on Symphonie, Mrs. Calcombeth, Paarl von Aalsmeer and The Doctor and sl. on Peace and Masquerade at Kentville, N.S. (J.F.H.).

Powdery Mildew (Sphaerotheca pannosa). A few potted rose bushes were mod. infected at Amherstburg, Ont. (W.G.K.). In general it was a bad year for powdery mildew on roses in P.E.I. Frau Carl was heavily infected and Blaze to a lesser degree at Charlottetown (R.R.H., J.E.C.). Mildew appeared late in the summer on unsprayed bushes at Kentville, N.S. (J.F.H.).

Rust (Phragmidium sp.) was tr. on hybrid perpetuals at Charlottetown, P.E.I. (R.R.H.).

SALIX - Willow

Crown Gall (Agrobacterium tumefaciens). Aerial galls were seen on S. alba var. tristis at Ste. Foy, Que. (J. Ringuet).

Scab and Twig Blight (Fusicladium saliciperdum, Physalospora miyabeana) was sev. at St. Jean Port Joli and Trois Pistoles, Que. (D.L.). Willow blight was not serious in N.S. early in the season but as summer progressed many shoots on old willows were killed back. The old French willows at Grand Pré park were sprayed after a year of neglect and some recovery was noted (K.A. Harrison).

Anthracnose (Marssonina kriegeriana) caused sl. damage to S. alba var. tristis in a nursery at Rougemont, Que. (D.L.). The spores in this specimen, at 18-20 x 5-8 μ, are somewhat larger than those given for M. kriegeriana, by Saccardo, but otherwise it agrees well (D.W.C.).

Die Back (various organisms). Phoma, Cytospora and Rhabdospora sp. were found associated with a dieback of S. pentandra at Rougemont, Que. The exact cause of the condition is undetermined (D.L.).

SPIRAEA

Foot Rot (Fusarium sp.) caused mod. damage to S. vanhouttei at Quebec City, Que. (D.L.).

Leaf Spot (Gloeosporium sp.) was mod. on S. vanhouttii at Quebec City, Que. (D.L.).

SYRINGA - Lilac

Powdery Mildew (Microsphaera alni) was sev. on white lilacs at Charlottetown, P.E.I. (R.R. Hurst).

THUJA - White Cedar

Dessication. Several cases of sev. injury or death of T. occidentalis were noted in Kent and Essex Counties, Ont. Trees appeared normal until growth began in the spring when branches and twigs at the tops of trees turned brown and dropped. The condition occurred most frequently where soil moisture was low and where trees were exposed to drying winds (R.W. Walsh).

ULMUS

Dutch Elm Disease (Ceratocystis ulmi). The presence of this disease on single trees at Port Dalhousie, Grantham, St. Catharines and Port Weller, Ont., was confirmed by the Forest Pathology Laboratory, Maple, Ont. (W.G. Kemp, G.C. Chamberlain). Dutch Elm Disease was observed for the first time in New Brunswick at Woodstock. The identification was confirmed by the Forest Pathology Lab., Quebec City (D. Creelman).

Leaf Spot (Gnomonia ulmea) caused considerable yellowing and leaf drop at St. Catharines, Ont. (G.C.C.). It was heavy on Chinese elm in a nursery at St. Laurent, Que. (H.S.T.).

Coral Canker (Nectria cinnabarina) occurred on both trunks and branches of Chinese elm in a hedge at Montreal, Que. Damage was sev. (H.S.T.).

VI. DISEASES OF HERBACEOUS ORNAMENTAL PLANTS

AGERATUM

Yellows (Callistephus virus 1) caused mod. damage to flowers in Assiniboine Park, Winnipeg, Man. (W.L. Gordon).

ALTHAEA - Hollyhock

Rust (Puccinia malvacearum). Heavy infections occurred at Fort Garry, Man. (W.L.G.). Several gardens at Dorval, Que. had tr.-25% rust (D.W. Creelman). It was sev. on specimens received from East Angus and Coaticook, and mod. in several gardens in St. Jean, Que. (R. Crete). Infections were mod-sev. in gardens in Charlottetown, P.E.I. (R.R. Hurst, J.E. Campbell).

ANEMONE

Rust (Tranzchelia pruni-spinosae) occurred on A. coronaria in a garden at Sidney, B.C. Nearby prune trees were heavily infected (W. Newton).

ANTIRRHINUM - Snapdragon

Stem Rot (Botrytis cinerea). A tr. of stem rot was seen at Hamilton, Ont. and some wilting was evident. Botrytis was sporulating on the stem cankers and was isolated from diseased tissue (W.G.K.).

Powdery Mildew (Oidium sp.) was tr. on the lower leaves of a few plants at Hamilton, Ont. (W.G.K.).

ARALIA

Wilt (Verticillium albo-atrum). One infected plant was seen at Victoria, B.C. (W.R. Foster).

ASTER

Rust (Coleosporium asterum =C. solidaginis). Infection was sev. in a 1/4 acre planting at Bowmanville, Ont. (H.S. Thompson).

BEGONIA

Powdery Mildew (Erysiphe cichoracearum) was noted at Saskatoon, Sask. (T.C. Vanterpool). Mildew infection varied from sl.-sev. on 25/150 tuberous begonias observed at Hamilton, Ont. (W.G.K.). Specimens were received from Charlesbourg, Que. (D. Leblond).

Ring Spot (virus). Numerous chlorotic rings were observed on the foliage of a single potted tuberous begonia at Grantham, Ont. Juice extract from the leaves when rubbed on cucumber produced chlorotic rings on the true leaves. The virus has not been identified. Similar symptoms were seen on 2/150 plants in a commercial greenhouse at Hamilton, Ont. (W.G.K.).

Oedema (excess water) was mod. on specimens received from Pointe Fortune, Que. (D.L.).

CALENDULA

Aster yellow (Callistephus virus 1) caused mod. flower damage in a garden in Winnipeg, Man. (W.L.G.). Infection was light in gardens at Kentville, N.S. (K.A. Harrison).

CALLISTEPHUS - China Aster

Wilt (Fusarium oxysporum f. sp. callistephi) was sev. in greenhouses at Ayer's Cliff, Que. (D.L.).

Yellows (Callistephus virus 1) caused sev. damage to a planting in Winnipeg, Man. (W.L.G.).

CANNA

Gray Mold (Botrytis cinerea) affected plants moved from a greenhouse at Tecumseh, Ont. (R.W. Walsh).

CATTLEYA

Sobralia Blight (Glomerella cincta). One diseased plant was received from Penticton, B.C. Two stems and the attached leaves were affected (G.E. Woolliams).

CELOSIA - Cockscomb

Leaf Spot (Phyllosticta sp.) was sl. on C. argentea var. cristata at Quebec City, Que. (D.L.).

CHRYSANTHEMUM

Ray Blight (Botrytis cinerea). Tr. infections were seen on outdoor plants at Saanichton, B.C. (W. Newton).

Leaf Spot (Botrytis cinerea). Lower leaves of a few plants of Indianapolis White were sl. infected at Leamington, Ont. The fungus was sporulating on the affected areas (W.G.K.).

Leaf Spot (Septoria sp.). White and Yellow Shasta were found mod. infected at Sarnia, Ont. Leaf spot was also prevalent on the lower leaves of Delaware, Oregon and Bonnafon Deluxe in a greenhouse at Hamilton (W.G.K.).

Wilt (Verticillium albo-atrum) was tr. in beds of Gold Lace and Queen's Lace at Leamington, Ont. The pathogen was recovered from 11/25 plants from the same greenhouse submitted to the laboratory for diagnosis (W.G.K.).

Foliar nematode (Aphelanchoides sp.). Chrysanthemums in a home garden in Maidstone Twp., Essex Co., Ont. were 50% defoliated. Most varieties were infected. Three sprays of parathion will control this pest (R.W. Walsh).

Petal Scorch. A small number of blooms were scorched by the sun in a Leamington, Ont. greenhouse (W.G.K.).

COSMOS

Aster Yellows (Callistephus virus 1) was sev. in gardens at Winnipeg, Man. (W.L.G.).

DAHLIA

Aster Yellows (Callistephus virus 1) was injurious to dahlias in a Winnipeg garden (W.E. Sackston).

DELPHINIUM

Powdery Mildew (Erysiphe polygoni). A heavy infection caused sev. damage in a garden at Charlottetown, P.E.I. (R.R. Hurst).

Bacterial Blight (Pseudomonas delphinii) was tr. in Queens Co., P.E.I. (R.R.H.).

DIANTHUS - Carnation

Branch Rot (Alternaria dianthi) affected a few plants in a small commercial greenhouse at Amherstburg, and was found in a bed of Harvest Moon at London, Ont. (W.G.K.).

Flower Blight (Botrytis sp.) was extremely sev. on White Apollo and Athena near Ridgeville, Ont. Cloudy weather and high humidity favored disease development. Sl. infections were also seen at Grantham, Ont. (W.G.K.).

Wilt (Fusarium sp.) appeared in patches throughout a greenhouse in Sarnia, Ont. (W.G.K.).

Stem Rot (Fusarium sp.). An entire bed of 1400 young carnation plants at Sarnia, Ont. was lost from stem rot. The cuttings had been propagated from a previous crop believed to be disease-free (W.G.K.).

Stem Rot (Rhizoctonia solani). R. solani was isolated from affected plants received from Brampton, Ont. (W.G.K.).

Rust (Uromyces dianthi = U. carophyllinus). Midas was sev. infected at London, Ont. whereas Harvest Moon showed only a tr. of rust. Carnations in 4 Sarnia greenhouses were rusted. Red Sim was heavily infected in 1 house. Apollo was mod. infected at Leamington, Ont. (W.G.K.).

Twig and Bud Blight (various fungi). Vermicularia herbarum, Fusarium scirpi f. acuminatum and Botrytis cinerea were found associated with the disease which was mod. at Quebec City, Que. (D.L.).

Aster Yellows (Callistephus virus 1). Sl. infections were observed on a few plants at Winnipeg, Man. (W.L.G.).

DIEFFENBACHIA

Bacterial Leaf Spot (Xanthomonas dieffenbachiae). A single houseplant was affected at Ottawa. Diseased leaves yellow and die. Bacterial exudate was prominent on the lesions. The disease as observed on this plant differs from the description by McCulloch and Pirone (Phytopath. 29: 956, 1939) in that lesions were also present on the petioles. There is some evidence that the petiole lesions followed mite damage (D.W. Creelman).

EPIGAEA

Powdery Mildew (Microsphaera alni var. vaccinii). Tr. infections were observed on E. repens at Nictaux, N.S. (C.O. Gourley).

EUPHORBIA - Poinsettia

Stem Rot (Rhizoctonia solani) affected a few poinsettias grown in pans at Niagara Falls, Ont. Cankers developed at soil level (W.G.K.).

GALANTHUS - Snowdrop

Stem and Bulb Rot (Rhizoctonia solani) occurred on G. elwesii at Gordon Head, B.C. (W. Newton).

GLADIOLUS

Core Rot. (Botryotinia draytoni). Sev. foliar and floral infections caused the loss of thousands of blooms at Quebec City, Champigny and Ste. Foy, Que. (D.L.).

Yellows (Fusarium oxysporum f. gladioli) was more widespread and destructive in Man. than in any previous year. The average loss to growers was estimated at 20% (B. Peturson). Mod. infections were noted at Ste. Foy, Disraeli and Boischatel, Que. (D.L.). Yellows sev. affected several varieties in a large planting in Queens Co., P.E.I. (R.R. Hurst).

Scab (Pseudomonas marginata) was sl. at Ste. Foy, Que. (D.L.).

Dry Rot (Stromatinia gladioli). Mod. infections were seen at Ste. Foy, Loretteville and Boischatel, Que. (D.L.) Dry rot caused the complete loss of a planting at St. John, N.B. (S.R. Colpitts). Up to 10% of the plants were affected in some areas of a commercial planting at Rockland, N.S. (J.F. Hockey).

Root Rot (various pathogens) caused a yellowing, often followed by a browning of leaves and ultimately the death of the plants at Saskatoon, Sask. Symptoms were sev. following hot weather 22-31 July. Isolations from affected plants yielded Fusarium, Pythium and Rhizoctonia spp. (T.C. Vanterpool).

Aster Yellows (Callistephus virus 1). Plants with symptoms characteristic of aster yellows occurred to the extent of about 1% in a planting at Fort Garry, Man. (B. Peturson).

GLOXINIA

Root-knot nematodes (Meliodogyne incognita) were found in one tuber at Cowichan Station, B.C. The plant was stunted with distorted crown leaves and petioles (J.E. Bosher).

HESPERIS - Dame's Rocket

Mosaic (virus) was mod. on H. matronalis at Rimouski, Que. (D.L.).

HIBISCUS - Rose-of-Sharon

Powdery Mildew (Erysiphe cichoracearum). Sl. infections occurred on H. syriacus at Boischatel, Que. (D.L.).

Leaf Spot (Phyllosticta syriaca) was mod. on H. syriacus at Boischatel, Que. (D.L.).

HYACINTHUS - Hyacinth

Bulb Nematodes (Ditylenchus dipsaci) were present in one planting at Gordon Head, B.C. (J.E.B.).

Soft Rot (Erwinia carotovora) was sl. both in the field and in storage at Metchosin and Gordon Head, B.C. (W. Newton).

HYDRANGEA

Powdery Mildew (Oidium sp.). Mildew affected 90% of 300 hydrangeas in a commercial greenhouse in Hamilton, Ont. Infections ranged from tr.-sev. The plants were tightly spaced on the bench and air circulation was generally poor (W.G.K.).

Oedema (excess water) occurred in H. paniculata at Quebec City, Que. (D.L.).

IRIS

Leaf Spot (Didymellina macrospora). Specimens received from the Ottawa, Ont. district were heavily infected. All plants in the garden were affected (H.S. Thompson). Leaf spot was general and heavy in gardens in Charlottetown, P.E.I. (R.R. Hurst).

Bulb Nematodes (Ditylenchus destructor) infected 5% of approximately 1/2 million bulbs at Gordon Head, B.C. (J.E. Bosher).

Soft Rot (Erwinia carotovora) was sev. in 2 gardens at Charlottetown, P.E.I. (R.R. H.).

Crown Rot (Sclerotium delphinii) appeared in trays in heat chambers preparatory to forcing. The bulbs were matted together by mycelium and profuse masses of sclerotia, causing the loss of 20,000 bulbs. Tr. infections were found in the field from which the bulbs were taken. The identification was confirmed by Dr. M. Pantidou (W.N.).

KALANCHOE

Leaf blight (Botrytis cinerea) caused sev. injury to leaves of plants in a greenhouse at Brentwood, B.C. (W.N.).

LATHYRUS

Leaf Spot (Ascochyta pisi). Sl. infection was seen on L. latifolius in Quebec City, Que. (D. Leblond).

Mosaic (virus). A small planting of L. odoratus was destroyed by mosaic at Kentville, N.S. Nearby garden peas were sev. infected (K.A. Harrison).

LILIUM - Lily

Blight (Botrytis elliptica). Specimens received from Magog, Que. showed tr. infection (R. Crete). Blight caused sev. defoliation in a patch of Regal lilies at Kentville, N.S. (K.A.H.).

LOBULARIA - Sweet Alyssum

Wilt (Fusarium sp.) was tr. on sweet alyssum at Disraeli, Que. (D.L.).

MATTHIOLA - Stocks

Foot Rot (Rhizoctonia solani) killed 50% of the plants in a garden at Fort Garry, Man. (W.L. Gordon).

Wilt (Sclerotinia sclerotiorum). Tr. infections were observed in a greenhouse at Sidney, B.C. (W. Newton).

NARCISSUS

Smoulder (Botrytis narcissicola). Badly rotted bulbs were received from Virgil, Ont. The grower estimated the loss of 125/500 bulbs of the variety Easter Flower. Other varieties were relatively free of the disease (W.G.K.).

Bulb Nematode (Ditylenchus dipsaci). The variety Actaea was sev. infected in a small planting at Gordon Head, B.C. The forcing varieties King Edward and Sir Watkin were sl. infected in a Victoria greenhouse (J.E. Bosher).

PAEONIA - Peony

Blight (Botrytis paeoniae) caused mod. damage on several plants in a Lethbridge, Alta. garden (M.W. Cormack). Specimens were received from Saskatoon, Sask. (T.C. Vanterpool). Extremely sev. foliage infections developed soon after blooming at Kentville, N.S. on a pink variety. Old fashioned red peonies nearby remained free from Botrytis (J.F. Hockey).

Ring Spot (virus) was sev. at Ottawa, Ont. on one plant which failed to bloom (H.N. Racicot).

PELARGONIUM - Geranium

Crown Gall (Agrobacterium tumefaciens) was sl. on geraniums at Brentwood, B.C. (W. Newton).

Gray Mold (Botrytis cinerea) destroyed a large bed of geraniums at Tecumseh, Ont. (R.W. Walsh).

Leaf Spot (Botrytis cinerea) was tr. on 23/50 stock plants of the variety George Tassel at Dunnville, Ont. (W.G.K.).

Cutting Rot (Botrytis cinerea). Approximately half of some 10,000 leaf bud cuttings were destroyed by Botrytis in a greenhouse at Dunnville, Ont. The pathogen was isolated consistently from diseased tissue. The propagation house was low and narrow and air circulation was extremely poor (W.G.K.).

Stem Rot (Botrytis cinerea) caused a 10% loss of 500 plants at Waterloo, Ont. (H.S. Thompson).

Crinkle (virus). Circular chlorotic spots were found in abundance at Dunnville, Ont. on the younger leaves of 50 stock plants of each of the varieties Olympic Red and George Tassel (W.G.K.).

Oedema (physiological). A single geranium plant from Dunnville, Ont. showed corky ridges developing on the stems. This condition usually occurs when excessive watering and high humidity in a greenhouse accompany cloudy weather (W.G.K.).

PETUNIA

Sclerotinia Wilt (S. sclerotiorum) affected 50% of the plants in a large bed at North Hatley, Que. (H.S. Thompson).

Aster Yellows (Callistephus virus 1). Flowers and stems were distorted in a Winnipeg, Man. garden, and a mod. infection occurred in Assiniboine Park (W.L. Gordon).

PHLOX

Powdery Mildew (Erysiphe cichoracearum) caused sev. disfigurement of foliage in several Vancouver, B.C. gardens (H.N.W. Toms). It was common on phlox in Que. nurseries (J. Ringuet). Specimens were seen from Dorval (D. Creelman), and from Drummondville and Rouyn (D. Leblond). Heavy infections occurred in plantings in Charlottetown, P.E.I. (J.E. Campbell).

Leaf Spot (Septoria spp.). S. divaricatae was general in Que. nurseries in 1957 (J. Ringuet), and S. drummondii was extremely heavy on Phlox drummondii at Kentville, N.S. It was necessary to replant a bed of phlox because of the serious effects of this disease (J.F. Hockey, D.W.C.).

Blight (virus) was common in Que. almost everywhere perennial phlox were grown (D.L.).

PORTULACA

Blight (Helminthosporium portulacae). Mod. infections developed on P. grandiflora at Ernestown Sta., Ont. The fungus attacked the leaves causing defoliation and the flowers causing a blackening of flower parts. No stem or root rot phase was observed (I.L. Conners, R.A. Shoemaker).

SAINTPAULIA - African Violet

Gray Mold Blight (Botrytis cinerea). The organism was isolated from specimens submitted by a Lethbridge, Alta. grower (M.W. Cormack).

Root Lesion Nematodes (Pratylenchus penetrans, Paratylenchus sp.) Nematodes were found in plants showing stunted growth from Deep Cove, Vancouver and Vernon, B.C. (J.E. Bosher).

Mite Injury (Tarsonemus Mites) caused a characteristic leaf and crown distortion at Saanichton, B.C. (W.N.)

STATICE

Rust (Uromyces limonii). A single plant in a garden near St. Catharines, Ont. bore numerous rust pustules (W.G. Kemp).

TAGETES - Marigold

Leaf Spot (Phyllosticta sp.) was mod. at Ste. Foy. The spots occurred mostly at the tip and the edge of the leaves (D. Leblond).

Aster Yellows (Callistephus virus 1) caused sev. damage to a large border planting at Winnipeg, Man. (W.L. Gordon). Yellows was tr. in a planting at Charlottetown, P.E.I. (R.R. Hurst).

TULIPA - Tulip

Flower and Foliage Spotting (Botrytis tulipae and B. cinerea) caused heavy losses to producers of cut bloom on Vancouver Island, B.C. High humidity and warm weather during flower development accentuated the losses. Rogueing of primary infections and spraying with captan, ferbam or zineb cut losses in some cases (W. Newton).

Fire (Botrytis tulipae) was widespread and sev. in s.w. Ont. in 1957. Tulip beds with tr. infections in early spring were soon destroyed even when attempts were made to remove infected plants (R.W. Walsh). Emperor tulips in a planting at Charlottetown, P.E.I. were sev. affected (R.R. Hurst). Infections at Kentville, N.S. were very light even in beds sev. affected in 1956. The season in 1957 was much less favorable (J.F. Hockey).

Topple (physiological). Specimens were received from a private garden in Ottawa, Ont. (H.S. Thompson). About 90% of the plants of Ursa Minor and Paul Richter were affected in a greenhouse at Cap Rouge (H.S.T.), and was sev. on yellow and pink varieties in a greenhouse at Neuville, Que. (D. Leblond).

VERONICA - Speedwell

Leaf Blotch (Gloeosporium sp.) was sev. on V. longifolia var. subsessilis in Battlefields Park, Quebec City, Que. (D.L.).

ZINNIA

Gray Mold (Botrytis cinerea) affected zinnias in a bed at Tecumseh, Ont. (R.W. Walsh).

Bud Blight (Botrytis cinerea). In a greenhouse at St. Catharines, Ont. 151/1500 plants were affected. Infection developed over a damp, humid weekend when drying conditions were poor (W.G. Kemp).

Aster Yellows (Callistephus virus 1), was tr. in a planting in Assiniboine Park, Winnipeg, Man. It was unusually rare on zinnias this year, though common on many other plants (W.L.G.). Fifteen plants were affected in an annual border at Charlottetown, P.E.I. (R.R.H.).

INDEX OF HOSTS

Abies 116
Acer 116
Aesculus 116
Ageratum 122
Agropyron 48
Alfalfa 30
Althaea 122
Anemone 122
Antirrhinum 122
Apple 93
Apricot 99
Aralia 122
Asparagus 51
Aster 122

Barley 7
Bean 51
Bean, Broad 53
Beet 53
Beet, Sugar 45
Begonia 122
Berberis 116
Betula 116
Blueberry 109
Bromus 48

Cabbage 53
Cabbage, Chinese 57
Calendula 123
Callistephus 123
Canada Thistle 45
Canna 123
Carrot 54
Catalpa 117
Cattleya 123
Cauliflower 55
Celery 56
Celosia 123
Chamaecyparis 117
Cherry 99
Chrysanthemum 123
Clover, Common 31
Clover, Sweet 33
Corn, Field 45
Corn, Sweet 83
Cornus 117
Cosmos 124
Cotoneaster 117
Cucumber 57
Currant 105

Dactylis 49
Dahlia 124
Delphinium 124
Dianthus 124
Dieffenbachia 125

Eggplant 59
Elymus 49
Epigaea 125
Euphorbia 125

Festuca 49
Flax 34

Galanthus 125
Gladiolus 125
Gloxinia 126
Gooseberry 106
Grape 110

Hesperis 126
Hibiscus 126
Hordeum 49
Hyacinthus 126
Hydrangea 126

Ilex 117
Iris 126

Juglans 117

Kalanchoë 127

Laburnum 117
Lathyrus 127

Lettuce 59
Ligustrum 118
Lilium 127
Lobularia 127
Loganberry 106
Lolium 49
Lonicera 118

Mahonia 118
Malus 118
Mangel 45
Matthiola 127
Melon 60
Morus 118
Mustard 46

Narcissus 127

Oats 4
Onion 61

Paeonia 127
Parsnip 63
Parthenocissus 118
Pea 63
Peach 102
Pear 97
Pelargonium 128
Pepper 66
Peppermint 46
Petunia 128
Phleum 49
Phlox 128
Picea 118
Pinus 118
Platanus 119
Plum 104
Poa 50
Populus 119
Portulaca 129
Potato 66
Prune 105
Prunus 119
Pumpkin 82
Pyrus 119

Quercus 119

Radish 82
Rapeseed 38
Raspberry 107
Rhamnus 119
Rhubarb 82
Ribes 120
Rosa 120
Rye 9

Safflower 40
Saintpaulia 129
Salix 120
Soybean 40
Spinach 83
Spiraea 121
Squash 83
Statice 129
Strawberry 111
Sunflower 43
Syringa 121

Tagetes 129
Thuja 121
Tobacco 46
Tomato 83
Tulipa 129
Turf 50
Turnip 91

Ulmus 121

Veronica 130

Watermelon 92
Wheat 1

Zinnia 130