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BOTANY AND PLANT PATHOLOGY DIVISION
CANADA DEPARTMENT OF AGRICULTURE

FOREWORD

The material in the Thirty-fifth Annual Report of the Canadian Plant Disease Survey is arranged on the lines of the previous reports. Special reports are scattered through the Report; in order of their appearance they are as follows: "Notes on Some Nematodes in Canada, 1955" by A.D. Baker; "Phenological Data, 1955" by R.C. Russell and I.J. Bassett; "Cereal Rusts in Western Canada in 1955" by B. Peturson and T. Johnson; "Damage caused by Wheat Rusts in Western Canada in 1955" by B. Peturson; "Rust Nurseries in Canada in 1955" by B. Peturson and others; "Physiologie Races of Cereal Rusts in Canada in 1955" by T. Johnson and others; "Ergot in Cereals in Western Canada in 1955" by I.L. Conners; "Flax Diseases in Manitoba in 1955" by W.E. Sackston; "Flax Diseases in Saskatchewan in 1955" by T.C. Vanterpool; "Sunflower Diseases in Manitoba in 1955" by W.E. Sackston; "Pea Disease Survey in 1955" by V.R. Wallen; a report on tobacco diseases by Z.A. Patrick and L.W. Koch; and "Survey of the Vegetable Market Gardens in the Lower Fraser Valley for Disease" by H.N.W. Toms.

Several important name-changes of well-known pathogens are discussed at some length in the present report. In two instances I am the prime mover in pointing out the necessity for the change. In another I am in agreement with the author's findings, but in still another case, where the author has proposed the reduction of several species to synonymy I fail to see that the evidence is adequate.

Section V on Diseases of Trees and Shrubs contains mostly observations on trees and shrubs planted for ornament. For observations on trees in the forest, the reader may consult the Annual Reports of the Forest Insect and Disease Survey, Canada Department of Agriculture.

At this place I beg to thank the many contributors to the present report. Besides the contributors mentioned above I beg to mention by name non-members of the Division, who have contributed. They are Mr. G.C. Morgan; Messrs. S.R. Colpitts and S.F. Clarkson; Messrs. D. Leblond and J. Rinquet; Mr. E. Lavallee; Dr. A.W. Henry; Mr. W. Lahey; Mr. W.R. Foster; Mr. N. Mayers; and all the District Potato Inspectors.

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New and Noteworthy Diseases

The leaf and stem rusts caused an estimated loss of 9 1/2 million bushels of wheat in 1955 in Man. and Sask. The initial spore shower was relatively light and was centered over Man., where 65% of the wheat acreage was in the stem rust resistant variety Selkirk and another 17% in the leaf rust resistant variety Lee. Although from the beginning of the season until mid-July temperatures and precipitation favored rust infection, hot, usually dry, weather then set in and in consequence ripening of the crop was hastened and rust development retarded. Race 15B was again the predominant race of stem rust. Selkirk was occasionally heavily infected principally as a result of a breakdown of resistance occasioned by the hot weather, but strain 15B-3 and two strains of race 29 capable of attacking Selkirk were isolated a few times.

Common root rot (Helminthosporium sativum and Fusarium spp.) was less in evidence than in the wet season of 1954 and was less severe than in 1953. The most critical observations were made in Sask., but the same conclusions appear applicable at least in Alta. Although the rusts were less destructive in 1955 than in the previous year, severe outbreaks of glume blotch (mostly Septoria nodorum) and speckled leaf blotch (S. avenae f. sp. triticea) occurred quite widely on wheat in the Prairie Provinces. The leaves and sheaths of Selkirk and Lee appeared to be highly susceptible to damage. Although in the absence of experimental evidence the loss cannot be estimated, it appeared that the disease along with hot weather, caused widespread premature killing of leaves and sheaths, which affected the filling of the heads, especially of Selkirk in southern Man.

Observations made chiefly by the Cereal Crops Division indicate that speckled leaf blotch (Septoria avenae) has become a destructive disease of oats, particularly on some varieties otherwise outstanding in Eastern Canada.

Yellow dwarf (virus) was again found in barley in Alta.; of the fields surveyed about 10% were severely affected. An extensive survey of leaf diseases of barley in the three Prairie Provinces demonstrated that the various diseases were unevenly distributed in Western Canada and that in breeding varieties good agronomically the plant breeder has selected lines possessing considerable resistance to the diseases locally prevalent.

Incidence of ergot in cereals was the highest since more extended observations were begun in the Prairie Provinces in 1953. Ergot was also prevalent in grasses. Indeed it appears that ergot is probably of greater importance to agriculture as a menace to livestock than as a hazard in cereal production.

Observations in Man. clearly indicate that Pseudoplea trifolii and Stemphylium botryosum are distinct pathogens, each causing a leaf spot on alfalfa. P. trifolii was also encountered on red clover and sweet clover. Another important observation made in Man. was the fact that the black stem

of sweet clover previously attributed to Ascochyta meliloti is caused by Cercospora davisii. In the same fields, the characteristic symptoms of Cercospora leaf spot were common. Flax diseases were of little importance; flax yields were exceptionally good in Sask. and were about average in Man. The most striking disease was yellows (virus), which caused a small amount of damage in Man. and e. Sask. Pasmo was more prevalent and severe in Man. than in recent years, but it was absent from much of the flax-growing area in Sask. Only traces of sunflower rust (Puccinia helianthi) were seen on the new rust resistant hybrid, Beacon, and in fact the general level of rust infection appeared to be less than formerly on susceptible varieties in areas where the acreage of this hybrid was extensive. Wilt (Sclerotinia sclerotiorum) and leaf mottle (cause unknown) were also less prevalent than usual.

Sclerotinia borealis Bubak & Vleugel is now recognized as a snow mold pathogen in Canada; as yet it has been found only on grasses in the experimental plots at Prince George, B.C. Sclerophthora cryophila W. Jones was described as the cause of downy mildew of orchard grass in B.C. Stem rust (Puccinia graminis) was recorded on Merion bluegrass at Winnipeg, Man., and Regina, Sask., whereas leaf rust (Puccinia poae-nemoralis) occurred on the same grass at Lacombe and Beaverlodge, Alta.

Although the incidence of bacterial ring rot (Corynebacterium sepedonicum) of potato in Canada differs from province to province, depending chiefly on local measures taken to suppress its spread, there are also annual fluctuations in its recorded incidence within each province. The fluctuations arise from differences in the weather that favor symptom expression and detection in affected stocks. In 1954 the recorded incidence was low because the cool rainy season was unfavorable for the development of ring rot and its detection was sometimes impossible on account of the premature destruction of the vines by a late blight epidemic. In 1955 the hot dry summer favored the development of ring rot in affected fields and the vines were not destroyed by late blight or frost before symptoms developed. Late blight was again detected in every province in Canada, but it was almost absent in Alta. The disease reduced yields in the early crop on the Pacific Coast, but elsewhere it was much less prevalent than usual. In the Atlantic provinces, where spraying is a general practice, the disease was controlled without difficulty in well-sprayed fields. Spindle tuber (virus) appears to be increasing gradually in several provinces.

In general, vegetable diseases were about as prevalent as usual, but the hot, usually dry, summer did favor marked development of a few in some sections. Early blight (Alternaria solani) occurred in epidemic proportions on tomato in Ont. and Que. being particularly severe in southwestern Ont. Anthracnose (Colletotrichum phomoides) was also heavy in southwestern Ont., whereas grey mold (Botrytis cinerea) was rather prevalent in N.S. Stemphylium solani Weber was recorded for the first time, when it was found in a mixed infection with early blight in southwestern Ont. There also, high incidence of cucumber mosaic and tobacco etch in tomato coincided with heavy aphid infection.

Blossom-end rot was particularly prevalent in the first tomatoes ready for harvest through southern Ontario and eastward.

Scattered outbreaks of fire blight (Erwinia amylovora) were reported in apple and pear from B.C. to Que. Powdery mildew (Podosphaera leucotricha) is rarely a disease of economic importance in Canada except in the B.C. interior. Recently it has been noticed more frequently in Eastern Canada. One reason for its scarcity may have been that repeated application of sulphur for the control of apple scab kept it in check; some of the organic fungicides now in use are ineffective. Apple orchards were exposed initially to rather heavy infection periods, but apple scab was well controlled in most well-managed orchards. A condition was found in the Okanagan valley in several apple orchards where Virginia Crab was used for the framework of the tree; the possibility that it is due to a virus is being tested. The close association of twisted leaf (virus) of sweet cherry and ring pox (virus) of apricot has been noted in the Okanagan; whether the two diseases are caused by the same virus or by two closely related viruses is being investigated. Brown rot (Monilinia fructicola) caused severe losses in the peach crop after the fruits were picked and before they reached the consumer. A severe epidemic of leaf curl (Taphrina deformans) affected peaches in the Niagara Peninsula, Ont.

Among the diseases noted on trees and shrubs the following may be mentioned: Rhizothyrium abietis Naum. recorded on needles of Abies balsamea in N.B. and Nfld. appears to be new for North America. A rarely collected fungus, Taphrina dearnessii, was found again on Acer rubrum in Que. The fungus may not be rare, but it is easily overlooked because it is evanescent in the necrotic spots, which except for their sudden appearance in great abundance are similar to those caused by several other fungi. A second collection of Marssonina betulae was made on the leaves of Betula papyrifera in N.B. Examination of affected specimens in 1955 indicates that Dutch elm disease Ceratostomella ulmi) is steadily spreading in Ont. and Que.

A few diseases of ornamental plants are worth mentioning: Powdery mildew (Erysiphe cichoracearum) has become a disease of considerable importance on tuberous begonias in Ont.; Karathane has proved effective in its control. The Curvularia that causes a leaf spot and corm rot of gladiolus has been found to be morphologically indistinguishable from C. trifolii. Examination of some old collections recently acquired disclosed a specimen of the rust, Uromyces scillarum (Grev.) Lév. on Hyacinthus collected at Sidney(?), B.C. in 1919; this rust has been recorded in North America only once previously when it was collected on Scilla hispanica at Berkeley, Calif., in 1931. The rust, Cumminsiella mirabilissima, was collected on Mahonia in Ont. for the first time although it has been frequently intercepted on plants imported from Europe.

Maladies nouvelles ou d'importance

Au Manitoba et en Saskatchewan, les rouilles de la tige et des feuilles ont causé en 1955 des pertes estimées à 9 1/2 millions de boisseaux de blé. La première chute de spores a été plutôt légère et s'est concentrée sur le Manitoba, où 65 p. 100 des emblavures consistaient au Selkirk, variété résistante à la rouille de la tige, et 17 p. 100 au Lee, variété résistante à la rouille des feuilles. Bien que depuis le début de la saison jusqu'à la mi-juillet la température et la précipitation aient favorisé l'infection par la rouille, le temps s'est ensuite remis à la chaleur et a été généralement sec, ce qui a hâté la maturation de la récolte et retardé le progrès de la rouille. De nouveau la race 15B a été la race prédominante de rouille de la tige. Le Selkirk a été à l'occasion fortement infecté, principalement par suite d'un écroulement de résistance occasionné par la chaleur, mais la lignée 15B-3 et deux lignées de la race 29 capables d'attaquer le Selkirk ont été isolées à quelques reprises.

La pourriture commune des racines (Helminthosporium sativum et Fusarium spp.) a été moins apparente que durant la saison humide 1954 et a été moins grave qu'en 1953. Les observations les plus précises ont été faites en Saskatchewan, mais il semble que les mêmes conclusions puissent s'appliquer au moins en Alberta. Bien que les rouilles aient été moins destructives en 1955 que l'année précédente, des cas graves de taches des glumes (le plus souvent Septoria nodorum) et de septoriose des feuilles (S. avenae f. sp. triticea) se sont présentés de façon très répandue sur le blé dans les provinces des Prairies. Les feuilles et les gaines du Selkirk et du Lee se sont montrées très sensibles à la maladie. Bien qu'à défaut de preuve expérimentale on ne puisse estimer les pertes, il apparaît que la maladie, de concert avec la chaleur, a causé la mort prématurée des feuilles et des gaines dans une proportion considérable, ce qui a nui au développement des épis, spécialement en ce qui concerne le Selkirk dans le sud du Manitoba.

Des observations effectuées principalement par la Division des céréales indiquent que la septoriose (Septoria avenae) est devenue une maladie destructive de l'avoine, particulièrement chez certaines variétés qui par ailleurs sont des mieux cotées dans l'est du Canada.

La jaunisse naine (virus) a été de nouveau trouvée sur l'orge en Alberta; des champs examinés, environ 10 p. 100 étaient gravement atteints. Une enquête d'envergure sur les maladies des feuilles de l'orge dans les trois provinces des Prairies a démontré que les diverses maladies n'étaient pas réparties uniformément dans l'Ouest canadien et que dans l'hybridation de variétés possédant de bonnes qualités agronomiques, le généticiste a sélectionné des lignées possédant beaucoup de résistance aux maladies dominantes de l'endroit.

A la suite d'observations d'envergure en 1953 dans les provinces des Prairies, l'ergot s'est révélé plus répandu que jamais sur les céréales.

L'ergot a été aussi très abondant sur les graminées herbagères. L'importance de l'ergot en agriculture tient probablement davantage à ce qu'il constitue un risque pour le bétail qu'un danger dans la culture des céréales.

Des observations faites au Manitoba indiquent clairement que le Pseudoplea trifolii et le Stemphylium botryosum sont deux pathogènes distincts dont chacun peut causer une tache des feuilles sur la luzerne. Le P. trifolii a aussi été trouvé sur le trèfle rouge et sur le trèfle d'odeur. Une autre observation importante a été faite au Manitoba: le noircissement de la tige du trèfle d'odeur, antérieurement attribué à l'Ascochyta meliloti, est en fait causé par le Cercospora davisii. Dans les mêmes champs, les symptômes caractéristiques de la tache cercosporéenne des feuilles étaient communs. Les maladies du lin n'ont pas eu beaucoup d'importance; les rendements du lin ont été exceptionnellement bons en Saskatchewan et ont été à peu près moyens au Manitoba. La maladie la plus notoire a été la jaunisse (virus) qui a causé un peu de dégâts au Manitoba et dans l'est de la Saskatchewan. Le pasmo a été plus répandu et plus grave que durant ces dernières années au Manitoba, mais il ne s'est pas trouvé dans une bonne partie de la région à lin de la Saskatchewan. On n'a vu que des traces de la rouille du tournesol (Puccinia helianthi) sur le nouvel hybride Beacon résistant à la rouille, et de fait, le niveau général d'infection par la rouille s'est montré plus bas qu'antérieurement sur les variétés sujettes dans les régions où la superficie ensemencée avec cet hybride était considérable. La flétrissure (Sclerotinia sclerotiorum) et la marbrure des feuilles (cause inconnue) ont de même été moins fréquentes que d'habitude.

Le Sclerotinia borealis Bubak & Vleugel est maintenant reconnu comme une nouvelle moisissure hivernale parasitaire au Canada; jusqu'ici, on ne l'a trouvé que sur des graminées dans les parcelles expérimentales de Prince-George (C.-B.). Le Sclerophthora cryophila W. Jones a été décrit comme étant la cause du mildiou du dactyle pelotonné, en C.-B. La rouille de la tige (Puccinia graminis) a été signalé sur le pâturin Merion à Winnipeg (Man.) et à Regina (Sask.), alors que la rouille des feuilles (Puccinia poae-nemoralis) est apparue sur la même graminée à Lacombe et à Beaverlodge (Alb.).

Bien que la fréquence de la pourriture du cerne des pommes de terre (Corynebacterium sepedonicum) varie au Canada d'une province à l'autre, en raison principalement des mesures prises à chaque endroit pour empêcher sa dissémination, il y a aussi, d'après les mentions faites, des fluctuations dans chaque province. Les fluctuations viennent de différences climatiques qui favorisent l'expression des symptômes et le dépistage dans les groupes atteints. En 1954, on n'a signalé que peu de flétrissure parce que la saison fraîche et pluvieuse n'a pas favorisé le progrès de la pourriture du cerne et que le dépistage était souvent impossible à cause de la destruction prématurée des tiges par une épidémie de mildiou. En 1955, l'été chaud et sec a favorisé la pourriture du cerne dans les champs atteints et les tiges n'ont pas été détruites par le mildiou ou le froid avant l'apparition des symptômes. Le

mildiou a de nouveau été dépisté dans chaque province du Canada, mais il était presque absent en Alberta. La maladie a diminué les rendements de la récolte hâtive sur la côte du Pacifique, mais ailleurs elle à été beaucoup moins abondante que d'habitude. Dans les provinces de l'Atlantique, où les pulvérisations constituent une pratique générale, la maladie a été tenue en échec sans difficulté dans les champs bien pulvérisés. La filosité (virus) paraît gagner graduellement du terrain dans plusieurs provinces.

En général, les maladies des légumes ont été à peu près aussi répandues que d'ordinaire, mais l'été chaud et généralement sec a favorisé de façon marquée certaines maladies dans certains secteurs. L'alternariose (Alternaria solani) s'est manifestée en proportions épidémiques sur la tomate en Ontario et en Québec et elle a été particulièrement grave dans le sud-ouest de l'Ontario. L'anthracnose (Colletotrichum phomoides) a de même été abondante dans le sud-ouest de l'Ontario, alors que la moisissure grise (Botrytis cinerea) était plutôt commune en Nouvelle-Ecosse. Le Stemphylium solani Weber a été mentionné pour la première fois, alors qu'on l'a trouvé en mélange avec une infection de brûlure hâtive dans le sud-ouest de l'Ontario. Là encore, la fréquence de la mosaique du concombre et de la gravure du tabac sur la tomate coincidait avec une infestation abondante de pucerons. La pourriture apicale a été particulièrement fréquente sur les premières tomates prêtes à récolter dans le sud de l'Ontario et vers l'est.

Des cas dispersés de brûlure bactérienne (Erwinia amylovora) ont été signalés sur le pommier et le poirier depuis la Colombie-Britannique jusqu'à la province de Québec. Le blanc (Podosphaera leucotricha) est rarement une maladie d'importance économique au Canada, sauf à l'intérieur de la C.-B. Récemment, on l'a noté plus fréquemment dans l'est du Canada. Sa rareté peut être attribuée au fait que l'application répétée de soufre destinée à combattre la tavelure l'ait tenu en respect; certains des fongicides organiques présentement employés ne sont pas efficaces. Au début, les vergers de pommiers ont été exposés à des périodes d'infection plutôt forte, mais la tavelure a été bien combattue dans la majorité des vergers bien entretenus. Une anomalie s'est présentée dans la vallée de l'Okanagan dans plusieurs vergers de pommiers où le Virginia Crab a été utilisé dans la greffe en charpente; on est en train d'étudier la possibilité que l'anomalie soit due à un virus. L'association étroite entre la torsion des feuilles (virus) du cerisier à cerises douces et la variole (virus) de l'abricot a été signalée dans l'Okanagan; on est en train de chercher si les deux maladies sont causées par le même virus ou par deux virus étroitement apparentés. La pourriture brune (Monilinia fructicola) a causé de lourdes pertes à la récolte de pêches après que les fruits ont été cueillis et avant qu'ils atteignent le consommateur. Une grave épidémie de cloque (Taphrina deformans) s'est abattue sur les pêches dans la péninsule de Niagara (Ont.).

Parmi les maladies notées sur les arbres et les arbustes, mentionnons les suivantes: Le Rhizothyrium abietis Naum. sur des aiguilles d'Abies balsamea au Nouveau-Brunswick et à Terre-Neuve semble une mention nouvelle en Amérique du Nord. Un champignon rarement récolté, le Taphrina dearnessii, a été de nouveau trouvé sur l'Acer rubrum en Québec. Le champignon n'est peut-être pas rare, mais il passe facilement inaperçu parce qu'il est évanescent dans les taches nécrotiques, lesquelles, à part leur apparence soudaine en grande abondance, sont semblables aux taches causées par plusieurs autres champignons. On a fait au Nouveau-Brunwick une seconde collection de Marsonina betulae sur des feuilles de Betula papyrifera. L'examen de spécimens atteints en 1955 indique que la maladie hollandaise de l'orme (Ceratostomella ulmi) s'étend progressivement en Ontario et en Québec.

Quelques maladies de plantes ornementales sont dignes de mention: le blanc (Erysiphe cichoracearum) est devenu une maladie d'importance considérable sur les bégonias tubéreux en Ontario; le Karathane s'est montré efficace pour le combattre. Le Curvularia qui cause une tache des feuilles et une pourriture des bulbes du glaieul a été trouvé identique morphologiquement au C. trifolii. L'examen de certaines vieilles collections récemment acquises a mis à jour un spécimen de la rouille Uromyces scillarum (Grev.) Lév. sur Hyacinthus récolté à Sidney (?) (C.-B.) en 1919; cette rouille n'avait été auparavant mentionnée qu'une fois dans l'Amérique du Nord, alors qu'elle avait été récoltée sur la Scilla hispanica à Berkeley (Calif.), en 1931. La rouille Cumminsiella mirabilissima a été récoltée sur la Mahonia en Ontario pour la première fois, bien qu'on l'ait souvent interceptée sur des plantes importées d'Europe.

The Weather and Its Influence on Disease

On Vancouver Island, as elsewhere in B.C , spring temperatures were below normal. The low temperatures prevaled from April to June and precipitation during June and July was 3.29 in. compared to the normal precipitation of 1.35 in. As a result late blight developed early and spread rapidly in many fields. However, most growers maintained their applications of fungicides and with fine weather prevailing during August and early September damage from late blight was confined to some reduction in yield in fields early defoliated by late blight (N. Mayers).

The winter of 1954-55 on the lower mainland of B.C. was fairly normal with the mean temperatures somewhat higher than usual. However, mean temperatures for April and May were 2.8° and 3.3°F. below normal, respectively, both being record lows. Low temperatures continued throughout the summer, which was generally cool and wet.

Planting of potatoes was late and the early crop was marketed 2-3 weeks later than usual. The small fruit crops were late in ripening and there was substantial loss from grey mold (Botrytis cinerea) in strawberry, raspberry and also in pole bean. Late blight of potatoes was much in evidence on the foliage by mid-July and caused considerable loss in the early crop. However, where the recommended spray program was followed, loss from tuber infection was not serious in the main crop.

August was fairly dry with only .11 in. rain.

There was a heavy freeze (7°F. in the Abbotsford fruit growing area) in mid-November (11-18 Nov.), which caused serious losses to late vegetables, complete loss of sheltered chrysanthemum flowers, and serious injury to small fruits and nursery plantings (H.N.W. Toms).

The 1954-55 winter might be termed a "normal winter" for the Okanagan Valley. There were several weeks of cold weather, but no excessively low temperatures. Snowfall was average.

Weather during the spring and early summer was abnormally cold. The months of July and August provided normal summer temperatures. Fall weather was mild until 11 Nov., when the temperature suddenly dropped 33° in 20 hours, to 4°F. A minimum temperature of -2°F. was recorded several days later. The total number of degree-hours of heat (above 50°F.), computed by Dr. D.V. Fisher of the Experimental Farm, Summerland, was 45,200, close to the average for the years 1946-1955, and 10,000 degree-hours higher than for 1954.

Blossom time for all tree fruits was between two and three weeks later than average. Picking season for cherries was three weeks late, for apples about ten days late. However, the apple crop was harvested before the temperature drop on 11 Nov.

Vegetable crops were also late. Incidence of onion mildew was unusually low, possibly because of well-timed drying winds.

During the spring and early summer there were no wet periods long enough to permit apple scab infections. This disease was practically absent in the Okanagan Valley whereas in the three previous seasons severe losses had been suffered.

The full amount of damage caused to fruit trees by the sudden temperature drop in November cannot be assessed until the spring of 1956. However, it occurred when many apple trees still bore a heavy covering of green leaves. Injury is evident in a small percentage of the buds of apple, peach, plum, and apricot. Browning or blackening of fruit spurs is common in apple, cherry, pear and plum. Bark splitting and browning of tissues are common in the trunks and crotches of cherry. In Okanagan districts north of Summerland the extent of injury is reported to be considerably greater.

The weather pattern for the Kootenays was similar to that for the Okanagan, except that there were longer wet periods in spring and summer months. These periods, perhaps augmented by the effects of heavy dew, resulted in severe outbreaks of apple scab and brown rot of stone fruits (M. F. Welsh).

In southern Alta. the winter was relatively mild and very little winter injury or snow mold damage occurred in forage crops or winter wheat. During the wet, cold spring, seedling blight was very evident in pea fields, but no more damage than usual occurred in sugar beets. Usually humid, warm weather during mid-July apparently favored the rapid development of several leaf and stem diseases of cereals and other crops. The balance of the season, however, was dry and most of these diseases caused little or no damage. Bacterial wilt of alfalfa was more severe than in 1954, probably owing to the abundant soil moisture early in the season (J. T. Slykhuis).

In central Alta., April 1955 was the wettest April on record, about 30 in. of snow and 0.5 in. of rain falling between the 18th and 29th. Before the land could be worked it had lost this valuable moisture and seeding dates were quite late. No further appreciable amount of rain fell until the end of June. July was very hot and dry with good rains in the last week. This was followed by a dry August. The Peace River district was very dry all summer and many crops were scarcely worth cutting. The dry conditions seemed to favor northern anthracnose of red clover and black stem of alfalfa, both being unusually prevalent in the Peace River area. Common root rot of cereals and take-all of wheat were less prevalent than usual (W. P. Campbell).

Heavy rainfall caused flooding during April and early May in many parts of Sask. Seeding was seriously delayed and a great deal of arable land was not seeded. The weather cleared during May, seeding was completed rapidly and growing conditions were good. There was steady growth and the crop, in spite of late seeding, was well advanced by 15 July. High temperatures in July favored early ripening of a healthy, bountiful crop. Rust appeared about a month later than in 1954 and did not develop to any extent in the dry, warm weather. Abundant soil moisture and vigorous growing conditions offset

damage by root rots. The season favored the development of ergot in grasses and on the margins of fields in cereal crops. In spite of dry days and almost dewless nights during August, stem and crown rust developed rapidly on late oats and caused considerable damage. The early crops were harvested under ideal conditions and the quality of the grain was excellent (H. W. Mead).

Stem and leaf rust were first observed on wheat in Man. on 13 June. Temperatures and precipitation favored rust development until 15 July and stem rust became well established on susceptible varieties in Man. and Sask. However a considerable acreage, particularly in Man., was sown to the stem rust resistant variety Selkirk. Also in the latter part of the season hot dry weather greatly hastened crop ripening and retarded rust development (B. Peturson).

In s.w. Ont. the summer was extremely hot and the temperatures only dropped for short periods following a few well-spaced rains in Essex and Kent counties. Serious boron deficiency symptoms in the table beet appeared in two large fields at Chatham where it was considered that the disorder was brought on by high temperatures which reduced the available boron in the soil below minimum requirements of the plant. Early blight (Alternaria solani) was much more prevalent than usual in the canning tomato crop. Also, Stemphylium solani, a fungus causing gray leaf spot of tomatoes, was found in mixed infections with A. solani. S. solani is usually prevalent on tomato crops in the southern States but hitherto has not been found in Ont. (C.D. McKeen).

In the Niagara Peninsula, the season opened extremely early. As a result some growers who have depended on a spring application of a dormant spray to control peach leaf curl failed to spray their trees in time. Others had not adequately protected the twig growth. The cool weather favored infection and there resulted the worst epidemic of leaf curl in many years.

The brown rot fungus caused little blossom blight during the early, short bloom period when the weather was fair and warm. Also sweet cherries were harvested almost free of brown rot. However the warm weather hastened the ripening of the early peaches with the result that markets became glutted and wastage from brown rot became serious before the fruit reached the consumer. Early in August the prolonged heat and drought was broken by hurricane Connie and the frequent rains that followed. Rain, hail and wind damaged varieties approaching maturity, caused many minute skin punctures and bruises, which served as infection courts for brown rot. The driving rains also favored an outbreak of bacterial leaf spot. Although there were four well-marked infection periods in late April and in May, apple scab was not difficult to control (G.C. Chamberlain).

In s.w. Que. weather conditions were in general unfavorable for development of plant diseases. Rainfall was below and temperature above normal. These warm and dry conditions did not favor apple scab and late blight

of potato, two diseases that are usually prevalent. These conditions, however, favored the development of physiologic disorders such as blossom-end rot of tomato (L. Cinq-Mars).

Spring started about 20 April on the south shore of the St. Lawrence in Que. Precipitation and temperature were favorable to plant growth. Soil and air warmed up slowly and steadily unlike in the previous year. Crops were seeded between 15 May and 10 June. Summer began in mid-June and ended around 10 Sept. Early summer was excessively dry and this condition affected considerably the development of vegetables and fruits. The drought, which was very severe in certain parts of the country, lasted about 20 days along the lower St. Lawrence. It was followed by a period of moderate rain showers occurring quite regularly but never sufficient to satisfy crop requirements. Air temperature during the same period remained above average and July and early August were hot. These weather conditions are likely responsible for the late appearance of diseases last summer. Precipitation increased toward the end of July and disease development was somewhat favored. In early August, bacterial blight and anthracnose of beans and Verticillium wilt of raspberry were observed. In mid-August, cucumber scab was recorded at Ste. Anne de la Pocatiere. About the same time a low percentage of blossom-end rot of tomato was noted. Apple scab was extremely sev. in orchards not regularly sprayed. The McIntosh variety was most sev. infected. Red and black currants were sev. rusted. Traces of few other diseases, such as anthracnose and bacterial blight of beans, fire blight of apple and blight of willow, were observed in Montmagny and L'Islet counties. Traces of early blight were found on tomato at Charny, in Levis county, toward the end of August. Around 1 Sept. air temperature dropped below normal, but as the water supply did not increase, disease development on vegetables, fruits and ornamentals was not much favored. Ascochyta diseases on peas were observed in small amounts here and there throughout the district. In a nursery, rust was abundant on hybrid perpetual roses, powdery mildew on hybrid perpetuals and polyanthas and black spot on hybrid tea, polyanthas and perpetual roses. In St. Jean Port Joli, a few ornamental oaks (Q. borealis) were found to be infected by Taphrina. By 20 Sept. late blight was found on tomato at Ste. Anne and vicinity and in a few cases anthracnose developed on stored fruits (L. J. Coulombe).

The first quarter of 1955 was characterized by an extremely heavy snowfall of almost 100 inches at Fredericton, N.B. Also 16 days were below 0°F. However, because of the snow coverage, the ground remained frost-free all winter. During the winter apple trees not adequately protected against mice suffered considerably from girdling.

The snow melted gradually in late March and by early April had entirely disappeared. Little, or no, flooding occurred.

Planting began early in May during a period of warm, dry weather, but it was interrupted after mid-May by frequent showers until 10 June. During this 3-week period the weather was somewhat favorable for apple scab infection. The first ascospore discharge occurred on 26 May when McIntosh bloom was at the full pink stage.

A very good hay and clover crop was harvested without difficulty during the latter part of July and the month of August. The hot, dry weather of August and early September was unfavorable to grain crops, especially barley.

The three months, September to November, were the driest on record and farmers faced the winter season with a grave water shortage.

The ground froze to a depth of 7-8 in. in November despite a snowfall of 7 in. (J. L. Howatt).

The winter of 1954-55 was milder than usual with mean temperatures for December, January and February at Kentville, N.S., from 5° to 7° above the 40-year average. Total precipitation was normal but a greater proportion than usual fell as rain. Temperatures during April and May approached the 40-year mean but the precipitation for these months was 3.71 in. compared to a mean of 5.56.

From June to September inclusive, the mean temperature for July was 4° above normal and for August over 1°. At the same time precipitation was distinctly less, particularly in June and July when the monthly means were 1.55 in. compared to 2.87 in. for the 40-year period.

The deficit in rainfall was apparent in the decreased prevalence of many diseases during the early summer. Later in the season the leaf spot and fruit rot diseases did appear to some extent (J. F. Hockey).

The weather at Charlottetown, P.E.I. in 1955 remained near the 46-year average except for a record low of 39.2 hours of sunshine in January.

Ascopores of apple scab fungus were discharged on 9 occasions at Charlottetown between 30 May and 16 June. An appreciable discharge took place during two periods, 31 May-2 June and 7 June. Trace discharges took place on seven other days. Infection was noticed on leaves of unsprayed trees on 19 June; the previous 18 days were marked by dull, unsettled weather accompanied by frequent showers and cool nights. Within a week leaves and twigs of unsprayed trees were sev. infected and considerable leaf drop followed.

As a result of the backward June weather late-sown cereals showed poor growth and considerable chlorosis. This condition was attributed to the lack of nitrogen. Late blight of potato was not recorded until 1 August. The weather was not conducive to its spread and consequently it did not become a serious problem. Early blight, however, caused sev. defoliation in a few potato fields (J. E. Campbell).

The spring of 1955 was very wet in Nfld. as the total precipitation was 29.56 in. compared to the normal of 13.85 in. During March and April, 99.8 in. of snow fell and May and June brought 14.05 in. of precipitation as compared with the normal of 7.47 in. Precipitation was normal (3.49 in.) in July, and a little below normal in August and September, but during October and November precipitation records were again broken when 8.23 and 12.59 in. respectively were recorded compared to the normal 5.58 and 5.70 in. From March to November, a total of 58.74 in. of precipitation were recorded whereas the normal total for the same period is 41.05 in.

Seeding was late in Nfld. on account of inclement weather and not until July were many farmers able to work their land. Many of the farmers who planted potato, carrot, beet and parsnip seed in early June were forced to re-seed their land in July as the seed had decayed. Late planting and early frost caused potato tubers to be small and yield was greatly reduced.

Weather conditions were ideal for the spread and increase of many plant pathogens, particularly those causing soft rot, late blight and potato wart (G. C. Morgan).

Notes on Some Nematodes in Canada, 1955

A. D. Baker

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The sugar-beet nematode, Heterodera schachtii Schmidt, 1871, was not found outside the areas previously reported in Ontario. On the other hand, the oat-cyst nematode, Heterodera avenae (Lind, Rostrup & Ravn, 1913) Filipjev, 1934, was found attacking oats at Tupperville, Ont. Previously this species had not been found west of the Waterloo area. There is no record of the golden nematode, Heterodera rostochiensis (Wollenweber, 1923) Franklin, 1940, in Canada.

Root-knot nematodes, Meloidogyne spp., were intercepted by officers of the Plant Protection Division on strawberry roots from Rockford, Ill., and from Beltsville, Md., U.S.A., and the southern root-knot nematode, Meloidogyne incognita Chitwood, 1949, on chamaeranthemum roots from Florida. The northern root-knot nematode, Meloidogyne hapla Chitwood, 1949, was recorded from shasta daisy roots from a nursery at Port Burwell, Ont., was numerous on strawberry roots from Kentville, N.S., and caused heavy galling of carrots from near Chatham, Ont.

Of the spiral nematodes, Rotylenchus robustus (deMan, 1880)Filipjev, 1934, was found in strawberry soil at Ottawa and at Fredericton, N.B. It was found in wheat soil from Lake Lenore, Sask., in buckwheat soil from Fallowfield, Ont., and in very large numbers around oat roots from Wyman, Que. Rotylenchus erythrinae (Zimmermann, 1904) Goodey, 1940, was found around the roots of Agrostis sp. from Hepburn, Sask., around white clover roots from Pierce's Corners, Ont., around wheat roots from Lake Lenore, Sask., around flax roots from Cardston, Alta., around alfalfa roots from Shawville, Que., around red clover roots from Hazeldean, Ont., and Macdonald College, Que., in oat soil from Tupperville, Ont., and from Wyman, Que., and from soil around a tamarack tree at Pierce's Corners, Ont. A fairly heavy infestation of Hoplolaimus coronatus Cobb, 1923, was found in pasture sod from Brandon, Man.

Records of root-lesion nematodes included Pratylenchus pratensis (deMan, 1880) Thorne, 1949, on oats from Agassiz, B.C., in soil around alfalfa roots from Shawville, Que., and in soil of strawberry roots from Kentville, N.S. Pratylenchus penetrans (Cobb, 1917) Sher & Allen, 1953, was found in soil from apple orchards at Oliver and Kelowna, B.C., and Ottawa, Ont., and on strawberry roots from Kentville, N.S., Keating Valley, B.C., and (heavy infestation) Hatzic, B.C. This species was recorded also from prune and cherry roots from Summerland, B.C., from peach from Peachland, B.C., from corn from Brandon, Man., in grass sod from Langley Prairie, B.C., from red clover roots from Ottawa, Ont., and from around wheat roots from Lake Lenore, Sask. Pratylenchus minyus Sher & Allen, 1953, was recorded from cherry, pear and prune trees from Summerland, B.C., from Japanese millet roots from Macdonald College, Que., in pasture sod from Fallowfield, Ont., in large numbers around pin-cherry roots from Blackburn, Ont., and around chrysanthemum roots from Peters Corners, Ont. Species of Radopholus were found in soil of water lily roots intercepted by officers of the Plant Protection Division from Hong Kong, around strawberry roots from Kentville, N.S., and around wild rice roots from near Richmond, Ont.

Of the subfamily Tylenchinae, Tylenchus filiformis Buetschli, 1873, was recorded from grass sod from Blackwell, Ont., and Tylenchus costatus deMan, 1921, was found near wild cherry roots at Blackburn, Ont. Psilenchus hilarulus deMan, 1921, was found in red clover soil from Hazeldean, Ont. Records of stunt nematodes were considerably expanded, as follows: Tylenchorhynchus dubius (Buetschli, 1873) Filipjev, 1936, from around alfalfa roots and red clover at the Central Experimental Farm, Ottawa, from riverside soil from Picture Butte, Alta., and from soil of Astilbe sp. from London, Ont. Tylenchorhynchus claytoni Steiner, 1937, from Chinese elm at Ottawa and from riverside soil from Picture Butte, Alta. Tylenchorhynchus acutus Allen, 1955, in chrysanthemum soil at Brandon, Man., and in riverside soil from Picture Butte, Alta. Tylenchorhynchus brevidens Allen, 1955, was found around red clover and corn roots at the Central Experimental Farm, Ottawa, around red clover roots from near Manotick, Ont., in cherry soil from Penticton, B.C., in pear soil from Summerland, B.C., and in sugar-beet soil from near Lethbridge, Alta. Tylenchorhynchus leptus Allen, 1955, was (numerous) in pasture soil from Fallowfield, Ont., in oat soil from Manotick, Ont., in grass sod from Arden, Ont., and in timothy sod from York, P.E.I., and Quinnville, Que.

There was no indication that the infestation of the potato-rot nematode, Ditylenchus destructor Thorne, 1945, in Prince Edward Island had spread during 1955. This species is not now considered as a serious threat to the potato industry but rigid inspections and precautions are being continued. The possibility that more than one strain or species is involved is being given attention by nematologists in Canada and the United States, but, up to the present, no one has produced proof of the existence of more than one species. The

writer has felt that the solution of this species question can be obtained only by the culture and study of pure populations, and this first step was accomplished at Ottawa through the development of the necessary techniques and knowledge of the parasite. This information has been passed on to other workers, who are now also culturing and studying pure populations, and the prospects of ultimately finding a clear answer have thus improved greatly.

There is experimental evidence that mass inoculations of the potato-rot nematode from potato to iris and from iris to potato are successful but this test has not yet been made with pure populations of these nematodes. However, there is not yet conclusive evidence that the iris form and the potato form are distinct species and thus, for the present at least, they must be regarded as the same species, i.e., Ditylenchus destructor.

Species of ring nematodes identified at Ottawa included the following: Criconemoides lobatum Raski, 1952, was found on wheat from Lake Lenore, Sask.; on red clover from Hartland, N.B., Hazeldean, Ont., Talon, Que., and Macdonald College, Que.; on strawberry from Stanstead, Que.; in timothy sod from Quinnville, Que.; in pasture sod from Merivale Station, Ont.; and in Fragaria vesca soil from Kentville, N.S. Criconemoides annulifer (deMan, 1921) Taylor, 1936, was found on English holly soil from Brentwood, B.C. Criconemoides curvatum Raski, 1952, was found in nursery soil from Victoria, B.C., and on red clover roots from the Central Experimental Farm, Ottawa, from Macdonald College, Que., and from Danford Lake, Que. This species was recorded also from oat from Preston, Ont., and strawberry from Fredericton, N.B. Criconemoides xenoplax Raski, 1952, was recorded from peach soil from Harrow, Ont., and from maple tree roots on the Central Experimental Farm, Ottawa.

Records of loose-coated nematodes included Hemicycliophora similis Thorne, 1955, on white clover from Stittsville, Ont., on pin cherry from Blackburn, Ont., and in large numbers near maple roots at Old Chelsea, Que. Hemicycliophora uniformis Thorne, 1955, was identified from soil near a tamarack tree at Pierce's Corners, Ont.

A pin nematode, Paratylenchus sp., was found in large numbers around red clover roots at Macdonald College, Que., and were recorded from prune soil at Summerland, B.C., peach tree soil at Peachland, B.C., strawberry soil at Hatzic, B.C., raspberry soil at Matsqui, B.C., prairie sod at Hepburn, Sask., corn soil and red beet soil (numerous) at the Experimental Farm, Brandon, Man., and red clover soil at the Central Experimental Farm at Ottawa, Ont., and at Hazeldean, Ont.

A flanged-spear nematode, Boleodorus thylactus Thorne, 1941, was found in soil of prune and pear orchards at Summerland, B.C., and in soil near a maple tree at the Central Experimental Farm at Ottawa, Ont.

The chrysanthemum nematode, Aphelenchoides ritzema-bosi (Schwartz, 1911) Steiner, 1932, was found in chrysanthemum leaves at Peters Corners, Ont., and the strawberry bud nematode, Aphelenchoides besseyi Christie, 1942, was identified from soil around lily roots imported from Hong Kong.

Records of dagger nematodes continue to accumulate. Xiphinema americanum Cobb, 1913, was found around the roots of the following: alfalfa (numerous) from Shawville, Que.; oats from Wilson's Corners, Que.; and wheat from Lake Lenore, Sask; vetch, wild rice, milkweed, and maple tree from the Ottawa district; peach tree from Leamington, Ont.; strawberry and English holly from Vancouver Island, B.C.; blackberry (numerous) from Otter Lake, Que.; and lawn sod from Agassiz, B.C.

Large numbers of Longidorus elongatus (deMan, 1876) Thorne & Swanger, 1936, were found around maple tree roots on the Central Experimental Farm at Ottawa, and Longidorus sylphus Thorne, 1939, was identified from around strawberry roots collected at Agassiz, B.C.

In the report on nematode problems for 1954 the writer made a plea that greater attention be given to reporting the occurrence of free-living nematodes from soils in different localities even though the role they may be playing is, in many cases, still rather obscure. Records from the Ottawa laboratory for the past year included the following: a species of forked-lip nematode, Chiloplactus symmetricus (Thorne, 1925) Thorne, 1937, was recorded from soil in prune and pear orchards at Summerland, B.C., and from soil in an apple orchard at Kelowna, B.C. Panagrolaimus subelongatus (Cobb, 1914) Thorne, 1937, was recorded from soil of a pear orchard at Summerland, B.C., from soil of an apple orchard at Oliver, B.C., and from soil of an apricot orchard at Osoyoos, B.C. Records of spear nematodes were numerous and included Dorylaimus monohystera deMan, 1880, from oat soil at Preston, Conestogo, and Aurora, Ont., apple soil at Okanagan, B.C., grass sod on the Central Experimental Farm, Ottawa, Ont., sod bank north of Arden, Ont., beach soil at Carleton, Que., pasture sod south of Hepburn, Sask., riverside soil east of Picture Butte, Alta., riverside sod north of Taber, Alta., and grass sod at Jasper, Alta. Another species, Dorylaimus bastiani Buetschli, 1873, was recorded from grass sod on the Central Experimental Farm, Ottawa, Ont., oat soil from Preston, Ont., weed soil from Little York, P.E.I., and lawn sod from Winnipeg, Man. Dorylaimus intermedius deMan, 1880, was found in meadow sod from Amherstburg, Ont., in wheat soil from near Winnipeg, Man., and in streamside soil from east of Hope, B.C. Dorylaimus carteri Bastian, 1865, was found in streamside soil from east of Hope, B.C., as well as Dorylaimus angulosa Thorne & Swanger, 1936. Other records of dorylaimids included Pungentus monohystera Thorne & Swanger, 1936, in timothy and grass sod from Little York, P.E.I., in meadow sod from St. Vallier, Que., and in lawn sod from Agassiz, B.C. Pungentus pungens Thorne & Swanger, 1936, was found in mountainside soil from near Summit, B.C., and Pungentus spp. were observed in peony soil

from Ayer's Cliff, Que., in meadow sod (larvae only) from St. Vallier, Que., and from soil near a maple tree on the Central Experimental Farm, Ottawa. The basket-headed nematode, Carcharolaimus teres Thorne, 1939, was found in wheat soil from Brandon, Man., and in riverside sod from north of Taber, Alta. Tylencholaimellus magnidens Thorne, 1939, was found in wheat soil from north of Carmel, Sask., and Tylencholaimellus striatus Thorne, 1939, in a clover field at Hazeldean, Ont. Some incidental findings included Amphidelus sp. from apple soil at Kelowna, B.C., Dorylaimellus sp. from soil in apple orchard at Osoyoos, B.C., Diphtherophora sp. in apple soil and from near a maple tree on the Central Experimental Farm, Ottawa, and in apple orchard soil from Point Pelee, Ont. Triplonchium sp. was found near a tamarack tree at Pierce's Corners, Ont., Wilsonema sp. from strawberry soil at Keating, B.C., and Paraphelenchus sp. from apple soil at Oliver, B.C., and from clover soil at Hazeldean, Ont.

Records of predacious nematodes included Mononchus parabrachyuris Thorne, 1924, in clover soil from Merivale, Ont., Mononchus brachyuris (Buetschli, 1873) Cobb, 1917, in wheat soil at Coaldale and Tyrs, Alta., and at East Winnipeg, Man., in soil from Harrow and Blackburn, Ont., and in lawn soil from Agassiz, B.C. Mononchus papillatus (Bastian, 1865) Cobb, 1916, was found in soil from Hornepayne and Blackburn, Ont., from Agassiz, Vancouver and Ladner, B.C. Mononchus sigmaturus Cobb, 1917, was found in greenhouse soil with roses at Moncton, N.B., and in celery soil from Armstrong, B.C. Mononchus longicaudatus (Cobb, 1893) Cobb, 1916, was recorded from apple orchard soil from Kelowna, B.C. Aporcelaimus vorax Thorne & Swanger, 1936, was recorded from orchard soil at Kentville, N.S., lawn sod at Agassiz, B.C., and as probably attacking carrot rust fly larvae at Bradford, Ont.

Records of parasites and associates of insects included Spherularia bombi Dufour, 1837, from abdominal cavity of Bombus ternarius Say at Saskatoon, Sask.; Aphelenchulus reversus Thorne, 1935, from abdominal cavity of Dendroctonus pseudotsugae Hopk., at Vernon, B.C.; Bradynema rigidum (Van Siebold) Zur Strassen, 1892, from abdominal cavity of Pseudohylesinus nebulosus at Vernon, B.C.; Aphelenchoides latus Thorne, in frass of Dendroctonus pseudotsugae Hopk., at Vernon, B.C.; and Rhabditis obtusa Fuchs, 1915, in frass of the same insect at Vernon, B.C.

Records of identifications of nematodes are published periodically from the Ottawa laboratory in The Canadian Insect Pest Review.

Phenological Data - 1955

The data for 1955 disclose one remarkable fact, namely that the flower dates at Winnipeg in the early season were ahead of the mean date whereas at Saskatoon the reverse was true. At Edmonton the flowering dates fluctuated sharply in the same period. The dates are given in the accompanying table.

In the latter part of the season the native plants flowered about the normal time or slightly earlier, particularly at Edmonton.

The data on the early-sown wheat at the three places in the Prairie Provinces indicate that there is a tendency to start sowing later than was the practice 15 years ago. The change has come about for several reasons. With modern power machinery any early start is less essential because the sowing of wheat and the successive crops can be accomplished more rapidly than before. It is also an advantage to let the annual weeds make a start and then to kill them before the grain is sown. This year wheat was sown 20 days later than average at Winnipeg but it developed fairly fast and was only 8 days late at maturity. At Saskatoon it was sown 13 days late and was 8 days late at maturity. At Edmonton it was sown 19 days late but it was correspondingly late in maturing (R.C. Russell).

The first flowering dates for the majority of plants recorded at Ottawa, Ont., were generally earlier than usual particularly as the season advanced. Four years ago phenological observations were begun on quite a number of additional plants. To bring the data together and yet show clearly the base for comparisons, the number of years that observations have been made on each species is shown in curves directly after the name of the species. The data are presented below (I.J. Bassett).

Alnus rugosa	(4)	7/4	N	Poa pratensis	(4)	26/5	N
Acer saccharinum	(20)	11/4	N	Rumex acetosella	(4)	26/5	6E
Corylus cornuta	(3)	13/4	1L	Anemone canadensis	(14)	28/5	6E
Poa annua	(4)	13/4	15E	Juglans nigra	(4)	1/6	4E
Populus tremuloides	(15)	15/4	2E	Carya cordiformis	(11)	6/6	5E
Populus grandidentata	(4)	23/4	2L	Dactylis glomerata	(4)	6/6	3E
Ulmus americana	(20)	25/4	N	Sambucus nigra	(6)	8/6	8E
Acer rubrum	(4)	26/4	2L	Bromus inermis	(14)	10/6	8E
Acer negundo	(15)	29/4	7E	Rhus typhina	(9)	17/6	6E
Betula papyrifera	(4)	29/4	1E	Catalpa speciosa	(12)	17/6	13E
Acer saccharum	(18)	5/5	3E	Phleum pratense	(14)	18/6	6E
Prunus pensylvanica	(14)	8/5	5E	Tilia americana	(14)	24/6	12E
Fraxinus americana	(3)	8/5	1E	Cephalanthus occidentalis	(10)	10/7	7E
Fagus grandiflora	(3)	11/5	2E	Ambrosia trifida	(4)	14/7	7E
Alopecurus pratensis	(4)	12/5	1L	Ambrosia artemisiifolia var. elatior	(3)	9/8	5E
Smilacina stellata	(14)	14/5	6E	Cassia hebecarpa	(9)	9/8	5L
Pinus sylvestris	(20)	18/5	9E	Hamamelis virginiana	(12)	16/9	6E
Quercus macrocarpa	(4)	19/5	1E				

Summary of Phenological Data Taken at Winnipeg, Saskatoon, and Edmonton in 1955

Species	Winnipeg		Saskatoon		Edmonton	
Corylus rostrata	--	--	--	--	2/5	N
Shepherdia canadensis	--	--	--	--	10/5	N
Pulsatilla ludoviciana	--	--	17/4	2E	2/5	2E
Populus tremuloides	14/4	11E	29/4	4L	28/4	2E
Phlox hoodii	--	--	12/5	14L	--	--
Salix petiolaris	--	--	10/5	4L	2/5	6E
Acer negundo	27/4	9E	16/5	9L	30/4	2E
Betula papyrifera	--	--	18/5	7L	6/5	2E
Thermopsis rhombifolia	--	--	19/5	8L	--	--
Amelanchier alnifolia	5/5	13E	21/5	7L	23/5	6L
Prunus americana	2/5	11E	--	--	--	--
Hierochloë odorata	--	--	24/5	5L	--	--
Prunus pennsylvanica	--	--	25/5	5L	26/5	8L
Viola rugulosa	--	--	26/5	4L	25/5	3L
Smilacina stellata	18/5	6E	30/5	5L	20/5	7E
Prunus melanocarpa	18/5	6E	1/6	4L	10/6	12L
Crataegus chrysocarpa	16/5	7E	30/5	2L	4/6	3L
Viburnum lentago	24/5	10E	--	--	--	--
Cornus stolonifera	22/5	8E	7/6	8L	4/6	1L
Thalictrum turneri	--	--	--	--	9/6	3L
Elaeagnus commutata	--	--	7/6	3L	13/6	8L
Hedysarum americanum	--	--	9/6	1L	--	--
Lonicera glaucescens	--	--	11/6	3L	6/6	2E
Achillea lanulosa	--	--	13/6	3L	4/7	7L
Anemone canadensis	--	--	10/6	1E	25/6	N
Galium boreale	--	--	16/6	1L	6/7	10L
Rosa alcea	--	--	20/6	N	13/6	3E
Gaillardia aristata	--	--	24/6	N	--	--
Bromus inermis	17/6	4E	23/6	1E	23/6	5E
Campanula petiolata	--	--	24/6	1L	11/7	2E
Spiraea alba	--	--	27/6	4E	28/6	5E
Symphoricarpos occidentalis	--	--	27/6	7E	--	--
Chamaenerion spicatum	--	--	26/6	9E	6/7	3E
Phleum pratense	--	--	--	--	3/7	4E
Psoralidium argophyllum	--	--	14/7	2L	--	--
Cirsium flodmanii	--	--	14/7	1E	--	--
Agastache anethiodora	--	--	--	--	10/7	2E
Apocynum androsaemifolium	--	--	--	--	5/7	11E
Solidago canadensis	24/7	4L	--	--	22/7	1L
Grindelia perennis	--	--	23/7	1E	--	--
Oligoneuron canescens	--	--	25/7	1E	--	--

Species	Winnipeg		Saskatoon		Edmonton	
Aster conspicuus	--	--	--	--	22/7	2E
Aster ericoides	--	--	2/8	3L	--	--
Aster laevis	--	--	23/7	7E	25/7	6E
Wheat -						
Sown	17/5	20L	13/5	13L	19/5	19L
Emerged	27/5	19L	24/5	12L	--	--
Headed	11/7	10L	6/7	4L	15/7	13L
Ripe	15/8	8L	13/8	3L	7/9	20L

1. DISEASES OF CEREAL CROPS

WHEAT

"MILDEW" (Alternaria tenuis and Cladosporium). A crop of standing wheat in a field at Meath Park, Sask., was already mod. mildewed on 23 Aug.; it had apparently matured early (T.C. Vanterpool). A. tenuis was heavy on dying leaves of wheat in a field in Queens Co., P.E.I., in August (R.R. Hurst).

EYE SPOT (Cercosporella herpotrichoides). Traces were observed to be quite general in low spots in winter wheat fields particularly in south Simcoe Co., Ont., in July (R.J. Baylis, R.A. Shoemaker).

ERGOT (Claviceps purpurea) was noticeable in Redman in the plots at Normandin, Que. (D. Leblond). Examination of two large sheaves of Acadia grown at Charlottetown, P.E.I., revealed a single head affected by ergot (J.E. Campbell). For its occurrence in Western Canada see Ergot Survey.

The root-inhabiting fungus, Cryptoascus graminis, caused a tr. infection on Thatcher in the plots in Queens Co., P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe graminis). Infection was 5-tr. 3-sl./46 fields of winter wheat and 13-tr. 5-sl. 1-mod. 1-sev./164 fields of spring wheat in s. Alta.; the sev. affected field was in Lehmi (J.T. Slykhuis). Out of 328 fields of wheat surveyed in central and n. Alta., 5 were affected; infection was 1-sl. nr. Thorhild, Alta., and 1-sl., 2-mod., and 1-sev. nr. Fort St. John, B.C. (W.P. Campbell). Out of 178 fields of winter wheat examined in Kent Co., Ont., powdery mildew was observed in 7 (S.G. Fushtey). See also Rust Nurseries.

HEAD BLIGHT (Fusarium spp.). Out of 254 fields examined, a sl. infection was recorded in 2 fields, one at Moose Jaw and one of durum wheat at Elrose, Sask., (H.W. Mead). Isolations were made from 2 samples: Common wheat, tr. infection, from Winkler, Man., and Mindum wheat, mod. infection, from Normandin, Que. (W.L. Gordon). A trace was observed in Mindum at Normandin on 16 Aug.; sporodochia of the fungus were present (D. Leblond).

SPOT BLOTCH (Helminthosporium sativum).* Infection was 5-sl. 1-mod./164 fields of spring wheat in s. Alta. (J.T.S.). Affected plants received from Maymont, Sask., 19 July (T.C. Vanterpool). A sev. infection occurred in patches in a field at Teulon, Man. (J.E. Machacek).

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* E.S. Luttrell (Am. J. Botany 42:57-68. 1955) presents convincing evidence for considering H. sativum Pamm., King & Bakke to be a later synonym of H. sorokinianum Sacc. ex Sorokin, Proc. Biol. Soc. Imp. Univ. Kazan 22(3):15. 1890; Sacc. Syll. Fung. 10:615-616. 1892; abstr. in Z. Pflkrank. 1:238-239. 1891. In 1924, Mourashkinski (Trans. Siberian Agric. Acad. 3:87-120. 1924)

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). In winter wheat, damage was 10-tr. 17-sl. 1-mod./46 fields examined in s. Alta. (J.T.S.) and a tr. was found in a single field nr. Fort St. John, B.C. (W.P.C.). In spring wheat, damage was 91-tr. 29-sl. 2-mod./164 fields in s. Alta. (J.T.S.)and 79-tr. 69-sl. 8-mod. 3-sev. in central Alta. and the Peace River area. It was less prevalent in 1955 than in the two previous years (W.P.C.).

Common root rot was less sev. in Sask. in 1955 than in 1953 and was less evident than in the wet season of 1954. A prolonged period of dry weather during late May and throughout June over most of the province appears to have provided conditions unfavorable for infection. Moreover, it would appear that generally there was an ample reserve of moisture in the soil to maintain good crop growth, which was reflected in the excellent yields of grain obtained. A notable feature of the yield and disease data given below is the degree of uniformity between crop districts. This uniformity suggests unusually uniform growing conditions over the province. An analysis of data from 166 fields gave an average disease rating of 7.5 for the province. The ratings for crop districts 1 to 9 were 7.6, 8.0, 7.8, 7.1, 7.6, 8.3, 6.3, 6.1, and 7.5 respectively. Corresponding wheat yields according to the August estimate were 22.7, 22.8, 22.5, 22.1, 24.6, 22.2, 23.4, 22.1 and 22.7 bu. per acre (B.J. Sallans).

Dr. Sallans has drawn my attention to an unfortunate omission in giving the ratings by crop districts in 1954 (P.D.S. 34:2); the sentence should read, "The ratings for the crop districts 1, 2, 5, 6, 7 and 8 were 9.3, 9.1, 12.3, 11.5, 6.2 and 6.6 respectively." (I.L.C.).

Seedlings of Chinook wheat sent from Lucky Lake, Sask., on 3 May were affected by common root rot. On a short survey trip to the west of Saskatoon and return on 11 Aug. symptoms of common root rot were unusually inconspicuous for that time of year. Samples of Pelisier durum wheat received from Lanigan and Webb in mid-August were affected by this disease (T.C. Vanterpool).

LEAF BLOTCH (Helminthosporium tritici-repentis). A sl. infection was found in a few fields in w. and s.-w. Sask. on 9 July. Leaf blotch was much less common than in 1954, when the weather was more favorable for the disease (H.W. Mead).

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*reported H. sorokinianum as the cause of black point of wheat in Siberia. In the paper, "details of the spore measurements and septations are given and H. sativum is regarded as a synonym" (Abstr. in Rev. Appl. Myc. 4:273-275. 1925). Later he (Trans. Siberian Agric. Acad. 6, 4 pp. 1926; abstr. in R.A.M. 6:293-294. 1927) reported it as a leaf spot of Agropyron tenerum. Although Charles Drechsler (J. Agr. Research 24:641-740. 1923) recognized the probability "that the Russian fungus is identical with the American form", he merely treated "it as a probable synonym." Luttrell has removed any remaining doubt that "the American form" is distinct; accordingly the correct name for the imperfect state of Cochliobolus sativus (Ito & Kurib.) Drechsl ex Dastur is Helminthosporium sorokinianum Sacc. ex Sorokin (I.L.C.).

GLUME STREAK (Leptosphaeria sp.). During a survey from Winnipeg to Swan River, Roblin and return via Brandon, Man., 19-21 July, dark linear discolorations were found on the glumes in 13 of the 20 wheat fields examined. The dark brown to black streaks varied in length and occurred on one or both sides of one or more of the sclerenchyma strands in the glumes. Frequently as many as four streaks coalesced near the tip of the glume. Similar dark streaks when present on the lemmas were confined chiefly to the exposed portion. Isolations were attempted from the diseased glumes from four of the affected fields. These yielded a species of Leptosphaeria when the plates of corn-meal agar were incubated for five weeks at 0° to 34° C. No pycnidiospores were produced although cultures of Septoria nodorum incubated under the same conditions produced pycnidiospores. Cultures of the Leptosphaeria were buff-grey whereas those of S. nodorum were black. The ascospores of the Leptosphaeria resembled those of L. avenaria f. sp. triticea in size and shape.

What appeared to be the same fungus was isolated from samples of diseased heads of Redman wheat received from Palmer, Sask., and Minnedosa, Man., and from those of an unidentified variety from Prelate, Sask. (W.A.F. Hagborg).

TAKE-ALL (Ophiobolus graminis). Infection was 3-tr. 2-sl. 1-mod./46 fields of winter wheat and 4-tr./164 fields of spring wheat in s. Alta. (J.T.S.). In central Alta. and the Peace River district infection was 28-tr. 14-sl. 4-mod. and 1-sev./328 fields (W.P.C.). Diseased specimens were also received from the Fort Saskatchewan, Star and Edmonton districts; damage was mod. to sev. in at least one field in each district (A.W. Henry). Infection was 3-tr. 1-sl. 1-mod./256 fields examined in Sask. (B.J. Sallans).

BASAL GLUME ROT (Pseudomonas atrofaciens). A trace was observed in a field nr. Crossfield, Alta. (W.P.C.).

STEM RUST (Puccinia graminis). Infection was 15-tr. 5-sl. 2-mod./46 fields of winter wheat and 84-tr. 21-sl. 1-mod. 1-sev./164 fields of spring wheat examined in s. Alta.; the sev. affected field was one of Lemhi on irrigated land (J.T.S.). Infection was 92-tr. 49-sl. 25-mod. 3-sev./328 fields in central and n. Alta. Stem rust occurred widely throughout central Alta., the more heavily infected fields being in an area bounded by the Sask. border and a line through Consort, Lacombe, Wetaskiwin and Lloydminster (W.P.C.). Stem rust was first observed at Saskatoon, Sask., on 20 July, nearly a month later than in 1954. By late August, stem rust had spread as far as w. central Sask. and damage was sev. in late crops in s. and e. Sask. Out of 244 fields examined during the general survey, rust was found in 137 as follows: 88-tr. 45-sl. 3-mod. 1-sev. (H.W. Mead). For a resumé of its occurrence in the Prairie Provinces see Cereal Rusts in Western Canada.

A survey of 178 fields of winter wheat in Kent Co., Ont., when the crop was nearing maturity, revealed stem rust in 78 fields (S.G. Fushtey). See also Rust Nurseries for additional observations on its occurence in Eastern Canada.

LEAF RUST (Puccinia triticina). Infection was 5-tr. 14-sl. 3-mod./46 fields of winter wheat and 36-tr. 42-sl. 33-mod. 14-sev./164 fields of spring wheat examined in s. Alta. (J.T.S.). Infection was 32-tr. 85-sl. 56-mod. 19-sev./328 fields of spring wheat examined in central and n. Alta. Leaf rust was fairly general in central Alta., but a trace was noted in only one field in n. Alta. near the town of Peace River (W.P.C.). Leaf rust was widespread in most parts of Sask. It was recorded in 132/254 fields examined: infection 4-tr. 19-sl. 40-mod. 69-sev. It was first observed at Saskatoon on 6 July (H.W. Mead). See also Cereal Rusts in Western Canada.

Leaf rust was present in all 178 fields surveyed in Kent Co., Ont.; infection was usually sl. to mod. but in several fields it was rated sev. (S.G. Fushtey). For other observations in Eastern Canada see Rust Nurseries.

BROWNING ROOT ROT (Pythium spp.). Infection was 1-tr. 4-sl. 2 mod./51 fields examined in Sask. Affected fields were mostly between Regina and Moose Jaw (B.J. Sallans). Typical field symptoms were seen at Floral, Sask., on 25 June and although a few brown root tips were observed when the roots were washed out, no oospores were present. Also isolations yielded only P. debaryanum and not the typical lobulate types associated with the disease. It would therefore appear that the symptoms were the result of phosphate deficiency. Damage was very sl. (T.C. Vanterpool).

GLUME BLOTCH (Septoria nodorum). A trace was seen in 2 fields of winter wheat and infection was 8-tr. 1-sl. 1-mod. in the 10 fields of spring wheat affected in s. Alta. (J.T.S.). Infection was 39-tr. 26-sl. 3-mod./328 fields examined in central Alta. and the Peace River district (W.P.C.). Diseased heads were also received from Strome (A.W. Henry). In Sask. infection was 7-sl. 4-mod. 2-sev./254 fields examined. In the Limerick area (s.w.), the sev. infections caused shrivelling of the kernels (H.W. Mead) and S. nodorum was also isolated from discolored head samples received from Assiniboia, Chaplin, Glentworth and Melavel, Sask., all w. or s.w. of Moose Jaw (W.A.F. Hagborg). Infection was mod. on Marquis and sev. on Redman in the plots at Normandin, Que. (D. Leblond) and sev. on Acadia in the plots at Charlottetown, P.E.I. (J.E. Campbell).

SPECKLED LEAF BLOTCH (Septoria spp.). Infection was 11-tr. 12-sl. 2-mod. 1-sev./26 fields of winter wheat and 23-tr. 32-sl. 8-mod. 2-sev./164 fields of spring wheat examined in s. Alta. Leaf blotch was also sev. on several durum and winter wheat varieties in the plots at Lethbridge (J.T. Slykhuis). Leaf blotch was found in 264 or 80.5% of the 328 fields examined in central Alta. and the Peace River district; infection was 48-tr. 184-sl. 31-mod. and 1-sev. The disease was first noted in the plots at Edmonton on 20 July (W.P. Campbell).

Leaf blotch was recorded in 44 out of 254 fields examined in Sask.; infection was 5-tr. 20-sl. 18-mod. 1-sev. In many fields infection was sufficiently heavy to kill the leaves by mid-season (H.W. Mead). In general, damage caused by plant diseases was much lighter than usual in Sask. this past season. However, the summer of 1955 will be remembered by both farmers

and plant pathologists because of the severe outbreaks of glume blotch and leaf blotch that occurred over the whole province. These diseases came as a surprise to the farmers as indicated by the number of enquiries. Between 22 July and 5 August 24 enquiries were received, more than the number made during the 1954 rust epidemic. These enquiries came from all parts of Sask. and from a comparison of the dates and points of origin it was clear that these diseases appeared first in the south and then later in the central and northern areas. The outbreak was not unexpected because these diseases appeared to have been increasing in recent years (T.C. Vanterpool).

Septoria avenae f.sp. triticea was generally distributed throughout Man. in 1955 and contributed considerably to the premature dying of leaves and leaf sheaths in both common and durum wheat. The destruction of these plant parts was most conspicuous in s. Man., particularly in the Red River Valley, and proceeded at a rapid rate during the hot weather that lasted from about mid-July to the end of August. In n.w. Man. infection caused by this organism was general, but the damage was less conspicuous.

The varieties Selkirk and Lee, which accounted for most of the wheat acreage in s. Man. appeared to be highly susceptible to damage of leaves and sheaths. On Lee, pycnidial production was abundant in large, confluent blotches on these plant parts. On Selkirk, pycnidial production was less conspicuous; the impression of the observer was that the leaves and sheaths frequently withered before the organism had time to produce abundant pycnidia. On durum wheat, the destruction of plant tissue was at least as noticeable as on the above-mentioned varieties of common wheat.

In the absence of experimental data, the loss caused by the disease cannot be estimated. A strong impression, however, was created that Septoria infection, in conjunction with hot weather, led to widespread premature killing of leaves and sheaths, which affected the filling of heads, especially in Selkirk wheat in s. Man.

The only definite record of glume blotch caused by Septoria nodorum came from Winnipeg where several varieties in the experimental plots were affected to a mod. extent (T. Johnson). Some additional observations are given under Rust Nurseries.

COMMON BUNT (Tilletia caries and T. foetida). The data obtained from the records of the Board of Grain Commissioners for the last twelve months are presented in Table 1. There was again a slight drop in the percentage of cars graded smutty in the past year. Bunt has been comparatively scarce in Hard Red Spring and durum wheats but continues to be abundant in Alberta Red Winter (W. Popp).

Infection was 1-tr. 2-sev./46 fields of winter wheat in s. Alta. No bunt was observed in fields of spring wheat in Alta. (J.T.S., W.P.C.). No bunt was seen in the 194 fields examined in Sask.; it was somewhat less prevalent than in most years and its greater rarity is attributed to the fact that most of the wheat was sown late and did not lie in a cold soil as long as usual (R.C. Russell). A survey of 106 fields in Man. and e. Sask. revealed no cases of bunt (W. Popp). During a survey for dwarf bunt (q.v.) in two counties in Ont., common bunt (T. foetida) was found in a few fields. In Simcoe Co., infection was 4-tr. 1-10%,

Table 1. Common Bunt in Wheat in Western Canada

Class of Wheat	August 1, 1954 to July 31, 1955 Cars Inspected	Cars Graded Smutty	% Graded Smutty	Aug. 1 to Oct. 31, 1955 Cars Inspected	Cars Graded Smutty	% Graded Smutty
Hard Red Spring	170,450	124	0.07	32,538	22	0.06
Amber Durum	3,291	3	0.09	2,729	1	0.03
White Spring	153	0	0.00	27	0	0.00
Alta. Red Winter	828	10	1.20	99	7	7.07
Garnet	2,489	1	0.04	253	0	0.00
Mixed Wheat	82	2	2.43	26	0	0.00
All classes	177,293	140	0.07	35,672	30	0.08

1-15%/70 fields examined (R.J. Baylis). In Kent Co., out of 178 fields examined common bunt was found in 3 fields (S.G. Fushtey).

DWARF BUNT (Tilletia contraversa). An intensive survey of winter wheat fields was carried out in two counties in Ont. In Kent Co., where the presence of dwarf bunt was suspected from an examination of samples for spores of the fungus, no dwarf bunt was found in 178 fields examined (S.G. Fushtey). In Simcoe Co., where it was found without difficulty in 1953 and 1954, dwarf bunt was recorded in 17 (24%) of the 70 fields examined. In 14 fields it was found in trace amounts, in 2 fields infection was 5%, and in one about 25% of the crop was bunted. In this 8-acre field of Cornell 595, near Stayner, winter wheat had been sown about 5 times in 10 years. The field had been sown in late September with the owner's uncleaned seed, which was also carrying a heavy load of dwarf bunt spores. In general the acreage sown to winter wheat was reported to be much smaller than usual and most growers in whose fields dwarf bunt was found reported seeding under difficulty in late September. All dwarf bunt infected fields were on clay loam (R.J. Baylis).

LOOSE SMUT (Ustilago tritici). A trace was found in one field of winter wheat in s. Alta. and in 7 fields out of 492 of spring wheat examined in Alta. (J.T.S., W.P.C.). Loose smut was recorded in 12 out of 194 fields examined in Sask. Because of its greater incidence in Lee than in other varieties commonly grown, loose smut is now more prevalent than formerly (R.C. Russell). In a survey of fields selected at random in the major crop districts in Man. and e. Sask., loose smut was found in 35 out of 106 fields examined. The level of infection was about the same as in 1954. Also, as in that year, loose smut occurred mostly in Lee, in fields of which infection averaged 4.3% and in some was as high as 15%. The average for all fields examined was 1.2% (W. Popp).

In the survey for dwarf bunt in Kent Co., loose smut was found in 139 of the 178 fields of winter wheat examined (S.G. Fushtey). In Simcoe, out of 70 fields examined, traces were present in 5 fields and an estimated 10% infection in one (R.J. Baylis).

BACTERIAL BLACK CHAFF (Xanthomonas translucens). A trace was recorded in one field each of winter and spring wheat in s. Alta. (J.T.S.). A mod. infection was seen in one field in a low area e. of Saskatoon, Sask. (H.W.M.) A mod. infection was present on all the plants examined in a field of Thatcher at Swan River, Man., and a tr. was seen on a few plants of Mindum at Ste. Agathe. In 20 other fields, mostly Selkirk, examined in Man., no infection was observed (W.A.F. Hagborg).

STREAK MOSAIC (virus). Infection was 17-tr. 15-sl. 9-mod. 6-sev./47 fields of winter wheat and 3-tr. 1-mod. 2-sev./164 fields of spring wheat examined in s. Alta. (J.T. Slykhuis). This disease was first observed in s. Alta. in spring wheat in 1948 when it was reported as "Chlorosis" (P.D.S. 28:5) (M.W. Cormack).

HEAD DISCOLORATION (physiological) was mod. in 3 fields of Rescue and was reported in several others in s. Alta. (M.W. Cormack).

MELANISM (physiological). Traces were seen in single fields at Moose Jaw and Piapot, Sask., (H.W. Mead).

OATS

ERGOT (Claviceps purpurea). A trace infection was collected on Garry oats at Homewood, Man., 1 Aug. (E.G. Anderson, D.B.O. Savile).

ANTHRACNOSE (Colletotrichum graminicola). Heavily infected specimens received from Stony Plain, Alta. Its presence associated with low grain yield on at least one farm (A.W. Henry).

POWDERY MILDEW (Erysiphe graminis). A sl. infection observed at Rocky Point, P.E.I., on 18 July (W.L. Seaman).

HEAD BLIGHT (Fusarium spp). Occasional spikelets were affected in a sheaf of Abgeweit grown at Fredericton, N.B.; F. avenaceum isolated (W.L. Gordon, G.J. Green). A few kernels showing a pinkish mycelial growth observed on Abgeweit in the plots at Charlottetown, P.E.I. (J.E. Campbell).

COMMON ROOT ROT (Fusarium spp.). Infection was 15-tr. 2-sl./42 fields in s. Alta. and 17-tr. 7-sl. 1-mod./248 in central Alta. and the Peace River district (J.T.S., W.P.C.).

LEAF BLOTCH (Helminthosporium avenae). Infection was 12-tr.4-sl. in s. Alta. (J.T.S.). It was not observed elsewhere in Alta. (W.P.C.). Observed twice in Man.: sl. infection at Neepawa and Wawanesa, the latter on Rodney (T. Johnson). During a survey of 40 farms in 6 townships in Temiscouata Co. in late June, a seedling blight believed to be caused by H. avenae was recorded as follows: infection 2-tr. 19-sl. 10-mod. 4-sev. (D. Leblond). A

rapid survey of oat fields in P.E.I. on 25 Aug. revealed that H. avenae was present in every field visited, infection varying from a trace to sev. Only traces of Septoria avenae were visible at that date (R.R. Hurst). Leaf blotch was causing sl. damage to Abegweit in the Experimental Farm plots at Charlottetown on 30 Aug. (J.E. Campbell).

ROOT ROT (Helminthosporium victoriae). In P.D.S. 33:9, H. victoriae was reported causing a root rot of Beaver oats at Notre Dame du Lac, Que. Evidence obtained at Ottawa and elsewhere has shown that Beacon, rather than Beaver, is susceptible to H. victoriae. It would seem that the two varieties have been confused. Only varieties with Victoria in their parentage have proved susceptible to H. victoriae (R.A. Derick).

HALO BLIGHT (Pseudomonas coronafaciens). Infection was 39-tr. 35-sl. 2-mod./248 fields examined in central Alta. and the Peace River district (W.P.C.) and 1-tr. 1-sl. 3-mod. 1-sev./8 fields examined in Man. (W.A.F. Hagborg).

STRIPE BLIGHT (Pseudomonas striafaciens). A mod. infection was recorded in one of the 42 fields examined in s. Alta. (J.T.S.).

CROWN RUST (Puccinia coronata). Infection was 2-tr./42 fields examined in s. Alta. and 5-tr. 4-sl./248 in central Alta. (J.T.S., W.P.C.). Crown rust was unusually widespread and sev. in Sask. and was found as far west as Scott in w. central Sask.; infection was 7-tr. 9-sl. 5-mod. 13-sev./43 fields examined (H.W. Mead). A heavy infection of crown rust was observed on Rodney at Kemptville, Ont. No other heavy infections were noted on this variety (J.A. Dawson). Infection was 8-tr. 6-sl. 9-mod. 17-sev. on the 40 farms visited in late August in Temiscouata Co., Que. (D. Leblond). Infection was generally light (tr.-5%) in most fields in Kings and Lunenburg counties, N.S., in July (D.W. Creelman). A 10% infection was recorded on Abegweit in the plots at Charlottetown, P.E.I., on 30 Aug. (J.E. Campbell). See also Cereal Rusts in Western Canada and Rust Nurseries.

STEM RUST (Puccinia graminis). Infection was 8-tr. 9-sl. 2-mod./42 fields examined in s. Alta. (J.T.S.). Infection was 34-tr. 40-sl. 50-mod. 41-sev./248 fields examined. The rust was confined to central Alta. and the heavily rusted fields were mostly e. and s.e. of Edmonton. It was particularly severe in mature fields of Victory (W.P.C.). Stem rust was unusually prevalent in central Alta. causing appreciable losses in some fields. Numerous specimens and reports received from points around Edmonton, Bretona, Stony Plain, etc. (A.W. Henry). Stem rust was recorded in 39/43 fields in Sask. as follows: 11-tr. 10-sl. 12-mod. 6-sev. Some late fields were destroyed by stem rust in late August. The rust was very severe on wild oats in many areas (H.W. Mead). See additional reports on wild oats in Section II under Avena fatua, also Cereal Rusts in Western Canada.

Stem rust was recorded on 30/40 farms visited in Temiscouata Co., Que.; infection was 23-tr. 7-sl. (D. Leblond). Infection was generally light in

Kings and Lunenburg counties, N.S.; a 10% infection was noted in a field at New Germany, Lunenburg Co. (D.W. Creelman). Stem rust caused mod. damage to Abegweit in the plots at Charlottetown, P.E.I.,; it was also heavy on Clinton. The red stage was noticeable on the leaves in a field at Sherbrooke, Prince Co., on 3 Aug.; damage would probably be sl. (J.E. Campbell, R.R. Hurst). See Rust Nurseries.

SPECKLED LEAF BLOTCH (Septoria avenae). Infection was 29-tr. 92-sl. 11-mod. in 132/248 fields examined in central Alta. and the Peace River district (W.P.C.). A sl. infection was recorded in 2 fields in the Bethune area out of 43 examined in Sask. (H.W.M.). The disease was recorded in 3 fields in Man.; tr. infection at Macdonald, sl. at Winnipeg, and mod. at Swan River (T. Johnson).

The leaf blotch and black stem phases of the disease were quite prevalent on oats in the Ottawa area, Ont. in 1955. The very dry weather during July and August tended to retard the development of the black stem phase and less lodging occurred than in 1953 or 1954. The seed blight phase was also quite prevalent, resulting in conspicuous darkened areas on the lemma and palea of the seed. Very sev. infections were noted on Rodney and Roxton particularly where the stand was luxuriant as on soils high in nitrogen. In some fields 50-80% of the leaf area was covered by disease lesions.

Septoria leaf blotch was also widespread in other provinces in Eastern Canada including the Maritimes. Leaf lesions were found in every field visited in early August. Fields in potatoes the previous year were frequently observed to be more sev. infected than those in hay or grain in 1954. No estimate of damage was attempted (F.J. Zillinsky).

In Temiscouata Co., Que., where 40 farms were visited, infection was 4-sl. 22-mod. 14-sev. (D. Leblond). This disease caused mod. damage to Abegweit in the plots at Charlottetown, P.E.I. A few other fields were seen in Queens Co., where infection was mod. to sev. and some lodging had occurred (J.E. Campbell, R.R. Hurst). See also Rust Nurseries.

The observations of Zillinsky confirm the findings of an earlier survey by R.A. Derick (Plant Dis. Reptr. 38:85-87. 1951). However, neither author mention the occurrence of leaf blotch (Helminthosporium avenae). The leaf symptoms of these two diseases can be readily confused as I know from personal experience. However, in 1939, after careful scrutiny of a wealth of specimens, it was concluded (P.D.S. 19:19) that, "In Que. and P.E.I. both diseases were fairly prevalent but leaf blotch was in general more severe than speckled leaf blotch. In N.B. and N.S. both diseases were about equally prevalent, being quite sev. in some fields in the former province." The situation, no doubt, has radically changed but these early observations in the Maritimes suggested that H. avenae may be an important seedling blight pathogen in cool wet springs and on one occasion (P.D.S. 22:8) its occurrence as a seedling pathogen was demonstrated (I.L.C.).

SMUTS (Loose Smut, Ustilago avenae and Covered Smut, U. kolleri). Smut infection was 7-tr. 3-sl./42 fields in s. Alta. Out of 248 fields examined in central Alta. and the Peace River district 36 were infected, 8 with infections

of 10-40%, av. infection o.8% (W.P.C.). Loose smut was observed in a single field in Sask., whereas covered smut was found in 9/43 with av. infection 1.5%. Covered smut appeared to be slightly less prevalent than last year (R.C. Russell). In Man. and e. Sask. a tr. of loose smut was recorded in 10 fields and tr.-1% of covered smut in 4 of the same fields out of 68 examined, with av. infection of 0.03%. The oat smuts have become relatively scarce in recent years as a result of the increased acreage of smut-resistant varieties (W. Popp). About 10% of the heads were affected by covered smut in a field at Marieville, Que. (R. Crete). A 1.5% infection of covered smut and a trace of loose smut were seen in a 2-acre field of Shefford at Ste. Anne de Bellevue (H. Genereux). In a survey of 40 farms in Temiscouata Co., covered smut infection was 5-tr. 17-sl. 3-mod. 2-sev. (D. Leblond). Tr. infections of loose smut were observed at Cambridge and Bridgetown, N.S. (D.W. Creelman), and at Sherbrooke, P.E.I. (J.E. Campbell).

BLAST (non-parasitic). Damage was 63-tr. 89-sl. 23-mod. 4-sev./290 fields examined in Alta.; it was less prevalent than last year (J.T.S., W.P.C.). Sl. damage was reported in 8/43 fields in Sask.; less blast was present than usual (H.W.M.). Damage was 13-sl. 18-mod. 9-sev./40 farms in Temiscouata Co., Que. (D. Leblond). Blast caused sl. damage at Sherbrooke and Charlottetown, P.E.I. (J.E. Campbell).

RED LEAF (virus). What was believed to be this disease affected several plants in a field near Holdfast, Sask. (H.W. Mead). Plants bearing purple-colored leaves were received from a farmer at Leask. Whether the coloration was due to phosphorus deficiency or the presence of a virus is unknown (T.C. Vanterpool).

RED LEAVES (associated with aphid injury). Infection was 2-tr. 3-sev. in s. Alta. (J.T. Slykhuis).

BARLEY

ERGOT (Claviceps purpurea). A sl.-mod. infection occurred in the varieties Brant, Fort, Herta, Len. 19, M.C. 5540, Montcalm and O.A.C. 21 in the Quebec Seed Board plots at St. Ambroise, Chicoutimi Co., Que. (D. Leblond). A tr. was observed in one field in Queens Co., P.E.I. (R.R. Hurst). See Ergot Survey.

POWDERY MILDEW (Erysiphe graminis). Infection was 1-tr. 1-sl./59 fields examined in s. Alta. (J.T.S.).

HEAD BLIGHT (Fusarium spp.) was fairly common on several hybrid barley lines at the Farm, Charlottetown, P.E.I. (R.R. Hurst).

STRIPE (Helminthosporium gramineum). A trace was seen in a single field in s. Alta. (J. T. S.). Infection was 2-tr. 1-sl. 2-mod./241 fields in central Alta. (W. P. C.).

SPOT BLOTCH (Helminthosporium sativum) was recorded in only 4 fields in tr. amounts in Alta. (J. T. S., W. P. C.). A trace was present on half the leaves in a field at Swan River, Man. (W. L. Gordon).

When sheaves of barley and rye grown at Fort Chimo, Que., were examined in the Cereal Crops Division at Ottawa it was found that none of the varieties were fully mature when harvested and some superficial mold was present because of their green condition when packed. In addition, some leaf spotting was present particularly on the lower leaves. Representative material was collected for examination in the Botany and Plant Pathology Division. In the 9 samples examined a parasitic fungus, Helminthosporium sativum, was detected in one of Olli barley. Saprophytic species found were: Acremoniella atra, Alternaria tenuis, Cladosporium cladosporioides,* Mycosphaerella tassiana (=. M. tulasnei), Penecillium spp. and Tricothecium roseum (A. E. Hannah, Mary E. Elliott).

* Although this binomial has not appeared previously in the Plant Disease Survey, the fungus has been known for some time as C. herbarum. Bisby (Trans. Brit. Myc. Soc. 27:101-112. 1944) had carefully described the fungus under the latter name from his "standard" culture. However, G. A. de Vries (Contribution to the Knowledge of the Genus Cladosporium Link ex Fr. Baarn, 1952, pp. XVI and 121) has shown that there occur two distinct species, C. herbarum and C. cladosporioides (Fres.) de Vries (Hormodendron cl. (Fres.) Sacc.). "Cladosporium herbarum is together with C. cladosporioides the commonest Cladosporium on dead organic material. Both species often occur side by side or mixed together on the same substrate". The conidia of C. herbarum are "more or less verrucose, with usually low warts (sometimes only visible when the conidia are observed in air bubbles), pale brown to brown, 1-celled, (1)4.5-11(19) x (2)4-5(7) microns, 2-celled conidia (about 1%) (5)9-15(20) x (3)4-7(8) microns, oval, elliptical, oblong, with or without constrictions at the septa, more cylindrical and 3-4-celled towards the proximal end of the chain, with one or more hila." The conidia of C. cladosporioides are "smooth or very finely verrucose, which is only visible with an oil immersion lens, pale brown, 1-celled, ovate, oval, limoniform, elliptical, slightly tapering at one or both ends, more cylindrical and often 2- to 3-celled towards the bottom of the chain, with one or more hila."

(Footnote continued on p. 12)

HEAD BLIGHT (Helminthosporium sativum) was quite general in a field in Queens Co., P.E.I. (R.R. Hurst). In a head submitted some of the spikelets were discolored and numerous minute lesions occurred on the awns. When portions of the head were incubated in a moist chamber, H. sativum fruited on the lesions (Mary E. Elliott). About 20% of the heads were slightly affected in a plot of Charlottetown 80 at the Farm, Charlottetown, P.E.I. (J.E. Campbell).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Damage was 86-tr. 98-sl. 20-mod. 9-sev./300 fields examined in Alta.; it was slightly less prevalent in s. Alta. than in the rest of the province (J.T.S., W.P.C.). An average disease rating of 9.6 was obtained from an examination of 30 fields in Sask. (B.J. Sallans).

NET BLOTCH (Helminthosporium teres). Infection was 12-tr. 9-sl. 2-mod./59 fields in s. Alta. (J.T.S.) and 26-tr. 75-sl. 34-mod. 7-sev./241 fields examined in central Alta. and the Peace River district. The disease was present wherever barley was grown (W.P.C.). During a special survey of 84 fields n.w. of Edmonton 11-12 July about 80% of the fields were found affected (W.P. Skoropad). Infection was 1-tr. 9-sl. 4-mod. 6-sev./43 fields examined in Sask. The disease occurred in most areas where barley is grown and infection was heavier than 1954 despite the drier season (H.W. Mead). Diseased specimens were received from Prince Albert and Hudson Bay Junction and mod.-sev. infections were observed 12 Aug. on a brief survey w. and s.w. of Saskatoon (T.C. Vanterpool). Infection was 1-tr. 1-sl. 4-sev./12 fields examined in Man. (W.A.F. Hagborg, J.E. Machacek). A 25% infection was noted on Charlottetown 80 in the plots at Charlottetown, P.E.I. (J.E. Campbell).

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* He lists the differences between the two species as follows: "C. herbarum differs from C. cladosporioides by the following characters: 1. the much rougher conidial wall; 2. the larger measurements of the conidia, especially the larger diameter; 3. the greater number of 2- to more-celled conidia; 4. the presence of inflations on the conidiophore at the place where conidial chains arise; 5. the formation of prolongations of the conidiophore after 7 days; 6. the usually more abundant sterile aerial mycelium, especially when young cultures are compared; 7. the smaller diameter of the conidial heads (18-85 microns vs. 50-113 microns in diam.); 8. the smaller number of conidia per conidial head (100 vs. 300 densely crowded when head fully developed); 9. the usually less extensive branching of the chains." Cladosporium graminum Link is a later synonym of C. herbarum and Heterosporium maculatum Klotzsch is probably the same fungus.

It may be noted that Mycosphaerella tassiana (de Not.) Joh. (M. tulasnei (Jancz.) Lindau) has been shown by three authors to be the perfect state of C. herbarum. According to de Vries, Janczewski, the first to demonstrate the connection, stated that Hormodendron cladosporioides (C. cl.) "never produced any perfect stage in his culture experiments." M. tassiana is already known to be a common saprophyte on many plants in northern latitudes (cf. J. Lind, abstr. in R.A.M. 3:687. 1924) (I.L.C.).

TAKE-ALL (Ophiobolus graminis). Damage was 4-tr. 2-sl. in n. central Alta. (W.P.C.).

STRIPE RUST (Puccinia glamarum). A trace was recorded in 2 fields in s. Alta. (J.T.S.).

STEM RUST (Puccinia graminis). Infection was 12-tr. 3-sl./59 fields in s. Alta. (J.T.S.); a trace was also noted in 10 fields in central Alta. (W.P.C.). Infection was 19-tr. 9-sl. 1-mod./43 fields examined in Sask.; damage was probably negligible. Common on barley at Saskatoon on 25 July (H.W. Mead). See also Cereal Rusts in Western Canada and Rust Nurseries.

LEAF RUST (Puccinia hordei). A trace was found in one field in s. Alta. (J.T.S.) and a sl. infection in one nr. Tofield in central Alta. (W.P.C.). Infection was 10-tr., 1-sl. 1-mod./43 fields examined in Sask.; the very light infection occurred mostly in w.-central Sask. (H.W. Mead). A sl. infection was noted on Charlottetown 80 in the Farm plots, Charlottetown, P.E.I., on 30 Aug. (J.E. Campbell). See Cereal Rusts in Western Canada.

SCALD (Rhynchosporium secalis). Infection was 7-tr. 5-sl. 3-mod./59 fields in s. Alta. (J.T.S.) and 40-tr. 36-sl. 28-mod. 17-sev./241 fields examined in central Alta. and the Peace River district. The disease appeared to be most sev. in fields on the black soils of the province (W.P.C.). In Sask. a trace was seen in 3/43 fields examined (H.W. Mead).

SPECKLED LEAF BLOTCH (Septoria passerinii). Infection was 2-tr. 3-sl./59 fields in s. Alta. (J.T.S.) and 18-tr. 108-sl. 65-mod. 37-sev./241 fields examined in central Alta. and the Peace River district (W.P.C.) This leaf blotch was only recorded in 5/43 fields examined in Sask.; infection was 5-sl. and 2-mod. (at Rosetown in w. central Sask.). It was also present in the Kelvington district (H.W. Mead). In 1955 barley in Man. was attached heavily by S. passerinii. This epidemic was probably more severe than any previous outbreak. The heaviest infections were observed in s. Man., especially in the Red River Valley, but heavily infected fields were found as far n. as Minnedosa and Russell. N. of the Riding Mountains infections were comparatively light. In the 29 fields examined in Man. infection was 3-tr. 2-sl. 10-mod. 10-heavy and 4-very heavy (G.J. Green).

COVERED SMUT (Ustilago hordei). Infection was 4-tr. 1-sl./59 fields in s. Alta. (J.T.S.). Covered smut was recorded in 18/241 fields examined in central Alta. and the Peace River district; maximum infection 15%, av. 0.8% (W.P.C.). Infection was 1-5% in fields examined around Fort Saskatchewan and about 25% of the heads were affected in a field nr. Stony Plain (A.W. Henry). Covered smut was observed in 12/40 fields examined in Sask.; average infection 0.5%. This smut appeared to be a little lighter than usual (R.C. Russell). In a survey of 95 fields in Man. and e. Sask. covered smut was found in 15; maximum infection 7%, av. 0.3% (W. Popp). A light infection was noted in barley in a field of mixed barley and oats at Grahams Road, Queens Co., P.E.I. (J.E. Campbell).

LOOSE SMUT (Ustilago nuda). Infection was 2-tr. 1-sl. 2-mod./59 fields examined in s. Alta. (J.T.S.). Loose smut was recorded in 110/241 fields examined in central Alta. and the Peace River district; in 9, infection was 10-40%. Average infection in all fields was 1.1% (W.P.C.). In several fields around Fort Saskatchewan 1% or more of the plants were affected (A.W. Henry). Loose smut was recorded in 20/41 fields examined in Sask. with an average infection of 0.6%. Despite several wet seasons recently, loose smut does not appear to be more prevalent than formerly (R.C. Russell). During a survey of 95 fields in Man. and e. Sask. true loose smut was found in 66 with maximum infection 12%, and av. infection 0.7%; false loose smut (U. nigra) was found in 20 with maximum infection 7%, av. infection 0.4%. One or more of the three smuts was found in 80% of the fields inspected. About half of the total infection was caused by true loose smut and the other half by the two seedling-infecting smuts, covered smut and false loose smut. Though widespread, loose smut infection was only about half as great as in 1954. This comparatively light infection was probably due to unfavorable weather conditions, as the highly susceptible varieties Montcalm and O.A.C. 21 are still widely grown (W.Popp). It should be noted that no attempt was made in Sask. or Alta. to distinguish between true and false loose smut; it is highly probable that some of the high infections of loose smut recorded in Alta. are the latter smut (I.L.C.)

BACTERIAL BLIGHT (Xanthomonas translucens). Infection was 1-tr. 1-sl./59 fields in s. Alta. and 5-tr. 4-sl. 2-mod. on heads and 1-tr. 1-mod. on leaves in fields in central Alta. (W.P.C.). Infection was 2-tr. 2-sl. 2-mod. 1-sev./9 fields in Man. (W.A.F. Hagborg).

FALSE STRIPE (virus) was found in 4/59 fields examined in s. Alta.; infection was 2-tr. 2-sl. The disease affected a few to over 50% of the plants in some lines of barley grown in the cereal crop nurseries at Lethbridge; several varieties that showed traces this year were apparently free from symptoms in 1954 (J.T. Slykhuis).

YELLOW DWARF (virus). Symptoms similar to those described in the literature for yellow dwarf were observed on barley in s. Alta. in a number of fields where aphids had occurred in noticeable numbers. Out of 59 fields surveyed yellowed plants were observed, in 20 to the extent indicated: 9-sl. 6-mod. 5-sev. Ten experiments have been conducted to determine whether aphids collected from various barley fields were carrying the yellow dwarf virus. In 3 of these experiments, 2 of the barley varieties used as test plants developed symptoms comparable to those described for the barley yellow dwarf virus, but in the other 7 experiments there was no indication of barley yellow dwarf in the test plants (J.T. Slykhuis).

Besides the observations on leaf diseases recorded above and in the Rust Nurseries (q.v.) the results of a special survey by H.A.H. Wallace on "Barley Leaf Diseases in Western Canada in 1955" have been summarized.

A survey of 157 barley fields in Man., Sask. and Alta. for foliage diseases of barley revealed that 90, 65 and 56% of the fields in the respective provinces carried a light to heavy infection by one or more diseases. The lighter infection in Alta. may be due to the fact that the crop was sown later than elsewhere and was therefore at a less mature stage of development when the notes were taken. The leaf spots caused by Helminthosporium spp. (mostly H. teres) occurred in light to heavy amounts in 84, 53, and 11% of the fields in Man., Sask. and Alta., respectively. In Alta. 40% of the fields showed light to heavy infection by Scald (Rhynchosporium secalis), but the disease was difficult to find except in trace amounts in farmers' fields in Sask. and Man. Speckled Leaf Blotch (Septoria passerinii) occurred in traces everywhere but in light to heavy amounts only in 11% of the fields in Man.

The Western Barley Co-operative Test was marked for disease at 13 stations. Brown Spot, a physiologic condition, was light to heavy on Leth. 27 at all stations, indicating that this condition was carried by the seed and is probably a genetic weakness. Leth. 23 was also lightly affected. A light infection of Scott 169 by Xanthomonas translucens at most stations and a light infection of U. M. 256 with False Stripe (virus) indicated that these diseases were present in the seed used in the test. Although difficulty was encountered in differentiating the leaf spots caused by Helminthosporium sativum and H. teres, the latter organism appeared to predominate and account for the varietal reaction: Vantage, susceptible; Montcalm, mod. susceptible; O. A. C. 21 and Husky, fairly resistant. Br. 4417 and Herta showed greatest resistance.

Speckled Leaf Blotch was fairly sev. at Brandon, but a light infection occurred in the plots at Melita, Man., and Saskatoon, Melfort and Tisdale, Sask. Br. 4417 was susceptible, O. A. C. 21 mod. susceptible, while Montcalm, Husky and Vantage seemed to have some resistance; Leth. 27 showed appreciable resistance.

Scald was heavy at Lacombe, Alta., fairly heavy at Swift Current, Sask., and light infections were present as far east as Tisdale. U. M. 584 was most susceptible whereas Vantmore, Scott 169, Leth. 23 and Leth. 27 showed marked resistance to the disease.

Resistance to one or more diseases can often be traced to parental varieties. For example, Glacier, which is resistant to Scald is a common parent of Scott 169, Leth. 23 and Leth. 27. Light infections by Leaf Rust and Powdery Mildew at Morden indicated that Br. 3902 was susceptible to the former and U. M. 570 and Br. 3902 to the latter. Possibly on account of the large number of varieties and crops grown at experimental stations, it is possible to find more diseases and usually heavier infections at these stations than in farmers' fields.

RYE

ERGOT (Claviceps purpurea). Traces were recorded on winter rye at Kentville, Kings Co., and Hebbville, Lunenburg Co., N. S. (D. W. Creelman). A few heads bearing ergots were noted in Prolific in the rust nursery plots at Charlottetown, P. E. I. (J. E. Campbell). See Ergot Survey for its occurrence in the Prairie Provinces.

POWDERY MILDEW (Erysiphe graminis). A trace was seen in 1/8 fields of winter rye examined in s. Alta. (J.T.S.).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Damage was 5-tr./8 fields of winter rye in s. Alta. (J.T.S.). Infection was 2-tr. 4-sl. 1-mod./11 fields of rye examined in central Alta. and the Peace River district (W.P.C.).

STEM RUST (Puccinia graminis). A tr. was found in a single field nr. Alliance in central Alta. (W.P.C.). A very light infection was recorded in 3 fields in n.w. Sask. (H.W. Mead).

LEAF RUST (Puccinia secalina). A trace was found in 2/8 fields of winter rye in s. Alta. (J.T.S.). Infection was mod. to heavy in a field at Ste. Rose du Lac, Man.; a trace also occurred in one at Sidney (W.L. Gordon).

SPECKLED LEAF BLOTCH (Septoria secalis). A trace was recorded in 3/8 fields of winter rye in s. Alta. (J.T.S.). Infection was 2-tr. 5-sl./11 fields examined in central Alta. and the Peace River district (W.P.C.).

STEM RUST (Urocystis occulta). Infection was 1-tr. 1-mod./8 fields of winter rye in s. Alta. (J.T.S.).

CEREAL RUSTS IN WESTERN CANADA IN 1955

B. Peturson and T. Johnson

Cereal rusts overwintered abundantly in Texas during the winter of 1954-55, and subsequent spread during the early spring was rapid. The threat posed by this situation was reduced by severe frosts, which struck n. Texas and Oklahoma 20-26 March, and was further reduced by the disastrous drought that followed in much of the s. part of the winter wheat belt. Despite the rather slow spread of rust in April and May enough rust had developed in parts of Texas and in the e. parts of Oklahoma and Kansas to make possible a very considerable northward movement of rust spores by the end of May. These spores, brought in by persistent s. winds that blew from Texas northward across the Great Plains area of the U.S. and Canada, 30 May - 1 June were deposited chiefly over the eastern Dakotas, Man. and, to a lesser extent, e. Sask.

These spore showers, containing both stem rust and leaf rust, but principally the latter, initiated both stem and leaf rust, which became evident as scattered infections on wheat in s.-e. Man. during the third week in June. The initial spore shower in 1955, was relatively light as compared with the first important spore movement in 1954, which took place 4-8 June and deposited rust spores over large areas of Man. and Sask. Furthermore, the spore movement in 1955 was centered on Man. whereas, in 1954, the spore

movement was concentrated on central Sask. In 1955, leaf rust spores outnumbered stem rust spores by about 10 to 1 in the initial spore showers while in 1954, leaf and stem rust spores occurred in about equal numbers in the early spore showers.

Stem Rust of Wheat

In 1955, stem rust of wheat was first found in Western Canada, at Morris, Man., 13 June on durum wheat. At that time it was very scarce and a search of about half an hour was required to locate a single rust pustule. These scattered infections were, no doubt, initiated by the rust spores brought northward by the persistent s. winds about a fortnight previously. The subsequent development and spread of stem rust in Western Canada was greatly influenced by weather conditions as well as by the wheat varieties grown in the rust area. In Man., where the heaviest rust-spore shower occurred and where the first field infections were found, about 65% of the wheat acreage (1,250,000 acres) consisted of the stem-rust-resistant wheat Selkirk and there were 1,880,000 acres of this variety in the rust area of Sask. There were only tr. amounts of stem rust on Selkirk and no significant amounts of stem rust inoculum was produced on this variety. Temperature and precipitation favored rust infection and development from the beginning of the season until 15 July. Stem rust, during this period, became well established on susceptible wheats in Man. and e. Sask. and by mid-July a light sprinkling of rust was present on susceptible wheat throughout the rust area. From mid-July to the end of the season temperatures were above normal and precipitation below normal except for the last week in July, when precipitation in the prairie region equalled or exceeded the normal. During August, except for a few stations in s.-w. Man., precipitation was much below normal. Rainfall deficiencies ranged to upwards of 70% in Man. and e. Sask. For example, the total August rainfall for Morden, Roland and Winnipeg, in Manitoba, amounted to 0.8 in., 0.6 in., and 0.5 in., respectively.

The hot dry weather of the latter part of the season greatly hastened crop ripening and retarded rust development. When stem rust had reached its maximum just before the crops ripened infection on susceptible varieties, in Man., ranged from trace to about 15%, averaging about 7%. In e. Sask. stem rust averaged less than 5% and in w. Sask. and Alta. it occurred only in trace amounts. Stem rust on durum wheat in Man. was very variable. In some areas infections averaged less than 10% in early fields while in other areas infections in the later fields averaged upwards of 60%. In Sask. stem rust was light on durums.

Leaf Rust of Wheat

Leaf rust, was first found at Winnipeg, Man., on 13 June, two weeks after spores in considerable numbers were caught in spore traps. Infection became quite general on susceptible wheats in the Red River Valley during the third week in June and ranged up to 30% by mid-July. Before harvest leaf

rust in Man. averaged about 65% on all plants. In e. Sask. leaf rust averaged about 35%, but in w. Sask. and Alta. infection was much lighter. When leaf rust infection had reached an intensity of 30-40% on susceptible wheats in Man., only trace amounts were present on Selkirk. Later, in some areas in that province, infection reached 40%. In all cases the pustules were small and apparently became established late. Many fields were examined which carried only traces of leaf rust. The infection on this variety averaged possibly 15% in Man. and owing to the late establishment of leaf rust on Selkirk it probably was only lightly damaged by this rust. In Sask. infection on Selkirk was much lighter than in Man. Variable leaf rust infection occurred on Lee wheat, but was in general somewhat lighter than on Selkirk. Lee comprised 16.8% of Manitoba's wheat acreage (327,000 acres), and in Sask. nearly a million acres of Lee were grown. Negligible amounts of leaf rust occurred on durum.

Stem Rust of Oats

Stem rust of oats was first found in Man. in 1955, on 20 June at Morden. This rust became more prevalent than wheat stem rust. Over half the oats grown in Man. and nearly all the oats grown in Sask. and Alta. were quite susceptible to one or more of the races of oat stem rust prevalent in 1955. A good deal of the oat crop was sown late. On this late crop stem rust developed extensively and mod. infection on susceptible varieties was found as far west as central Alta. while lighter infections occurred in w. parts of that province. The early oat crop, even in Man., carried only light rust infection. In late oats, in Man. and e. Sask. stem rust averaged about 30% on susceptible oats with lighter infections in w. Sask. and Alta. Fairly heavy stem rust infections occurred on the new resistant oats Garry and Rodney in Man. and e. Sask. Some late fields were seen which carried up to 50% infection of small rust pustules. This unusually sev. infection was possibly due to a partial breakdown in resistance as a consequence of the high August temperatures. Most of the oat rust present in Western Canada consisted of races 7 and 8 which at normal temperatures do not appreciably affect Rodney and Garry. Only a very few isolates of race 7A, which attacks Rodney, were found.

Crown Rust of Oats

Crown rust appeared in the field in Man. on 13 June. A quite heavy infection averaging about 40% developed on late oats in Man. and e. Sask. Light infection occurred in w. Sask. and a trace in Alta.

Rusts on Rye

Tr. amounts of stem rust were found on rye in Man. in n.-w. Sask. and central Alta. A mod. infection of leaf rust ranging up to 30% occurred on rye in Man. Traces were also noted in s. Alta.

Leaf Rust of Barley

A very light infection of leaf rust was observed on barley in Man. and e. Sask. and traces in Alta.

DAMAGE CAUSED BY WHEAT RUSTS IN WESTERN CANADA IN 1955

B. Peturson

The estimate of damage caused by leaf and stem rust of wheat to susceptible varieties in Western Canada in 1955 was made by comparing their yields with that of Selkirk wheat, which remained almost free of stem rust,

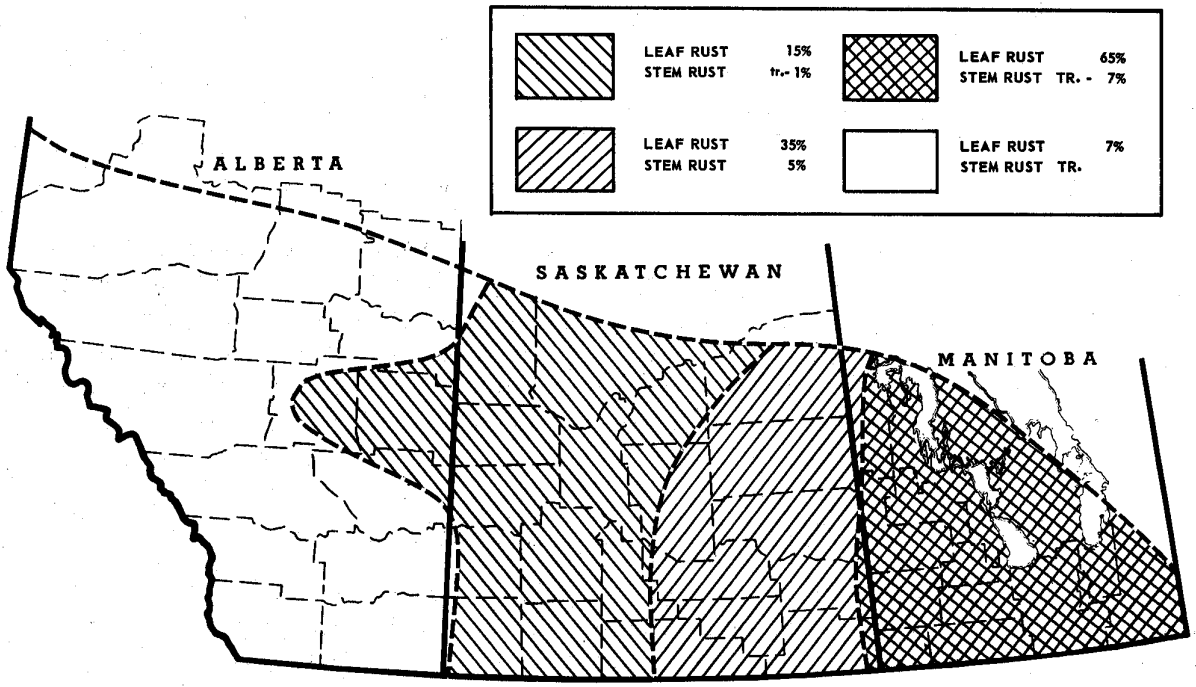

Fig. 1. Map of the Prairie Provinces showing approximate average intensities of leaf rust and stem rust in 1955 on susceptible common wheat.

carried only very light leaf rust infections, and sustained negligible rust damage. Yield information was obtained by United Grain Growers, Ltd., from farmers who, in 1955, grew Selkirk wheat and one or more of the varieties Thatcher, Redman, and Lee, on comparable land, sown about the same date.

In Man., where Thatcher and Redman carried light stem rust infections and heavy leaf rust infections, they yielded 15.3% less than Selkirk; in the e. half of Sask. where both stem and leaf rusts were considerably less prevalent than in Man., Thatcher yielded 7.7% less than Selkirk; and in the

w. half of Sask., where stem rust occurred in trace amounts only and where leaf rust was quite light, Thatcher yielded 1.3% less than Selkirk. Lee yielded 6.2% and 3.6% less than Selkirk in Man. and e. Sask., respectively. These two varieties were equal in yield in w. Sask. When the acreages of various wheat varieties grown in the three areas mentioned above and the differences in yield between them and Selkirk the most rust resistant variety grown are taken into account, it is estimated that yield losses due to leaf and stem rust amounted to 1 1/2 million bushels in Man., 6 million bushels in e. Sask. and 2 million bushels in w. Sask., a total of 9 1/2 million bushels for Man. and Sask., or 2.8% of the total crop for these two provinces. Wheat did not suffer any appreciable rust damage in Alta.

The areas, in the Prairie Provinces chiefly affected by stem rust and leaf rusts of wheat are indicated on the accompanying map (Fig. 1).

RUST NURSERIES IN CANADA IN 1955

B. Peturson, G. J. Green, T. Johnson and A. M. Brown

The introductory sections, Cereal Rusts in Western Canada in 1955 and Damage Caused by Wheat Rusts in Western Canada in 1955, of Report 12, issued by the Plant Pathology Laboratory in December 1955, have been reproduced as separate reports under their respective authors in the preceding pages. Here will be given the sections on Cereal Rusts in the Rust Nurseries and Diseases Other than Rusts with the last of the 5 tables as Table 2.

Cereal Rusts in the Rust Nurseries

The following varieties were used in the rust nurseries in 1955: Wheat: McMurachy, Lee, Kenya Farmer, Little Club, Marquis, Mindum, Thatcher, Selkirk, Redman, Exchange, and Frontana. Oats: Bond, Trispernia, Exeter, Garry, Clinton, Landhafer, and Rodney. Barley: Montcalm, Black Hulless, Vantage, and Feebar. Rye: Prolific.

Wheat Stem Rust

Heavy, or even mod., stem rust infection was largely confined to the central part of Canada, roughly from Fort William, Ont. to e. Sask. E. of Mindemoya, Ont., stem rust infection was generally light. The mod. to heavy infection which occurred on Lee, Mindum, Thatcher and Redman in the nurseries in the central part of the country is an indication of the predominance of race 15B in the area. This race, though present throughout Canada, was less prevalent in the far east and the far west. For example, the data from Kentville, N.S., where the above-mentioned varieties bore no more than a trace of rust while Little Club and Marquis bore 50 and 30 per cent, respectively, show that races other than 15B were principally present. From this station

biotypes of races 29 and 48 were isolated. The heavy infection (50%) on McMurachy at Kapuskasing, Ont., also indicated the presence of races other than 15B. Race identifications showed that in addition to race 15B there were present race 56, two biotypes of race 29 and one of race 48. The heavy infection on McMurachy was evidently caused by races 29 and 48. At Creston, B.C., race 15B was less important than other races, as is made evident by the fact that Little Club and Marquis bore 40 and 30% infection, while Lee, Thatcher and Redman carried only traces of infection.

The heaviest infection shown by Selkirk was 40% at Morden, Man. As it is known from race identification studies that 15B-3 occurred on Selkirk at that station it is possible that the presence of this biotype had something to do with the heavy infection. But as the ordinary type of race 15B was also isolated from Selkirk, it is likely enough that the heavy infection was due principally to a breakdown of resistance as a consequence of the hot weather in the latter part of July and early August.

Wheat Leaf Rust

Leaf rust infection was mod. to heavy in the nurseries from Melfort, Sask., eastwards except for those at Lower South River, N.S., and St. John's, Nfld. In the Prairie Provinces, w. of Melfort and Indian Head, infection was light except at Lacombe, Alta.

Frontana was uniformly resistant. Infection was not visible or a mere trace except in one nursery where it reached about 1%. The amount of infection on Selkirk ranged widely from trace to 60%, but was everywhere of a resistant to semi-resistant type. Lee showed two distinct types of reaction at 3 nurseries in Western Canada and at 2 in Eastern Canada. About half the plants were resistant with a low percentage of infection, while the remainder were susceptible with a much higher percentage. Although this has been observed in Eastern Canada in previous years, it was noted this year for the first time in Western Canada. This year, races 5a, 15a and 126a all showed evidence of containing strains capable of attacking some plants of Lee more heavily than did the usual run of these races. Kenya Farmer was rather highly resistant in most nurseries. The maximum infection was 20% (at Dauphin, Man.). It was, however, evident from the reaction of Kenya Farmer in several nurseries that it is not uniform in leaf rust reaction. At Winnipeg, infection ranged from trace on some plants to 20% on others, and at St. Catharines, Ont., from 5 to 20%. At Fort William, Ont., some plants had 10% infection, others 80%. Redman, though now generally susceptible, showed resistance at certain places in Eastern Canada, notably Pictou and Nappan, N.S.

Oat Stem Rust

Infection was rather light in Que. and the Maritime Provinces. The generally higher infection on Clinton than on Exeter is probably an indication of a high prevalence of race 7, to which Clinton is very susceptible. The Maritime Provinces and e. Que. formed an exception in this respect, as there

these two varieties were rusted to about the same extent, whereas Bond, Trispernia and Landhafer, which are susceptible to all oat stem rust races, were the most severely rusted.

A notable feature of this year's oat stem rust epidemic was the rather heavy infection of the new varieties Garry and Rodney in the Prairie Provinces. Garry is resistant to all known races, and the survey for physiologic races does not show the presence of much race 7A, the only race known to attack Rodney severely. Possibly the heavy infection was the result of a partial breakdown of resistance due to unusually high temperatures.

Crown Rust of Oats

Where crown rust occurred in appreciable amounts it was much heavier on Bond, Exeter and Clinton than on Rodney and Garry. Only trace amounts occurred on Landhafer and very little rust developed on Trispernia except at Brandon, Man., and Merrickville, Ont., where rust infection on it averaged 20% and 30% respectively.

Rusts on Barley

Stem rust caused heavy infection only in Man. and at Creston, B.C. Vantage showed no more than a trace of rust at any point. The rust on barley was principally wheat stem rust, as the reactions of Prolific rye indicate that rye stem rust was abundant only at Winnipeg and Macdonald College, Que. Infection by leaf rust was heavy in 3 of the 4 nurseries in N.S. and in several others, particularly Lennoxville, Que., Guelph and Fort William, Ont., and Agassiz, B.C.

Flax Rust

Three flax varieties, Rocket, Dakota and Bison, were included in each rust nursery. Flax rust occurred in 7 of the nurseries: Beaverlodge and Lacombe, Alta., Scott, Sask., and Winnipeg, Morden, Brandon and Dauphin, Man. In the nurseries where rust was found it occurred in trace amounts on Bison and Dakota except at Lacombe, Alta., where the infection averaged 5% on Bison, and at Brandon, Man., where it averaged 5% on Dakota. No rust was found on Rocket at any of the stations.

Diseases Other Than Rusts

A summary of the incidence of the diseases observed is to be found in Table 2.

On wheat, powdery mildew was most sev. in the nurseries in B.C. A mod. infection was observed in 3 nurseries in N.S. and light infection in 2 nurseries in Ont. On barley, powdery mildew was found chiefly in B.C., where infection was sev., and in Ont.

Rust Nurseries

Diseases caused by species of Septoria were rather widely distributed and were conspicuous in some nurseries. Speckled leaf blotch of oats was found in all Eastern nurseries examined for its presence and occurred also in B.C. The fact that it was not found in nurseries in the Prairie Provinces should not be taken to indicate that it does not occur in that region, as it was found occasionally, in small amounts, in farmers' fields. Speckled leaf blotch of barley (S. passerinii) occurred in all the nurseries in Man. and e. Sask. and was found also in 2 of the 4 nurseries in Alta. Septoria avenae f. sp. triticea caused sev. infection of leaves and sheaths of wheat in the nurseries in Man. and e. Sask. This organism occurred generally throughout this area and probably caused a mod. yield reduction in Man. S. nodorum occurred also in some of the Western nurseries and was present at a number of points in Eastern Canada. S. tritici was found only in nurseries located in areas in which some winter wheat is grown.

Scald of barley (Rhynchosporium secalis) was found in only 2 nurseries in Alta., 2 in Sask., and in 2 nurseries in Que. Infection was heavy only at Edmonton, Alta. Light infection was recorded at Lacombe, Alta., and Scott and Melfort, Sask. In Que. mod. infection occurred at Lennoxville, and a mere trace at Ste. Anne de la Pocatiere.

Infection caused by Helminthosporium sativum and H. teres occurred on barley in many nurseries, but as it is difficult to distinguish between the symptoms caused by these fungi without making cultural studies, it was decided not to include in this report such observations as were made.

PHYSIOLOGIC RACES OF CEREAL RUSTS IN CANADA IN 1955

T. Johnson, B. Peturson, G.J. Green and A.M. Brown

Only that part of Report No. 11, issued by the Plant Pathology Laboratory, Winnipeg, Man., February 1956, on the distribution of physiologic races of cereal rusts in Canada will be reported here.

Distribution of Physiologic Races

Puccinia graminis var. tritici

In the 1955 physiologic race survey 17 races, including several biotypes, of wheat stem rust were identified from 306 isolates obtained from the various cereal producing regions of Canada. The races (number of isolates in brackets) were: race 1 (1); race 11-1 (18); race 15B, 3 biotypes (202); race 29, 4 biotypes (20); race 34 (2); race 39 (1); race 48A (16); race 36, 2 biotypes (43); race 87-1 (1); race 139 (1); and race 179 (1). The biotypes were: 15B (187), 15B-3 (10), 15B-4 (5); 29-1 (15); 29-2 (3), 29-3 (1); 29-4 (1); and 56 (41); 56A (2).

Several varieties not used previously as differential or accessory hosts were employed in 1955. These are: Thatcher, Mayo 54, Kenya 117A,

Table 2. Incidence of certain pathogenic fungi on wheat, oats, barley and rye grown at 35 locations in Canada in 1955

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

Note: - signifies that no observation was made; 1 = trace; 2 = light; 3 = moderate; 4 = heavy

* Examination to determine identity of species was not always made. Septoria from Western Canada was principally S. avenae f. sp. triticea.

** Septoria tritici present.

*** Spore measurements indicate that some of the infection was caused by S. nodorum.

Kenya 58F(L), Kenya 321.B.T.1.B.1, and Kenya 360H. Rust collections were identified to races on the varieties Marquis, Reliance, Arnautka, Mindum, Einkorn and Vernal. These varieties differentiate all races isolated in Canada in the last ten years with the exception of races 2 and 59, which are uncommon. The varieties Kota, Spelmar, Kubanka, Acme and Khapli, which complete the set of hosts used in previous years, were included periodically with the six varieties mentioned above. Their reactions always confirmed the race identification made with the abbreviated set of hosts.

In the last few years sub-races or so-called biotypes have been found in several common and some uncommon races. With few exceptions these sub-races have been distinguished largely by their ability to attack varieties resistant to other cultures of the race. When the first biotypes were discovered they were designated by a capital letter following the race number as 59A, 15A, 15B, 48A, etc. This system of nomenclature was satisfactory as long as accessory varieties used for race identification were not numerous. However, the inclusion among accessory hosts of several sources of resistance has resulted in a further splitting up of biotypes and this has led, in some instances, to complications in race nomenclature. The problem is exemplified in races 15 and 29. In race 15 there are already described, in addition to biotypes 15A, 15B and 15C, the sub-biotypes 15B-1, 15B-2, 15B-3 and 15B-4. Should any of these biotypes be subdivided further this numbering system would become rather unwieldy. In the last two years we have found four subdivisions in race 29 and have called them 29-1, 29-2, 29-3, and 29-4 (see above). This type of designation, also used for races 11-1 and 87-1, has been employed to avoid, firstly, a succession of letters and digits, and secondly, confusion with biotypes identified by other workers using a similar system of nomenclature but different accessory hosts.

With regard to the distribution of physiologic races in 1955, race 15B predominated in both Eastern and Western Canada, as it has for several years, but its frequency diminished from 76% of the isolates in 1954 to 61% in 1955. The prevalence of race 15B-3, a biotype of 15B virulent to Selkirk, increased from 1.6% in 1954 to 3.3% in 1955. Five of the 10 isolates of this biotype were obtained from Selkirk wheat in Man. where the greatest acreage of this variety is located. The prevalence of race 15B-4, a biotype of 15B which can attack the durum variety Golden Ball and some of its derivatives, increased very slightly over 1954. An interesting feature of the 1955 race distribution was the increase of race 56 to 14% of the isolates. The prevalence of this race had decreased since 1950 to a low of 4% in 1954. As in some former years, this race was most frequently collected in Alta. A biotype of 56, called 56A, was discovered in the spring of 1955 when a culture of race 56 from Normandin, Que., was found to attack McMurachy and about half the plants of Selkirk at low temperature. Other cultures of this race attacked these varieties only at high temperature. Two isolates of this biotype, one in Ont. and the other in Alta., were obtained in 1955. Race 29 (6.5% of the isolates) constituted about the same proportion of the isolates as in 1954. The 3 biotypes of this race described in 1954 were again isolated and a fourth was discovered; the latter can attack Kenya 117A, Kenya 321.B.T.1.B.1 and Kenya 360H. Two of the four biotypes of race 29 are virulent to Selkirk. A biotype

of race 11, called 11-1, was isolated rather frequently from the durum variety R.L. 3206 in Man. The 1955 cultures of this race were alike and are regarded as a biotype because they are more virulent on Golden Ball and its derivative 3206 than a 1953 culture of race 11. The biotype of race 48 known as 48A was again fairly common, comprising over 5% of the isolates. A single culture of race 87 was identified. It differs from 2 cultures of this race obtained in 1954, as the latter isolates attack McMurchy and Selkirk whereas the 1955 isolate does not. Races 1, 34, 39, 139 and 179 occurred rarely and do not appear to threaten any important commercial variety in Canada.

The varieties Kenya Farmer and Mayo 54 were resistant to all isolates.

Stem Rust on Barley

Stem rust collections on cultivated barley and on the wild grass, Hordeum jubatum, in N.B., Man., Sask., and Alta. were tested for rye stem rust and wheat stem rust by inoculating Rosen rye and Little Club wheat. As only 9 of the 54 collections tested proved to be rye stem rust, it appears that this rust was not important on barley in 1955.

Puccinia triticina

The procedures used in the identification of the races of wheat leaf rust were as follows. Each rust collection was initially increased on the susceptible variety Little Club. When the infections were well developed, two single-pustule isolates were established and used for race identification. These isolates thus represent a random selection of the races. The remainder of each original culture on Little Club was used to inoculate a "screening" set composed of the varieties Exchange, Kenya Farmer, Lee, Frontana, Selkirk and Klein Titan. The purpose of this procedure was to ascertain the presence of any rust strains particularly virulent to one or other of these varieties.

Altogether 313 isolates were studied and identified as to race, as follows (number of isolates in brackets): race 1 (4); race 3 (3); race 5 (94); race 9 (6); race 11 (10); race 15 (106); race 35 (5); race 58 (42); race 93 (1); race 126 (39); and race 140 (3). By the use of the variety Renown along with the regular differential hosts, the pathogenicity of each isolate on this variety was determined. The isolates highly virulent to Renown are designated by the suffix a. These virulent races (number isolates in brackets) found in 1955 were as follows: race 1a (3); 3a (1); 5a (78); 9a (3); 15a (85); 58a (3); 126a (30). The number of isolates to which Renown responded by either a resistant or an indeterminate reaction may be readily found by substracting the figures for the a races from those given earlier for the races as a whole.

The use, in past years, of Renown and Hope as accessory differential hosts has indicated the increasing prevalence, especially in races 5, 15 and 126, of strains virulent to Hope and H44 derivatives in the Prairie Provinces

where such varieties have been widely grown. In other parts of the country these strains have occurred and still occur much less frequently. In 1955, of the total number of isolates, the virulent strains accounted for 28.7% in Eastern Canada, 94.6% in the Prairie Provinces and 39.1% in B.C.

The race distribution in 1955 appears to be little different from that of 1954. Race 15 was the most prevalent race; it made up 33.9% of the total isolates as against 30.7% in 1954. Second in order of prevalence was race 5 which accounted for 30.0% of the isolates, as compared with 28.1% in 1954. Third and fourth in order of frequency of collection were race 58, which is and has been for many years the predominant race in Eastern Canada, and race 126, which occurs rather generally in Eastern Canada and the Prairie Provinces. Other races occurred but rarely. Among these may be mentioned race 35 found only in P.E.I. and Ont. and race 140 in P.E.I. and Man. The former is distributed chiefly in the eastern parts of the U.S. and Canada; the latter is of rare occurrence and was found previously only in Ont. and Man. in 1951.

A point that should not be overlooked in a race survey is the tendency of particular varieties to select certain races. In the 1954 report, it was pointed out that there was some evidence that Lee was being rusted more by race 126 than by other races. When the data from the 1955 survey were tabulated it was evident that race 126, which made up 12.5% of the total isolates and only 3.2% of the isolates from Redman, accounted for 32.1% of the isolates from Selkirk and 37.5% of those from Lee. There is also some evidence that race 15 occurs more frequently on Selkirk and Lee than on other varieties.

From greenhouse tests with seedling and adult plants of Lee it seems that this variety does not react identically to all isolates of race 126. To some isolates, the reaction was resistant, to others it was only partially resistant or moderately susceptible. There is similar evidence for races 11 and, though less conclusive, for races 5 and 15. It seems quite possible that the isolation of unexpectedly large numbers of isolates of races 126 and 15 from Lee is due to adaptation of these races to Lee by the production of strains congenial to that variety.

Puccinia graminis var. avenae

In the 1955 physiologic race survey, 12 races of oat stem rust were identified from the 186 isolates studied. These races (number of isolates in brackets) are: 1 (1); 2 (6); 4 (1); 5 (8); 6 (10); 7 (104); 7A (5); 8 (26); 10 (14); 11 (6); 12 (4); and 13 (1).

The races were identified by the method used for several years. Each field collection was increased on the susceptible variety Victory and the resulting inoculum was used to inoculate the varieties Richland, White Russian, Sevnothree, Rodney and Garry for race identification.

The distribution of the races was much the same as in the last several years. Race 7, which has predominated, comprised 56% of the isolates and race 8, the second commonest race, 14%. For several years race 6 has occurred only in Eastern Canada but this year it was found as well in all three of the Prairie Provinces. It is still an uncommon but potentially dangerous

race because Richland and White Russian types of resistance are ineffective against it. Like race 8, it can attack varieties such as Ajax, Exeter and Fortune which are widely grown in Western Canada. Race 7A, the only race capable of attacking the new variety Rodney, was scarce; this race was found only in Man., where Rodney is most widely grown, and 4 of the 5 isolates of the race were from that variety. The new variety Garry was resistant to all races. Some fields of these two varieties showed rather heavy infections of small pustules in 1955. But as these pustules yielded races to which the varieties were resistant it is believed that this year's high summer temperatures had caused a partial breakdown of resistance and permitted some rust development.

Puccinia coronata var. avenae

From 94 isolates obtained from collections on oats in many localities in Eastern and Western Canada in 1955, 18 physiologic races were identified. These races (with the number of isolates in brackets) were as follows: 201 (14); 202 (23); 203 (2); 209 (8); 210 (1); 211 (3); 212 (3); 226 (1); 228 (6); 231 (4); 232 (5); 234 (2); 235 (2); 237 (1); 238 (2); 239 (6); 240 (10); and 280 (1). All these races except 280 have been found in Canada in previous surveys.

There were few changes from the races identified in 1954. Only races 205, 216 and 229 failed to reappear in 1955. However, there was a slight change in the prevalence of some races. In 1954, 80.5% of the isolates from Western Canada and 49.5% from Eastern Canada belonged to races that heavily attack varieties possessing the Bond type of crown rust resistance. In 1955, the corresponding figures were 72.8% for Western Canada and 41.3% for Eastern Canada.

No races were found in Canada this year capable of attacking the varieties that are currently being used in breeding.

Isolates from Aecia collected on Rhammus cathartica

Collections of aecia on Rhammus cathartica were obtained from Man., Ont., N.B. and P.E.I. in 1955. Two varieties of crown rust, avenae and secalis were isolated when the aeciospores were transferred to cereal and grass hosts that differentiate the various varieties. Apparently the variety avenae was the predominant crown rust variety in 1955. Five physiologic races were represented as follows: race 202 (8); 212 (1); 239 (1); and 240 (2). Var. secalis was isolated 3 times. The prevalence of race 202 was in agreement with the results obtained from the race survey using the uredinial collections on oats.

ERGOT IN CEREALS IN WESTERN CANADA IN 1955

I. L. Conners

A fairly extensive survey was carried for the third successive year to determine the incidence of ergot in cereal crops in Western Canada. The results of the previous surveys have already been published (P.D.S. 33:23-28; 34:30-32). I am particularly indebted to Dr. W.L. Gordon, Winnipeg, Dr. H.W. Mead, Saskatoon, and Dr. W.P. Campbell, Edmonton, for summarizing the information in the respective provinces. The results are presented in Table 3.

When the figures for the three years are compared the percentage of wheat fields showing ergot was sl. higher in 1955 than in 1953 and considerably higher than in 1954. The overall increase is due to the marked increase in Man.; the significant concentration of affected wheat fields in central Alta. and w.-central Sask. in 1953 has not occurred again. On the other hand, the barley percentages are the lowest for the three years. As in the past, a high percentage of the rye fields showed ergot.

In Man., the average infection in wheat fields showing ergot rarely exceeded a trace; in one field of Selkirk 5% of the heads were affected and in two others of this variety up to 12% of the heads on plants about the margin of the field bore sclerotia, although the av. infection was but tr.-0.1%. No significance is attached to the fact that the few appreciable infections were in Selkirk. The greater concentration of ergot in margins of the field was repeatedly observed in rye fields. Rarely did the av. infection exceed a tr. In one field at Plum Coulee the infection was more uniform: at the margins 20%, av. 14%. The presence of ergot in Agropyron and Bromus inermis growing at the margin or along the roadside was noticed on two occasions. In one field, the rye at the margin was heavily infected, in the other only a tr. was present and it was only slightly heavier at the margin. In the two fields of barley affected, infection was a tr. in one; and 25% at the margin, av. 1%, in the other (W. L. Gordon).

In Sask., ergot infection was rated as 6-tr. 2-sl. 2-mod./254 fields of wheat, 4-tr./45 fields of barley and 4-sl./5 fields of rye examined from Saskatoon. Infection in rye was lighter than anticipated as the grasses on the headlands were sev. infected this year. Infection in wheat was mostly at the margins of the fields (H. W. Mead). Traces were observed in 2 fields of barley and in one of wheat in central Sask. Ergot has been observed every year in tr.-sl. amounts in wheat and barley fields since the sev. outbreak in 1942. Before that year it was difficult to find ergot in these cereals (T.C. Vanterpool).

In Alta., infection in spring wheat was 3-tr. 1-mod. in the 164 fields examined in crop districts 1-4 and 14-tr., 1-0.5%, 2-1%, 1-3% and 1-5%/220 fields examined in central Alta.; in the 108 fields examined in n. Alta. and the Peace River district no ergot was seen. A mod. infection was also reported on several fields of Chinook and Rescue in the Medicine Hat area. Traces were

Table 3. Fields of Cereals inspected for Ergot by Province and Crop District in 1955.

C.D.	Wheat						Barley						Rye					
	Man.		Sask.		Alta.		Man.		Sask.		Alta.		Man.		Sask.		Alta.	
	Total	Ergot	Total	Ergot	Total	Ergot	Total	Ergot	Total	Ergot	Total	Ergot	Total	Ergot	Total	Ergot	Total	Ergot
1	-		22	3	66	2	-		5		11		-		1	1	-	
2	3	2	46	2	48		1		7		24		1	1	1		8	4
3	19	5	37	1	18	2	4		5	1	10		6	5	1	1	-	
4	-		11		32		-		-		8		1	1	-		-	
5	-		15		28	1	-		5		4		-		-		-	
6	4		66	1	52	6	-		12	1	15	1	-		1	1	3	3
7	7	3	27	2	47	2	1		3	1	9	1	3	3	-		2	2
8	4	2	19	1	31	4	2	2	6	1	31	3	4	4	-		-	
9	4	1	16		10		-		2		26		2	2	2	2	-	
10	7	2			34	4	2				20	1	1	1			-	
11	6	1			18	2	1				27	1	2	2			-	
12	-				-		-				-		-				-	
13	2				10		1				12	1	2	2			1	1
14	-				29		-				28		-				-	
15					8						11						-	
16					39						44						5	
17					11						7						-	
B.C.*					11						13	1					-	
TOTAL	56	16	259	10	492	23	12	2	45	4	300	9	22	21	6	5	19	10
% Ergot		28.6		3.9		4.7		16.7		8.9		3.0		95.5		83.3		52.6

* Peace River Block of B.C.

recorded in 8/241 fields of barley in central Alta. and the Peace River district. In rye infection was 6-tr., 1-2%, 1-8%, 1-10% and 1-40% in the 19 fields examined in Alta. Ergot was also found in volunteer rye by roadsides on 4 occasions (W.P.Campbell, J.T.Slykhuis).

Observations by Dr. Campbell in central and n. Alta. show that ergot was present on a wide variety of grasses. He made 158 observations as follows: Agropyron spp. 17, Agrostis alba 2, Avena fatua 1, Bromus inermis 69, other B. spp. 8, Calamagrostis canadensis 26, Elymus innovatus 31, Phleum pratense 3, Poa pratensis and Stipa viridula 1 each. From these and observations made in s. Alta. and elsewhere, it is evident that ergot was prevalent in wild grasses in the Prairie Provinces in 1955. Indeed it appears that ergot is probably of greater importance to agriculture as a menace to livestock than as a hazard in cereal production.

II. DISEASES OF FORAGE AND OTHER FIELD CROPS

A. FORAGE LEGUMES

ALFALFA

BLACK STEM (Ascochyta imperfecta) appeared to be less prevalent in s. Alta. than in 1954; infection was 10-tr. 6-sl. 2-mod./58 fields examined (E.J. Hawn). In the rest of Alta. infection was 10-tr. 15-sl. 11-mod. 15-sev./136 fields examined, being most destructive in the Peace River district (J.B. Lebeau, S.B. Hrushovetz). Black stem was common in n. Sask. and was found in the scattered fields that occur in s.e. Sask. Infection, about the same as in 1954, was 20-sl. 25-mod./45 fields examined (H.W. Mead). Infection was mod.-sev. on first crop hay and seed fields s.e. of Winnipeg, Man., in June; tr.-light on second crop hay s. and w. of Winnipeg; mod.-sev. in seed fields s.e. of Winnipeg and in the Interlake region. Two second-crop hay fields on sulphur-deficient soil s. of Boissevain were very sev. damaged by black stem and Ascochyta leaf spot (W.C. McDonald). Black stem and leaf spot were mod., being sev. along the ditches, in a field at Notre Dame du Lac, Que. (D. Leblond).

LEAF SPOT (Cercospora zebrina). A few leaves were found infected in a field at Great Falls, Man. (W.C. McD.).

WINTER CROWN ROT (low-temperature basidiomycete). Damage was mod. in one field at Coalhurst, Alta., and in the plots at Lethbridge (M.W. Cormack). Damage was 11-tr. 40-sl. 37-mod. 12-sev. in central Alta. and the Peace River district (J.B.L., S.B.H.). The disease, associated with winter injury, caused sl. damage in 12/45 fields examined in Sask.; mostly single plants were killed (H.W.M.).

BACTERIAL WILT (Corynebacterium insidiosum) was observed affecting about 10% of the plants scattered in a 3-4 year old field of Grimm at Cache Creek, B.C., 17 Aug. 1954 (G.E. Woolliams). The disease was sev. in a field at Kamloops, B.C. (W.R. Foster). The disease was found in 27/58 fields examined in s. Alta., and, in general, wilt development seemed more pronounced this year than in 1954. In the Lethbridge area, 2 fields showed considerable wilting in August. Sev. damaged plants were received from Kamloops, B.C. (E.J.H., M.W.C.). Damage was 3-tr. 4-sl. 8-mod. 3-sev./136 fields examined; diseased fields were all in central Alta. (J.B.L., S.B.H.). Damage was estimated to be from 1 to 10% in the fields examined in the Interlake region of Man. Wilt was also observed in the plots in Brandon (W.C. McD.). The disease was sev. in several varieties in 3-year-old plots at the Farm, Ste. Anne de la Pocatiere, Que.; 20% of the plants were affected (R.O. Lachance).

LEAF SPOT (Leptosphaeria pratensis (Stagonospora meliloti). A tr. of leaf spot was recorded in one field near Edmonton, Alta. (J.B.L., S.B.H.). Tr.-light infection was general in Man.; stem blight was also observed in one field at Menisino (W.C.McD.).

DOWNY MILDEW (Peronospora aestivalis). Infection was 4-tr. 1-sl./58 fields examined in s. Alta. Scattered plants in the plots at Lethbridge showed mod.-sev. infection in early fall (E.J. Hawn). Infection was 1-tr. 1-sl. 1-mod. in the 3 affected fields all in central Alta. (J.B.L., S.B.H.). A tr. of downy mildew was recorded in 3/45 fields examined in Sask.; a slight infection was observed in polycross lines and standard varieties at Saskatoon; there appeared to be sl. differences in susceptibility (H.W. Mead). A light infection was noted on first crop hay in June e. of Winnipeg, Man. (W.C. McDonald).

YELLOW LEAF BLOTCH (Pseudopeziza jonesii). The pathogen was identified from specimens from the plots at Saanichton, B.C., where varying degrees of infection occurred in different varieties (M.W. Cormack). A sl. infection was found in a single field in s. Alta. in the Scandia district (E.J. Hawn). Infection was 8-tr. 17-sl. 11-mod. 8-sev. in central Alta. and the Peace River district, being particularly sev. in the latter area (J.B. Lebeau, S.B. Hrushovetz). The disease was present through central and n. Sask. as well as in the s.e. part. Recorded in 20/45 fields; infection and defoliation were lighter than in 1954, causing sl. damage (H.W. Mead). Highest infections were recorded on second-crop hay and in seed fields n. and e. of Winnipeg, Man., in July and August; a tr. infection was also observed w. of Winnipeg (W.C. McDonald).

COMMON LEAF SPOT (Pseudopeziza medicaginis). A sl. general infection was observed on Rhizoma alfalfa in the University plots, Vancouver, B.C. (H.N.W. Toms). Infection was 6-tr. 4-sl. 3-mod./58 fields examined in s. Alta.; a mod. general infection was present on a test plot of Rambler at Seven Persons (E.J.H., M.W.C.). Infection was 13-tr. 37-sl. 14-mod. 2-sev./136 fields examined in the rest of Alta.; it was particularly prevalent in the Peace River district (J.B.L., S.B.H.). This leaf spot was present wherever alfalfa was grown in Sask. including the s.e. area. Average damage was mod.; at Oxbow (s.e.) it was causing sev. defoliation (H.W.M.). The disease was present on specimens of Grimm alfalfa received from Chicoutimi Co., Que. (R.O. Lachance).

LEAF SPOT (Pseudoplea trifolii). Sl. infections were general in Man. in 1955. Single ascospore isolates obtained from perithecia formed in the spots on the leaves or in black lesions on the stem from alfalfa, sweet clover, red clover and strawberry clover produced perithecia of P. trifolii on sterilized alfalfa leaves in moist petri dishes, two isolates from alfalfa produced them on PSA slants and one from alfalfa and one from red clover on sterile sweet clover stems. Spores of Stemphylium have never been observed in any of these single spore isolates (W.C. McDonald).

These findings of Dr. McDonald fail to confirm the report of R. R. Nelson and M. F. Kernkamp (Phytopathology 43: 584-585. 1953) that the conidial state of Pseudoplea briosiana (=P. trifolii) is a species of Stemphylium indistinguishable from S. botryosum. Rather, his findings confirm the observations of earlier workers. Neither F. R. Jones (Phytopathology 6:299-300. 1916), J.H. Miller (Am. J. Botany 12: 224-237. 1925) nor J. G. Horsfall (Cornell Agr. Exp. Sta. Memoir 130. 1930) make mention of such a state. The description and figures of Pseudplea trifolii given by Miller and by L. E. Miles (Phytopathology 15:677-690. 1925) and those of Pleospora herbarum by O. F. Smith (J. Agr. Research 61:831-846. 1940) clearly indicate that two quite distinct organisms may be present on these hosts (I. L. C.).

CROWN BUD ROT (Rhizoctania solani, Fusarium spp., etc.) was observed in 50/58 fields examined in s. Alta. Damage was slightly higher than in 1954, with the regular increase in the damage to individual crowns and in the percentage of infected plants being correlated with age of stand (E. J. Hawn).

LEAF SPOT (Stemphylium botryosum). Isolates were obtained from leaf and stem lesions on alfalfa at Hamiota and Maleb, Man. Isolates of S. botryosum from alfalfa and sweet clover have produced mature perithecia of Pleospora herbarum on sterile alfalfa leaves, sweet clover stems and PSA slants (W. C. McDonald).

ROOT ROT (various fungi). Damage was 1-sl. 3-mod./136 fields examined; the affected fields were all in the Edmonton area, Alta. (J. B. L., S. B. H.).

WITCHES' BROOM (virus). A mod. amount found in one field at Kamloops, B. C. (W. R. Foster). Infection was a tr. in 2 fields and sl. in one in central Alberta and tr. in one field in the Peace River district (J. R. L., S. B. H.).

WINTER INJURY. Extensive injury occurred in 5 fields in the Choiceland and Meadow Lake districts, Sask. The cause may not have been primarily low temperatures, but flooding or icing in the damaged fields (H. W. Mead).

YELLOWS (boron deficiency). About 10% of the plants were affected in a neglected field of Grimm examined in 1954 at North Kamloops, B. C. (G. E. Woolliams). Considerable yellows was seen in fields on sandy soils in Kamouraska Co., Que. (R. O. Lachance).

Yellowing as a result of injury by the potato leaf hopper varied from tr. to sev. on single clones in a University Nursery at Winnipeg, Man. (W. C. McD.).

COMMON CLOVER

WINTER CROWN ROT (low-temperature basidiomycete). A sl. infection was found on red clover in 3 fields near Dawson Creek, B.C., and on alsike clover in one field at Spirit River, Alta. (J.B. Lebeau).

LEAF SPOT (Cercospora zebrina) Sl. infections were found on red clover at Innisfall, Alta. (J.B.L., S.B.H.), and at Lac du Bonnet, Man., and on white clover in the University plots, Winnipeg (W.C.McD.). A tr. was collected on red clover at Petite Riviere, Lunenburg. Co., N.S. (D.W. Creelman).

SOOTY BLOTCH (Cymadothea trifolii) heavily infected alsike clover in a field at the Farm and in a lawn at Kentville, N.S. (D.W.C.).

POWDERY MILDEW (Erysiphe polygoni). A sl. infection was observed in one field of red clover in the Brooks district and in another near Lethbridge, Alta. (M.W. Cormack). Powdery mildew was recorded in 12/41 fields of red clover examined; infection was 1-sl, 8-mod, 1-sev, in the Peace River district and 2-mod. in n. central Alta. (J.B.L., S.B.H.). A mod. infection was noted on red clover n.e. of Winnipeg, Man. (W.C. McDonald). Powdery mildew was general on red clover late in the season, causing sl.-mod. damage in Kings Co., N.S. (D.W. Creelman).

ROOT ROT and WILT (Fusarium scirpi var. acuminatum) was sev., infecting red clover at the Farm, Normandin, Que. (D. Leblond).

NORTHERN ANTHRACNOSE (Kabatiella caulivora). Sl. infection was found in one field of red clover in the Brooks district and in a plot at Lethbridge, Alta., in late July. The pathogen was identified on a specimen of red clover from Prince George, B.C. This is the first reported instance of its occurrence in that area (M.W. Cormack). Infection was 6-tr. 16-sl. 8-mod. 4-sev./41 red clover fields in central Alta. and the Peace River district. The disease was also found in 17 roadside patches of red clover. A trace was also found in alsike clover in 2 fields in central Alta. (J.B. Lebeau, S.B. Hrushovetz).

LEAF SPOT (Leptosphaeria pratensis (Stagonospora meliloti). A sl. infection was noted in 2 fields in central Alta. (J.B.L., S.B.H.).

LEAF SPOT (Pseudoplea trifolii). The fungus was isolated from spots on red clover stems from Dugald, Man., and from spots on the leaves of the clover, Trifolium fragiferum L. collected at Winnipeg (W.C. McDonald).

LEAF SPOT (Pseudopeziza trifolii) was common and general on red clover in Kings and Lunenburg counties, N.S. (D.W. Creelman).

LEAF SPOT (Stagonospora recedens). A sl. infection was found in one field at Fort St. John, B.C., and in 3 in w.-central Alta. (J.B.L., S.B.H.).

LEAF SPOT (Stemphylium botryosum) occurred in tr. amounts in a plot of Lasalle red clover at Lethbridge and in a field of red clover in the Brooks area, Alta. (E.J. Hawn). The presence of S. botryosum on the spots was confirmed from an examination of a specimen collected at Lethbridge. It was probable that the fungus was a saprophyte because tunnels of a small leaf miner was associated with the occurrence of the former (D.B.O. Savile).

LEAF SPOT (Stemphylium sarcinaeforme). Mod. infection on red clover n.-e. of Winnipeg, Man. (W.C. McD.).

LEAF SPOT (cause undetermined). Infection was 1-sl. 3-mod. 2-sev./ 9 fields of alsike clover examined in central and n. Alta. (J.B.L., S.B.H.).

RUST (Uromyces fallens). Traces were observed on red clover at Winnipeg and Lac du Bonnet, Man. (W.C.McD.) and a mod. infection at Cooksville, Lunenburg Co., N.S. (D.W.C.).

DECLINE (?virus). A pasture of Ladino clover sown in the spring of 1953 at St. Pacome, Kamouraska Co., Que., appeared to be in excellent condition until midsummer 1955, when it began to show signs of decline: yellowing, mosaic and phyllody. This may be a form of aster yellows (R.O. Lachance).

MOSAIC (virus) affected nearly all the plants of crimson clover (T. incarnatum) being grown in the plots at the Farm, Summerland, B.C. in Aug. 1954. The plants were sev. dwarfed and almost all leaves were malformed, cup-shaped, and showed a sev. type of rugose mosaic. Circumstantial evidence strongly suggested that the virus was seed-borne (G.E. Woolliams). At the Farm, Brandon, Man., most plants of alsike clover in the guard rows around red clover plants appeared affected by mosaic (bean virus 2); the red clover was not affected (W.C. McDonald).

RING SPOT (virus). In 1954, in s.w. Ont. some stands of red clover were found seriously affected and damaged by ring spot, according to W.G. Benedict (Plant Dis. Reptr. 39:457-459. 1955). The disease was attributed to a strain of the tobacco ring-spot virus.

YELLOWS (virus). A disease of the yellows type was common in fields of red clover in York Co., N.B. In 5 fields examined a tr. to 2% of the plants were affected. The virus was transferred by means of dodder (Cuscuta gronovii) to tomato and potato, var. Green Mountain. The symptoms produced in these plants resembled those of bunch or purple top (D.J. MacLeod).

A single roadside plant of red clover found near Rocky Mountain House, Alta., showed symptoms suggestive of yellows. The flower parts were green and growth habit suggested that in witches' broom (W.P. Campbell).

RED LEAF (potato leaf hopper injury). There was observed a pronounced reddening of parts of the leaves of white and Ladino clover in the University plots, Winnipeg, Man., where potato leaf hoppers were abundant (W.C. McDonald).

SWEET CLOVER

GREY STEM CANKER (Ascochyta caulicola). Tr.-sl. infection was found on roadside stands nr. Raymond, Alta. (M.W. Cormack). Infection was sl.-mod. on sweet clover varieties in the test plots at Brandon, Man.; in other areas infection was sl. (W.C. McDonald).

BLACK STEM (Ascochyta meliloti). A light infection, confined mostly to the stems, was found in 8/12 fields examined in Sask. (H.W. Mead).

WINTER CROWN ROT (low temperature basidiomycete). A sl. infection was seen at Evansburg, Alta. (J.B.L., S.B.H.).

SUMMER BLACK STEM (Cercospora davisii). In 1954 (P.D.S. 34:37) black stem attributed on the basis of symptoms to Ascochyta meliloti was reported to be sev. in fields n.-e. of Winnipeg, Man. The pathogen has since been identified by Dr. F.R. Jones of Wisconsin as C. davisii. Isolations made from other material collected in 1954 revealed that C. davisii was widely distributed in Man. In 1955, infection ranged from sl. to very sev. on varieties in the seed trial plots at Brandon and was isolated from other areas in the province. Cercospora leaf spot was common in the affected fields (W.C. McDonald).

LEAF SPOT (Leptosphaeria pratensis (Stagonospora meliloti) was found in 5 fields in the Peace River district of Alta; infection was 3-tr. 2-sl. (J.B.L., S.B.H.). Tr. infections were general in Man. (W.C. McD.). Leaf spot sev. infected white sweet clover at Notre Dame du Lac, Que. (D. Leblond).

COMMON LEAF SPOT (Pseudopeziza medicaginis) Light infections at Ste. Rose and Steinbach and traces in other parts of Man. (W.C. McD.).

BASAL STEM ROT (Sclorotinia ?sclerotiorum). Affected specimens received from Tisdale, Sask.; not as common as in 1954 (T.C. Vanterpool).

MOSAIC (bean virus 2) again appeared in almost every sweet clover plant in the plots at Brandon, Man. Inoculation experiments showed that the virus could be transmitted mechanically to beans, peas and alsike clover, but not to red or white clover. It is believed to be Pierce's strain of bean virus 2

as described by C. W. Hungerford and I. G. Hillyer (Plant Dis. Reptr. 38:621-627. 1954). The disease was prevalent in one field at Steinbach, but it was not found in other areas (W. C. McD.).

BLACK STEM (cause undetermined). Infection was sl. in a red clover field at Fort Saskatchewan and mod. in one at McLennan, Alta. (J. B. L., S. B. H.).

VETCH

BLACK ROT (?Phytophthora cactorum var. applanata). About 3/4 of the plants of hairy vetch (Vicia villosa) grown from seed sown amongst hops in a commercial planting at Lillooet, B. C., were affected and dying from a black rot in April. The above pathogen was isolated from the hops, which was similarly affected. The disease was most prevalent in the lowest part of the field (G. E. Woolliams).

B. OIL-SEED CROPS

FLAX

Dr. W. E. Sackston has summarized his observations in a special report entitled "Flax Diseases in Manitoba in 1955".

The disease situation in the 64 flax fields examined in Man. and e. Sask. 15-19 August was quite different from previous years. Wet weather in May and June delayed seeding, in some cases so late that the crop failed to mature before freeze-up. Hot, dry weather during most of July and August hastened ripening of much of the crop. Stands were very good in many of the fields examined, but the plants were short and there was often little or no basal branching. Bolls were relatively few on most plants, but most of the bolls examined averaged 8-10 seeds. The estimated yield was 8.7 bushels per acre, from 530,000 acres.

YELLOWS (aster yellows virus, California strain) was the most striking disease in flax fields in the area surveyed. Its prevalence and severity are indicated by the fact that growers from various parts of Man. submitted specimens for diagnosis. A number of growers reported that there were only traces of the disease in fields of Marine, adjacent to other varieties such as Red wood and Raja in which infections of 1-30% occurred. Infections recorded during the survey were: zero in 6 fields, trace-1% in 36, 5-10% in 17, 20-30% in 4, and 35% in 1 field. The fields in which no diseased plants were seen were all ripe. Early sown flax seems to escape infection, and the few affected plants are hard to find in a ripe stand.

PASMO (Septoria linicola) was more prevalent and severe in farm fields of flax than in any year since 1948. The disease develops best in a warm season, such as 1955, but it usually is most sev. when the weather is humid as well as warm, and both July and August were quite dry. Whatever the conditions were that accounted for extensive development of pasmo, they also favored the development of diseases induced by species of Septoria on cereals and other hosts. There was no pasmo in 25 fields, traces-10% in 19, 11-50% in 11, 75-100% in 9.

BOLL BLIGHT (cause unknown) was relatively light in 1955, providing additional support for the hypothesis that it is a physiological disorder similar to "blast" in oats. The condition was not observed in 12 fields, most of them too green to show it; there was up to 10% in 14 fields, 15-25% in 31, 30-35% in 6, and 50% in 1 field, in which the blighting was apparently caused by a late-season application of a hormone herbicide.

HEAT CANKER (physiological). Specimens of flax affected by heat canker were submitted from s. Man. by a number of flax growers following hot weather in July. More than 20% of the plants were killed in one field, according to the grower. Two fields with 10% of the plants affected were seen during the survey.

MISCELLANEOUS. Traces of Seedling Blight were found in one field, and 40% damage was caused by Rhizoctonia Seedling Blight in a field s. of Winnipeg examined in June. Traces of Top Discoloration, and some other evidence of Drought Injury, were seen in 8 fields in the light soil area in s.-w. Man. and s.-e. Sask. Root Rot symptoms were seen in 5% of the plants in one field. Wilted plants in a soil bed in the Cereal Breeding greenhouses, uninoculated, gave rise to pure cultures of Fusarium oxysporum f. lini.

Prof. T.C. Vanterpool, University of Saskatchewan, Saskatoon, has a similar report on "Flax Diseases in Saskatchewan in 1955".

The first month of the growing season was moist, with normal temperatures and low sunshine. Flax seed germination was uniform and the growth good. Then followed three months of low rainfall, higher than average temperatures but no extremely hot spells, and good sunshine. The high subsoil moisture and the relatively uniform temperatures were favorable for the growth of flax. A crop strikingly free of disease and of high average yield resulted. The estimated average yield was 11.1 bu. per acre or 13,100,000 bu. on 1,180,000 acres. Thus, the acreage was more than doubled over last year, the yield up 3/4 bu. per acre and production the highest since 1912. There was undoubtedly the smallest loss from disease since the flax acreage increase at the beginning of World War II. Flax yellows was the only disease which caused any concern, not because of the losses it caused, which in the aggregate would be little more than trace, but because it was widely distributed and new to the growers. A preliminary examination of the flax seed from the 1955 crop has indicated that the seed for the 1956 crop in Sask. will be unusually free of seed-borne pathogenic fungi.

RUST (Melampsora lini) virtually absent except for sl. infestations in a few fields of Redwing which, though susceptible to rust, is recommended for n. areas because of its earliness. A sample of Redwing, in which Alternaria linicola had invaded the stem through rust pustules, was received from Wynyard (See Blight (Alternaria linicola).

SEEDLING BLIGHT (Rhizoctonia solani) was more prevalent in central districts than last year, but less prevalent than in years when the spring was warmer and drier. It was more conspicuous in farmers' fields than in the early sown plots at the University. The reduction in seedling stand was slight.

BROWNING and STEM BREAK (Polyspora lini) was not recorded in central, w.-central, and n.-e. areas that were surveyed. The result was not unexpected as 1954 seed carried a trace only of P. lini.

PASMO (Sphaerella linorum (Septoria linicola) was not observed in the central, w.-central or n.-e. areas surveyed. As reported last year pasmo was widely distributed over central Sask. late in the season, so that there must have been abundant over-wintered inoculum this spring. The dry, bright weather of June, July and August appear to have been responsible for its absence this year.

HEAT CANKER. One case only was found at Floral on 25 June. Specimens were received later from Cavell, Stony Beach and Heward, and seemed to have come from late-sown fields. Although the average daily sunshine was 3 hours above normal in June, the lack of very high temperatures and plentiful soil moisture must have prevented much damage from heat canker.

BLIGHT (Alternaria linicola) was scarce. One sample of Redwing, from Wynyard, lightly infected with rust, showed some stem browning. A. linicola had entered through the rust pustules, producing discolorations above and below them. There was little blackening of the stems by Alternaria spp. and Cladosporium herbarum on mature crops left uncut until late in the fall.

YELLOWS (aster yellows virus, California strain). Eight enquiries were received from growers in the black and dark brown soil zones. Disease surveys showed that yellows was moderately sev. in central and e. areas: mostly 0.5-5%, while it was light, traces mostly, on a wide expanse of the Rosetown plains. At the Scott Farm infestations varied between 2 and 5%, and on the 'mud flats' s. of Unity between 2 and 4%. Yellows was present in practically all fields in the n.e. (Nipawin - White Fox area), but in traces mostly. The disease is, nevertheless, widespread though records for the extreme s.w. are meagre. It is known to be present in flax in irrigated areas in that region. Yellows was not as sev. as in 1954. The same is true for carrot yellows and purple top of potato, both caused by the same virus. It may be noted that leafhoppers of the Macrostyles fascifrons complex, a vector of the aster-yellows virus, were not as plentiful this year as in 1954 according to Mr. A.R. Brooks, Entomology Laboratory, Canada Dept. of Agriculture, Saskatoon.

Several weeds previously shown by either Kunkel or Severin and his collaborators to be hosts of the virus have been found infected in, or near, flax fields.*

BIRD INJURY (mainly goldfinches) was sev. in experimental plots in one location at Saskatoon; in 1954 the injury was mod. One report was received from Melfort. The frayed and cup-like appearance of the empty bolls may show a slight resemblance to the aborted floral parts of flax plants affected with yellows when viewed from a distance of a few feet.

LIME (PLASTER) INJURY and LIME-INDUCED CHLOROSIS. In a small area in the flax experimental plots in 1953, several young plants 3 to 6 in. high were observed to be sl. stunted with white, bleached, circular to elongate spots on most of the leaves, the lower ones being more sev. affected. Some plants also showed sl. chlorosis. As the plants grew older, the majority of the spotted leaves fell off, but the new growth appeared normal. Examination of the soil revealed numerous small white lumps, which looked like discarded building plaster that was probably thrown there several years earlier when a nearby building was being erected. The pH of the soil was 8.3. During 1954 the plot was fallowed. In 1955 three 8-foot rows of each of the following crops were sown in the lime area: flax (Rocket), bread wheat (Redman), durum (Stewart)

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* Thanks to Dr. A.P. Arnason, Entomology Division, Ottawa, statements were made available on the incidence of Macrosteles fascifrons in the cultivated areas of the neighbouring provinces, Man. and Alta. These statements have been summarized below (I.L.C.)

The Macrosteles fascifrons complex has been observed to be in great abundance in s. Man. for the last several years. Low populations occur in the spring, build up to a peak in early August, and then decline. Whether or not the insect overwinters in Man. is unknown.

These leaf hoppers are found on a variety of plants and are particularly abundant on late head lettuce. They also occur in small numbers on potatoes. No general survey has been made for the insect. Aster yellows is known on a variety of plants particularly carrots, up to 40% having been found infected in a planting. Flax apparently affected by this disease was noted in 1955, but may have occurred in earlier years (R.D. Bird).

In 1953, A.M. Harper found the Macrosteles fascifrons complex was very abundant throughout the irrigated areas about Lethbridge, Alta. He also recorded considerable yellows in carrots in that year. There was some evidence of yellows in this crop in 1954 and 1955, but the disease was far more serious in 1953. I am unaware of any serious infection of yellows in flax in s. Alta. in 1955. As a rule if any unusual trouble is widespread, farmers bring material to the laboratory for examination. In mid-September upon receipt of your enquiry, a brief survey was made in a number of flax fields and leaf hoppers that appeared to be Macrosteles fascifrons were found (C.W. Farstad).

barley (Titan), oats (Exeter), alfalfa (Grimm), sweet clover (Alfa), rape (Golden), sunflower (Mennonite) and safflower (Sask. 5260). The symptoms described above again developed on most of the flax plants, whereas the other crops appeared normal except for slight stunting of a few plants. It is inferred from these results that flax is more susceptible to lime injury than the other crops tested. This conclusion agrees with previous field observations on flax and cereals in high lime areas. High lime ordinarily produces a general chlorosis in flax without any white spotting; in this case the white spotting is possibly due to a trace element deficiency or toxicity brought about by the high lime. Sl. chlorosis was found in two fields (Annaheim, Spalding) on 29 June. It is probable that the condition was more conspicuous earlier.

Other Observations

RUST (Melampsora lini) Infection was 4-tr. 1-mod./21 fields examined in s. Alta. (J.S. Horricks) and 15-tr. 3-sl. 5-mod. 1-sev./50 fields most of which were located in the Peace River district and around Fort Vermilion. Because the observations were made in early August it is probable that rust increased in severity before harvest (W.P. Campbell). Rust was reported to be prevalent on Redwing at Chinook Valley, where continuous cropping appears to have favoured destructive outbreaks of the disease (A.W. Henry).

BROWNING (Polyspora lini). Infection 3-tr. 1-sl./50 fields examined; the affected fields were in the Peace River district, Alta. (W.P.C.).

ROOT ROT (Rhizoctonia solani). Infection was 4-tr. 1-sl./21 fields examined in s. Alta. (J.S. Horricks).

PASMO (Septoria linicola) caused sev. damage in one field nr. Medicine Hat, Alta. (M.W. Cormack).

YELLOWS (aster yellows virus, California strain) A sl. infection was observed in 4 fields in w.-central Sask. Although a large acreage of flax was seen in s.e. Sask. in late August, the crop was ripe and already too far advanced for detection of yellows (H.W. Mead). A trace (3 plants) were found affected by yellows in the Cereal Crops plots at Ottawa, Ont., as early as 20 June; the weather became very dry and there appeared to be no further development of the disease. (Mary E. Elliott, W.G. MacGregor).

RAPE

WHITE RUST (Cystopus candidus) A mod. infection was present in a test plot of Argentine rape at Winnipeg, Man. (W.E. Sackston).

DOWNY MILDEW (Peronospora parasitica) A sl. infection was recorded in 4/8 fields examined in Sask. (H.W. Mead).

STEM ROT (Sclerotinia sclerotiorum). Infection was tr.-sl. in a field examined s. of Prince Albert, Sask. 22 Aug. Although this disease was sev. on rape, sweet clover and alfalfa in 1954, no reports of its occurrence on the other crops were received this year (T.C. Vanterpool).

LEAF SPOT (cause unknown) was rather conspicuous in one field of Argentine rape at Gunton, Man. Spots mostly discrete, round, 1-3 mm. in diam., grayish-brown with pale to dark brown margins scattered over the leaf (W.E. Sackston).

BLACK SPOT (cause unknown). A heavy infection was noted on the stems and pods in a planting at Gunton, Man. A tr. observed in 3 other fields in the Interlake area. Spots on siliques, pedicels and stems; about 1 mm. in diam. or on the stems elongate 1/2-1 mm. wide, up to 4 mm. long; numerous, discrete or sometimes confluent,dark brown to black, the larger ones with lighter central area. No fungus found fruiting on the spots; isolations yielded only Alternaria tenius and miscellaneous fungi (W.E. Sackston). A tr. of spotting was found on stems of rape in a field s. of Prince Albert, Sask. (T.C. Vanterpool).

HEAT CANKER? Plants were found breaking over at the ground line in a field on peaty soil at Riverton, Man. The plants were on a thin part of the field and were apparently survivors in a flooded spot. The symptoms resembled heat canker in flax (W.E. Sackston).

YELLOWS (Callistephus virus 1) was conspicuous in one field at Riverton, Man., out of 6 examined in the Interlake district; 1% of the plants were affected. A tr. was present in the University plots, Winnipeg (W.E.S.).

ROQUETTE

ANTHRACNOSE (Colletotrichum brassicae Schulz & Sacc.) was heavy on roquette (Eruca sativa) in the Cereal Crops plots at Ottawa, Ont. It was first observed in 1954. Of the species of Colletotrichum reported on Cruciferae the fungus agreed most closely with C. brassicae originally described on B. oleracea var. caulocarpa (Mary E. Elliott).

SAFFLOWER

LEAF SPOT (Alternaria carthami). This fungus was again isolated from spots on the leaves of safflower grown in the Cereal Crops plots, Ottawa, Ont. (M.E.E.).

ANTHRACNOSE (Gloeosporium carthami (Fukui) Hori & Hemmi) A single seedling was found dying in the plots, Cereal Crops Div., Ottawa, Ont.; the fungus appears to belong in Colletotrichum (M.E.E.).

RUST (Puccinia carthami) Tr.-sl. infections were noted in the experimental plantings at Lethbridge and Seven Persons, Alta. (F.R. Harper). Rust was sev. in some plots at Morden, Man.; present in all the Cereal Breeding Laboratory plots but scarce in the University plots, Winnipeg. In greenhouse tests, 2 distinct races of the rust were shown to be present (W.E. Sackston). The rust was again found on leaves of susceptible varieties in Cereal Crops Division plots, Ottawa, Ont.; it was first observed in 1954 at Ottawa (Mary E. Elliott).

ROOT ROT (Pythium sp.) was sev. in experimental plots of N-852 grown on irrigated land at Lethbridge, Alta. (F.R. Harper).

SOYBEAN

The usual summary that has been prepared regularly by Dr. A.A. Hildebrand on the diseases of soybeans in southwestern Ontario is not available this year because of his absence abroad last summer. He hopes to resume the series next year (I.L.C.).

BACTERIAL BLIGHT (Pseudomonas glycinea). Infection was sev. in several varieties, some new and others old, in the University plots, Winnipeg, Man.; on the other hand, infection was tr.-mod. in certain other varieties. The causal organism was isolated and proved pathogenic to certain susceptible varieties but not to P.I. 68521 and P.I. 68554-1, which had proved resistant in Illinois and had been secured by Mr. Baldur Stephanson for use in his soybean-breeding program (W.A.F. Hagborg). A sl. infection was observed on the leaves of Blackeye in the Farm plots, at Ottawa, Ont. (R.L. Millar).

SUNFLOWER

Dr. W.E. Sackston has contributed a special report on "Sunflower Diseases in Manitoba in 1955".

The sunflower acreage in 1955 was 18,000 acres, about the same as in 1954. Farmers' plans to double the acreage were thwarted by excessive rains at seeding time. An extended hot, dry spell in July and August hastened filling and maturity of the seed, although in some instances yields may have been reduced by the drought. The provincial average yield was estimated at 800 pounds per acre.

Forty-six fields in the central and outlying areas were examined during a disease survey made 6-9 September. Dr. E.D. Putt, Experimental Farm, Morden, assisted throughout the survey; Mr. L.B. Siemens, Man. Dept. of Agriculture, and Mr. A. Heppner, Cooperative Vegetable Oils, Altona, assisted for one day.

The disease situation was quite different from that of previous years, partly as a result of the release and extensive planting of the rust resistant hybrid variety, Beacon (Synthetic M-1). Because Beacon is a late-maturing variety,

it was recommended only for the Red River Valley and most of it was grown there, although some fields were sown by growers in the outlying areas.

RUST (Puccinia helianthi) was present in every field. Only traces of infection were found in the 18 fields of Beacon examined, 16 of them in the central area, and two 100 miles west of it. Light infection, up to 10% on the mid-leaves, was seen in 10 fields of Advance or Mennonite. Mod. infections, 15-25% on the midleaves, were seen in 7 fields of Advance and one of Mennonite, mostly in the central area. Heavy infection, 30-40% on the midleaves, was found in 2 fields of Mennonite in the central area and in 5 of Advance in the outlying area. Very heavy infection, with the midleaves carrying 50-80% of rust, or killed by rust, was seen in 3 fields of Mennonite, all in the central area. In every field of Advance, a hybrid variety, plants of the inbred female parent S37-388 were much more heavily rusted than were the hybrids.

In previous years, some of the heaviest rust infections were found in the area around Altona and Rosenfeld. Only light to mod. infections were found even on Advance in this area in 1955. Possibly the shift to the rust-resistant Beacon reduced the opportunities of inoculum build-up from early spring infections. Many of the fields of Mennonite were in the region near Winkler; the heavy infections on Mennonite in this area may have resulted because there was an abundance of susceptible material on which the early inoculum could increase.

The heavily rusted fields of Advance in the outlying areas were on or near farms where sunflowers were grown in previous years. The outlying fields with light to mod. infections, however, were many miles away from any farm where sunflowers were known to have been grown previously. The initial inoculum must have travelled considerable distances, unless it came from plants of the several wild species of Helianthus that occur in Man. Many colonies of the various wild sunflowers were heavily rusted in 1955. Some colonies near rusted fields of cultivated sunflowers in outlying districts were relatively free of rust, however, so wild sunflowers may not have been the source of inoculum.

WILT (Sclerotinia sclerotiorum). Traces of wilt were found in 24 fields, and 10% of the plants were attacked in one field of Advance and one of Beacon, both on the same farm. Canada thistle and sowthistle plants were killed by the same organism in some of the affected patches in sunflower fields. This is the first year since 1948 in which no infections heavier than 10% were encountered.

LEAF MOTTLE (cause unknown), which was prevalent and destructive in 1954, was not serious except in 2 fields in 1955. There were traces of the disease in 10 fields in the central area; plants with similar symptoms in 2 outlying fields did not have the vascular discoloration usually associated with the condition. In one field, immediately adjacent to a field in which 50% of the plants showed mottle in 1954, 1% of the plants showed symptoms 27 July, and 20% were affected in September. In another location, two acres of sunflowers were sown by a farmer cooperator in a field in which leaf mottle was reported

by him to be sev. in 1954. Mottle symptoms were observed on 20% of the plants on 27 July; 65% were affected in September. Although the cause of the disease has not yet been found, it is now known, or suspected that the disease is not seed borne; that the worst attacks occur on relatively light soil; that the disease is either soil borne, or associated with certain locations, and that there are no striking deficiencies or excesses of the elements for which analyses have already been made.

STALK ROT and PREMATURE RIPENING (various causes). External discoloration of sunflower stems was present in trace amounts in 15 fields. Some of the affected stems were black and the pith, dark green to black; in other cases, the stems were brown and the plants were prematurely ripe, possibly as a result of rust attack, or because of drought. Mod. to sev. stem discoloration in 2 fields was associated with hail or similar injury; the plants were prematurely ripe in one end of a third field, possibly because of adverse conditions there earlier in the season.

YELLOWS (aster yellows virus?) affected a few plants in 17 fields, up to 1% in 9, 3% in 2, and 5-10% in 1 field. Affected plants were more numerous in fields of Beacon, but the disease was also present on Mennonite and Advance plants as well, and may have affected some S37-388. In previous years, affected plants in Advance fields usually appeared to be Sunrise, the male parent of the hybrid. Symptoms of this disease were also noticed on plants of Helianthus aridus growing along a roadside.

Typical aster yellows symptoms developed on several sunflower plants set out among infected carrots in a plot at the University. Sunflowers enclosed in cheesecloth cages remained free of the disease.

DOWNY MILDEW (Plasmopara halstedii) was present in trace amounts in 10 fields; 1% of the plants were affected in 4, and 3% in 1 field. Affected plants were also present in plots at Winnipeg, Morden, and Altona. No affected plants were seen in any fields in the outlying area.

MISCELLANEOUS. Head Drop was present in trace amounts in 13 fields, all in the central area. It was observed in experimental plots at Winnipeg, and was conspicuous among volunteer plants allowed to develop on the 1954 plot area. A condition resembling head drop was seen affecting some plants of Helianthus maximilianus and H. annuus lenticularis. Powdery Mildew (Erysiphe cichoracearum) was present in a number of farm fields, and was quite sev. in plots at Morden. There were striking differences in reactions of different sunflower varieties at Morden. The disease is now well established in the laboratory greenhouses at Winnipeg. A dry head rot was found on a few plants. Small, elongate black lesions were seen on the stems of plants in plots at Winnipeg and Morden, and in 14 farm fields: (7 Mennonite, 5 Beacon, and 2 Advance). The lesions, which resemble those attributed to virus infection in Argentina, were confined to the north and west sides of the stems. Traces of damage by 2,4-D were seen in five fields, and severe injury, resulting from drift of the chemical applied to control roadside weeds, was present in one field examined. Hail injury was severe on stems in two fields. Lesions caused by Septoria helianthi were numerous on the cotyledons of volunteer seedlings on the 1954 plot area. The disease disappeared as the plants grew larger. It was not found elsewhere.

Other Observations

WILT (Sclerotinia sclerotiorum) Infection was sl. at Lacombe and mod. in the University plots, Edmonton, Alta.; sclerotia were present on the fallen stems (W.P.C.). A specimen was received from Falher (A.W.Heney).

C. ROOT CROPS

MANGEL

LEAF SPOT (Cercospora beticola) infection was tr.-sev. on the outer leaves of Frontenac in a planting in Queens Co., P.E.I. (R.R. Hurst). A specimen collected 15 September was fruiting profusely (I.L. Conners).

SUGAR BEET

LEAF SPOT (Phoma betae) A tr. infection was seen in one field nr. Barnwell, Alta. (M.W.Cormack).

BLACK ROOT (various fungi). Phoma betae was present on affected stecklings sent in from the Fraser River delta, B.C. (H.N.W.Toms). Black root was found in all 42 fields examined in a pre-thinning survey in s. Alta. On the average, about 50% of the seedlings were infected and 3% of these were sev. damaged or dead. Phoma betae and Rhizoctonia solani were most frequently isolated from diseased material. Tr. infections of root rot were found in 2 fields in July. Storage piles examined in late October showed no damage (F.R.Harper).

D. MISCELLANEOUS CROPS

CORN

Diplodia zeae (Schw.) Lev. Mycologists and plant pathologists are interested in achieving stability in names applied to the organisms with which they are working, yet stability will not be attained by authors continuing to use a name that clearly lacks priority under the International Rules of Botanical Nomenclature. The common corn parasite known as Diplodia zeae is a particularly clear case. Shear and Stevens (Mycologia 27:467-477. 1935) showed that Schweinitz, contrary to the homonym rule of today, had applied the name Sphaeria zeae twice to different fungi, in 1822 and 1832 respectively. Their examination of specimens in the Schweinitz and other herbaria revealed that Sphaeria zeae Schw. 1832 was the fungus usually known as Diplodia zeae (Schw.) Lév. On the other hand, Sphaeria zeae Schw. 1822 was the fungus then generally known as Gibberella saubinetii (Mont.) Sacc. As there seems some doubt about the final generic position of this Diplodia on corn they suggested the

continued use of D. zeae. However, Petch (Ann. Mycol. 34:257-260. 1936) showed that Gibberella saubinetii was a synonym of G. cyanogena (Desm.)Sacc., a common saprophyte of herbaceous and woody stems and further that the Gibberella on cereals was without a name. He correctly chose Sphaeria zeae Schw. 1822 as a basonym of his new combination Gibberella zeae (Schw.) Petch, a name that has since been generally accepted. Thus, the argument of Shear and Stevens for ignoring an earlier homonym because it was quietly buried in the synonymy of another species became pointless. Another source of confusion is the fact that subsequent authors have treated the name proposed by Léveillé as a new combination, not as a new species. Léveillé actually wrote "Diplodia Zeae, n. sp." with a latin diagnosis, concluding with "Hab. Tete de Buch propre Burdigalam ad culmos Zeae Maydis", i.e. a specimen on corn stalks from near Bordeaux, France. He lists as possible synonyms "Sphaeria Zeae Schwein. Syn. Fung. North Amer., p. 207 - Sphaeria dolosa Pers. (herb. Lugd. Batav.)".

The next available name for the Diplodia on corn is Sphaeria maydis Berk. 1847 based on specimens collected at Cincinnati, Ohio, May 1, 1841. Shear and Stevens examined the type and found it to be "typical Diplodia Zeae". Saccardo (Syll. Fung. 3:373. 1884) transferred the fungus to Diplodia as D. maydis (Berk.) Sacc. There seems no valid reason for further delay in the adoption of the latter name (I. L. C.).

RUST (Puccinia sorghi). Infection ranged up to 100% on inbred corn lines in the experimental plots, Harrow, Ont.; damage was sl. (N. J. Whitney). Sl. infection was reported in one corn field in Queens Co., P. E. I. (R. R. Hurst).

STALK ROT (Pythium and Fusarium spp.) was widespread in hybrid field corn in s. w. Ont. in 1955. In Essex and Kent counties infection ranged up to 75% of the plants and the damage was often sev. In the disease nursery at the Harrow Farm, inbred lines were sev. damaged; sometimes every plant was diseased (N. J. Whitney).

ROOT ROT (Pythium and Fusarium spp.)was also widespread this year in hybrid field corn in s. w. Ont. This disease first appears in August and increases in intensity as the corn matures. Of interest is the noticeable absence of root and stalk rot in corn grown on muck in the Thedford marsh (N. J. Whitney).

SMUT (Ustilago zeae). Two affected ears were observed in field corn in P. E. I. (R. R. Hurst).

MINT

RUST (Puccinia menthae) caused some damage in a planting of spearmint (Mentha spicata) at Hamilton, Ont. (J. K. Richardson). Rust caused sev. defoliation in a short garden row of peppermint (M. piperata) at Kentville, N. S. (K. A. Harrison).

WILT (Verticillium abbo-atrum) affected about 25% of the plants in an 8-acre field of peppermint in the Thedford Marsh, Ont.; damage was sev. (N.J. Whitney).

MUSTARD

WHITE RUST (Cystopus candidus) Infection was mod.-sev. on the leaves of brown mustard (Brassica juncea) and a trace on some yellow varieties of white mustard (B. alba) in the plots at Lethbridge and Seven Persons, Alta. Infection was also mod. in 1/8 fields examined in s. Alta. (M.W. Cormack).

SUDAN GRASS

LEAF SPOT (Pseudomonas syringae) A mod. infection was observed in the plots at the Farm, Lacombe, Alta. (S.B. Hrushovetz).

CULTIVATED AND OTHER GRASSES

AGROPYRON - Wheat Grass

Ergot (Claviceps purpurea) was recorded on several species in Alta. as follows: one collection on A. albicans nr. Metiskow (e.-central); roadside collection on A. cristatum nr. Drumheller; A. dasystachyum, noted at 4 locations in n.-central Alta.; A. smithii, 3 collections in c. Alta.; A. subsecundum, 6 collections in w. Alta.; A. trachycaulum, noted nr. Thorsby (W.P. Campbell) About 25% of the heads of A. repens affected in a patch at Broad Cove, Lunenburg, N.S. (D.W. Creelman).

Powdery Mildew (Erysiphe graminis) A mod. infection observed in A. repens in a grain field at Graham's Road, Queens Co., P.E.I. (J.E. Campbell).

Leaf Rust (Puccinia rubigo-vera) Tr. infection on A. trachycaulum in the plots at Lethbridge, Alta. (E.J. Hawn).

Snow Mold (Sclerotinia borealis Bubak & Vleugel). In P.D.S. 31:39, an undetermined species of Sclerotinia was reported to have caused extensive damage to grasses on the experimental plots at Prince George, B.C. Recently, J. Walton Groves and Constance A. Bowerman (Can. J. Botany 33:591-594. 1955) have shown that the pathogen was S. borealis, "previously known only from Sweden, Norway, Finland and the U.S.S.R." Apothecia were developed in culture and compared with authentic material from Sweden. According to them, specimens were received on the following grasses: Agropyron dasystachyum, A. desertorum, A. intermedium, A. semicostatum, A. sibiricum, Agrostis canina, Alopecurus pratensis, Arrhenatherum elatius, Bromus erectus, B. inermis, Dactylis glomerata, Elymus canadensis, E. sibiricus, Festuca elatior, F. gigantea, F. rubra, Lolium perenne, Phleum pratense, Poa ampla, and P. compressa (I.L.C.)

Head Smut (Ustilago bullata) A mod. infection was reported in a field of A. trachycaulum at Barons, Alta. (J.T. Slykhuis).

AGROSTIS

Ergot (Claviceps purpurea) Two collections made on A. alba in e.-central Alta (W.P. Campbell).

Leaf Rust (Puccinia rubigo-vera) A light-mod. infection was general on A. tenuis in Lunenburg Co., N.S. (D.W. Creelman).

ALOPECURUS

Eye Spot (Mastigosporium album) was found in a single field of A. pratensis at Wolfville, Kings Co., N.S.; damage was sev. (D.W. Creelman).

AVENA

Ergot (Claviceps purpurea) was found on wild oats (A. fatua) in a field of wheat nr. Wetaskiwin, Alta. (W.P.C.).

Stem Rust (Puccinia graminis) Very sev. infections were noted on A. fatua in central Alta.; even the pedicels and glumes showed large uridinial sori (W.P.C.). Heavy stem rust infections were noted on wild oats between White Fox and Henribourg in s. Sask.; farmers cutting barley were brown from the rust spores on the wild oats in the barley (T.C. Vanterpool).

BROMUS

Ergot (Claviceps purpurea) The occurrence of ergot on B. inermis was noted at 69 locations in central Alta. and the Peace River district. It was also found on B. ciliatus at 7 locations btwn. Edson and Jasper and once on B. pumpellianus w. of Wetaskawin (W.P. Campbell). A sl. infection was noted on B. inermis in the University plots, Winnipeg, Man. (W.C. McDonald).

Leaf Blotch (Helminthosporium ?bromi) A sl. infection was recorded in the plots of B. inermis at the Illustration Station, Evansburg, Alta. (S.B. Hrushovetz). A sl.-mod. infection was present in the University plots, Winnipeg, Man.; perithecia of Pyrenophora bromi were abundant on over-wintered straw (W.C. McDonald).

Leaf Spot (Selenophoma bromigena) Sl.-mod. infection was general on B. inermis in the Red River Valley, Man.; infection was also sl.-sev. in the University plots, Winnipeg (W.C. McDonald). Infection was mod-sev. in small row plots of this grass at Kemptville, Ont. (R.J. Baylis).

CALAMAGROSTIS

Ergot (Claviceps purpurea) was noted on C. canadensis, a common wild hay and pasture grass, at 26 locations in central Alta. and the Peace River district (W.P. Campbell). Ergot on native bluejoint grass is unusually prevalent this year in s. Alta. and has caused some loss of livestock (Exp. Farm, Lethbridge).

DACTYLIS GLOMERATA - Orchard Grass

Purple Leaf Spot (Mastigosporium rubricosum) A sev. infection, which sev. damaged or killed the leaves was observed on one farm at Mavillette, Digby Co., N.S. Although this disease is often reported on the Pacific Coast, it is apparently a newcomer to the Atlantic provinces (D.W. Creelman).

Stem Rust (Puccinia graminis) was prevalent on orchard grass in the University plots, Winnipeg, Man.; the rust was identified as var. avenae (W.C. McDonald). Stem rust was heavy on this grass in the plots at Harrow, Ont., in the late summer. (W.G. Benedict).

Downy Mildew (Sclerophthora cryophila W. Jones) In P.D.S. 34:53, this disease was attributed to an undescribed species of Sclerophthora. Since then W. Jones (Can. J. Botany 33:350-354. 1955) has described and illustrated the fungus (I.L.C.).

Brown Stripe (Scolecotrichum graminis) A mod. infection was observed on orchard grass var. Hercules in the plots at Ottawa, Ont.; reddening of the older leaves was very noticeable. Orchard grass appeared to be more affected than timothy (R.J. Baylis). Brown stripe was common and heavy throughout Kings Co., N.S. (D.W. Creelman).

ELYMUS

Ergot (Claviceps purpurea) was noted on E. innovatus at 31 locations in w.-central Alta. and in the Peace River district (W.P. Campbell).

FESTUCA

Root Rot (Helminthosporium sativum and Fusarium spp.) A sl. infection was found on F. rubra in a field nr. Beaverlodge, Alta. (J.B. Lebeau).

GLYCERIA

Ergot (Claviceps sp. indet.) Collections were made on G. borealis nr. Trochu and Lloydminster, Alta. (W.P. Campbell).

HORDEUM

Crown Rust (Puccinia coroneta) was collected nr. Hinton, Alta. on H. jubatum (S.B. Hrushovetz, W.P. Campbell). The identification was confirmed. This is the first collection of the rust on this host to be deposited in the Herbarium at Ottawa, although it is known on other grasses in the tribe Hordeae (J.A. Parmelee).

PHLEUM PRATENSE - Timothy

Ergot (Claviceps purpurea). Three collections made on timothy in n.-central Alta. (W.P. Campbell). Tr. infection observed in timothy at Baker Settlement, Lunenburg Co., N.S. (D.W. Creelman).

Leaf Spot (Heterosporium phlei) was found sev. affecting a single field of timothy at East Mines, Colchester Co., N.S.; the disease has not been previously reported in N.S. (D.W. Creelman).

Rust (Puccinia graminis var phlei-pratensis) was of common occurrence in Man. in 1955. It was observed on patches of volunteer timothy in many parts of the province, infection ranging from a tr. to 20% (T. Johnson).

Stripe Smut (Ustilago salvei Berk. & Br., Ann. Nat. Hist. Ser. 2, 5:463. 1850; Uredo striaeformis West., Bull Acad. Roy. Belg. 18:406. 1851; Ustilago striaeformis (West.) Niessl, Nedw. 15:1. 1876) According to a note of G.C. Ainsworth and Kathleen Sampson (The British smut fungi (Ustilaginales). C.M.I. Kew. 1950, p.37) Berkeley and Broome described U. salvei on Dactylis glomerata collected by Rev. T. Salwey, St. Martin's, Guernsey. "Examination

of the Berkeley and Broome type in Herb. Kew shows the host to be Holcus lanatus and the fungus to be U. striiformis". Despite the plea of J. A. Stevenson (Plant Dis. Reptr. 30 53-59. 1946) to treat the name as a nomen ambiguum, it seems illogical to deny recognition to a name when there is now no doubt about the identity of the fungus to which it was applied (I. L. C.). Scattered timothy plants affected by this fungus were observed at various times about St. Catharines, Ont. (T. R. Davidson) The identification was confirmed (D. B. O. S.).

POA

Ergot (Claviceps purpurea) A single collection on P. pratensis was made nr. Olds, Alta. (W. P. Campbell).

Powdery Mildew (Erysiphe graminis) sev. infected volunteer plants of P. compressa in an alfalfa field nr. Piney, Man. (W. C. McDonald).

Stem Rust (Puccinia graminis var. poae). In the spring, 1955, stem rust was observed to be developing on a patch of Kentucky bluegrass, var. Merion at the University, Winnipeg, Man. In late August it was present on bluegrass lawns in several parts of Winnipeg. Also rusted Merion bluegrass specimens were received from Regina, Sask. at the end of August. Although urediniospore dimensions agree rather closely with those of timothy rust, pathogenicity tests indicate that the rust is probably P. graminis var poae. Canada bluegrass has also been found rusted at Winnipeg (T. Johnson). Stem rust was heavy on P. pratensis in the plots at Harrow, Ont (W. G. Benedict, I. L. Conners).

Leaf Rust (Puccinia poae-nemoralis) A sl. infection was recorded on Merion bluegrass at Beaverlodge, Alta. (W. P. C.) and a mod. infection on this grass and P. trivialis in the plots at the Farm, Lacombe (S. B. H.). This rust was collected at Beaverlodge in 1954 (P. D. S. 34:54), and from examination of a specimen on Merion bluegrass its occurrence at Lacombe in 1955 may be confirmed (J. A. Parmelee).

STIPA

Ergot (Claviceps purpurea) was noted on S. viridula nr. Jasper, Alta. (W. P. Campbell).

Additional Note

Downy Mildew (Peronospora camelinae Gäum. (P. parasitica sensu lat.) was found by Dr. Arne Gustavsson, Botanical Museum, Lund, Sweden, affecting false flax (Camelina sativa) at Winnipeg, Man., in 2 small experimental plantings of seed imported from Sweden. Duplicate specimens collected and determined by him have been deposited in DAOM. This appears to be the first record of this pathogen in Canada (D. B. O. Savile)

III. DISEASES OF VEGETABLES AND FIELD CROPS

BEAN

GREY MOLD (Botrytis cinerea). Pod infection was very heavy in Blue Lake pole beans after a rainy period in the Fraser River Valley, B. C. Loss was reported to be almost 100% of the crop; no protective fungicide had been used (H. N. W. Toms). A tr. occurred in a field of Tendergreen at Canaan, N. S. (K. A. Harrison).

ANTHRACNOSE (Colletotrichum lindemuthianum) had apparently been heavy in a field of Michelite in Elgin Co., Ont.; in the sample submitted for diagnosis seedless shrivelled pods accounted for nearly 40% of the crop (R. N. Wensley). Anthracnose was common and sev. in gardens along the Lower St. Lawrence in Que. (D. Leblond). Several gardens were visited in the same general area but damage appeared to be sl. -mod. Infection was quite variable, sev. damage being confined to the wetter, more humid portions of the plantings (L. J. Coulombe). The disease caused sev. damage in a planting of Soldier at Hampstead, N. B. (S. R. Colpitts). Only a tr. of anthracnose was observed at Kentville, N. S.; the dry season held the disease in check (K. A. Harrison). A few plants showed sev. infection in a late planting at York, Queens Co., P. E. I. (J. E. Campbell). Specimens revealed ascervuli to be numerous, mostly grouped along the veins although the numerous necrotic lesions, up to 5 mm. in diam., were larger than those usually observed (D. B. O. Savile). Several reports were received from all three counties in P. E. I. (R. R. Hurst). Infection was tr. -sev. on wax beans in gardens at Topsail and Manuels, Nfld. (G. C. Morgan).

ROOT ROT (Fusarium spp., Rhizoctonia solani) varied greatly in prevalence in the 10-15 fields visited in s. w. Ont. Some fields were almost free of infection while in others 70% of the plants were affected. The disease appeared worse in the drier sections and the lighter soils. In one field where the disease was sev. in 1948, it was again heavy this year (R. N. Wensley).

HALO BLIGHT (Pseudomonas phaseolicola) was for the second consecutive year unusually scarce in s. Alta.; tr. -sl. infection was noted in 2 fields (F. R. Harper). The disease was sev. in some gardens, but apparently not as destructive as in 1954 (W. P. Campbell). Halo blight caused sl. -mod. damage in the 6 gardens examined in south shore communities e. of Quebec City (L. J. Coulombe). Although halo blight has been very destructive in Annapolis and Kings counties, N. S., for several years only traces were observed this year on account of the dry season (K. A. Harrison).

DAMPING-OFF (Pythium, etc.). Cool wet weather delayed emergence of an experimental plot of Michelite and 14-B-An in Essex Co., Ont.; of the seedlings that did emerge, the stem of some 12% was affected by a soft rot caused by damping-off organisms (R. N. Wensley).

STEM CANKER (Rhizoctonia solani) caused about 50% damage in one small field of Tendergreen in Kings Co., N.S. (K.A. Harrison).

STEM ROT (Sclerotinia sclerotiorium) destroyed about 2% of the plants of Blue Lake in a 15-acre field at New Westminster, B.C. (N.S. Wright). The disease affected 60% of the plants in a field of the Kenearly strain of Yellow Eye in Annapolis Co., N.S. (K.A.H.).

RUST (Uromyces appendiculatus). The aecial state was quite heavy on leaves received from Chilliwack, B.C., on 23 Aug. (H.N.W. Toms). This is the first collection of the aecia to be received for deposit in the Herbarium from a Canadian locality (D.B.O. Savile). A sl. rust infection was observed in a planting in Queens Co., P.E.I. (R.R. Hurst).

COMMON BLIGHT (Xanthomonas phaseoli). What appeared to be this disease was affecting about 25% of the plants in a planting of Italian pole beans at Grand Forks, B.C., July 1954 (G.E. Woolliams). A tr. was seen in a market garden at Medicine Hat, Alta. (F.R. Harper). Common blight was heavy in 3 fields of Michelite inspected in Kent Co., Ont., on 15 Aug.; the disease was common in most areas in s.w. Ont. by this time (R.N. Wensley). A tr. was noted on Clipper inspected at Ottawa (R.L. Millar). Light infections were noted in Queens Co., P.E.I., but the disease was less prevalent than usual on account of the weather being dry (J.E. Campbell).

CURLY TOP (Beta virus 1) affected a tr.-10% of the plants in some plantings in the south part of the Okanagan Valley, B.C. In 1954 the disease was present in nearly every field, infection varying up to 70% of the plants in the Okanagan and Thompson Valleys (G.E. Woolliams).

COMMON MOSAIC (Phaseolus virus 1) was present in most fields in the B.C. Interior, but infection was usually only tr.-1%. In 1954, the disease was quite prevalent in the Okanagan and Thompson Valleys, infection being 10-90%. Both the green peach aphid, Myzus persicae, and the black bean aphid, Aphis rumicis, were very abundant and probably accounted for the widespread prevalence of mosaic (G.E. Woolliams). Common mosaic was found in only a few fields in s.w. Ont., but in one 15-acre field of Michelite in Huron Co. 50% of the plants were affected (R.N. Wensley). About 15% of the plants were affected in a 1/2-acre field at Charney, Que. (L.J. Coulombe). Mosaic increased very rapidly in 1954 in a planting of Yellow Eye at Kentville, N.S.; when the seed was planted in 1955, every plant was infected (K.A. Harrison).

YELLOW MOSAIC (Phaseolus virus 2). Infection was sev. on Michelite, but relatively light on 14-B-An in a plot in Essex Co., Ont. (R.N. Wensley). The disease was sev. in 5 gardens in Fredericton, N.B.; 12-22% of the plants infected (D.J. MacLeod). Mosaic affected 60% of the Blue Lake plants in a small garden at Kentville so sev. that they produced few pods and many died; gladiolus in the same garden showed sev. mosaic symptoms (K.A. Harrison).

BALD HEAD (mechanical injury) and SNAKE HEAD (seed corn maggot) caused 20% damage in a planting of Clipper in Kent Co., Ont. The seed harvested by combine thresher in 1954 and untreated was slow in germinating because of cool weather (R. N. Wensley).

COLD INJURY. Three large fields of snap beans at Wheatley, Ont., exhibited an unusual blotchy yellowing of the primary leaves on 7 June. During the preceding week air temperatures fell to about 35° F on three nights. The affected crops recovered and yielded well (C. D. McKeen).

LEAF MOTTLE (manganese deficiency) was quite striking in plantings of beans about Quebec, Que.; weather was very dry during June and July (D. Leblond).

SUN SCALD. About 15% of the plants were affected in a 3-acre field on Lulu Island, B. C. The mid-leaflet of the leaf that was of a certain maturity wilted and then dried up; damage nil. The condition was diagnosed as sun scald following a wet spell (H. N. W. Toms).

STEM NECROSIS (cause unknown) affected 75% of the Blue Lake plants in a 6-acre field at Rutland, B. C.; the injury was below the soil surface and in some respects resembled rhizoctonia injury (M. King).

WIND DAMAGE affected about 10% of the leaves in plantings at Canaan, N. S., on 5 July. The young leaves showed brown discolorations where two had rubbed together; the hot dry weather apparently intensified the injury (K. A. Harrison).

BEET

LEAF SPOT (Cercospora beticola) was general on the lower leaves of garden beets in the Montreal district, Que.; damage was negligible (E. Lavallee). A tr. was present on Flat Egyptian in the plots at Ste. Clothilde (R. L. Millar) and on Crimson Globe in a garden in Queens Co., P. E. I. (R. R. Hurst).

DAMPING-OFF (Rhizoctonia solani). Young seedlings in a 10-acre field at Chatham, Ont. were sev. affected, the stand being reduced by 50%. The field was sown in early August; the extremely hot weather during the next 3 weeks were favorable to the pathogen (C. D. McKeen).

SCAB (Streptomyces scabies). A sl. infection was noted on Detroit Dark Red in a market garden at Queens Co., P. E. I.; the warm dry summer favored scab development (J. E. Campbell). Scab was fairly heavy on beets about Conception Bay, Nfld., particularly in the Manuels-Kelligrews area (G. C. Morgan).

BORON DEFICIENCY. A case of boron deficiency was sent in from Grand Forks, B. C.; after the stecklings were set in the field, the roots failed to renew normal growth (G. E. Woolliams). Beets for canning were sev. affected by internal black spot on 3 farms in the Chatham area, Ont. Symptoms developed in late July following an excessively hot period of 4 weeks' duration. The beets were unfit for canning and the loss to one grower was $10,000. (C. D. McKeen).

BROCCOLI

2,4-D INJURY was sev. on 20 plants in a home garden nr. Ottawa, Ont. Injury varied from a proliferation of the parts to the formation of a large ball of proliferated tissue that transformed the entire plant. Tomato plants growing close by were sl. damaged (D. S. MacLachlan).

CABBAGE

GRAY MOLD (Botrytis cinerea) caused a sev. rot of cabbage stored in 3 outside cellars at Topsail, Nfld. (G. C. Morgan).

CLUB ROOT (Plasmodiophora brassicae) causes considerable damage to cabbage and cauliflower in the Fraser Valley, B. C., where it has been common for many years, but it has now spread to a number of fields in the Chilliwack area (W. R. Foster). Club root was again general on Montreal and Jesus Islands, Que., but losses seemed less than usual (E. Lavallee). Diseased specimens received from Danville, Richmond Co., (H. N. Racicot). Every plant was infected in a 2-acre field of Penn State at Waterville, Kings Co., N. S. and caused about 20% damage; apparently the infection originated in the seed bed (K. A. Harrison). In a garden at Highfield, Queens Co., P. E. I., all the plants were affected but the damage was sl. The grower had experienced trouble previously with club root and tried Vancide 51 as a control. The fungicide was applied as a drench about the base of the newly set plants. The treatment appeared to have inhibited growth of the organism to some extent and permitted the crop to head up. On very hot days the plants showed sl. signs of wilting but always recovered again (J. E. Campbell). Infection was sev. this year in Bonavista, Trinity, and Conception Bays, Nfld.; many small gardeners lost most of their cabbage seedlings. Heavy infections were also noted in 12 commercial plantings. Many farmers are concerned over the increased infection in their fields in recent years (G. C. Morgan).

SCLEROTINIA ROT (S. sclerotiorum). A single rotting head of Penn State covered with sclerotia was seen in storage at Waterville, N. S. (K. A. Harrison).

BLACK ROT (Xanthomonas campestris) was observed and reported to occur in many crops in s.w. Ont. in 1955; usually the disease is quite rare (C.D. McKeen). A tr. was observed at Waterville, N.S. (J.F. Hockey).

HERBICIDE INJURY was observed in cabbage seedlings on Lulu Island, B.C. Stem above the cotyledon leaves were much swollen, somewhat twisted with greatly enlarged pith; base of stem rough and showing small cracks; leaves cupped inwards; petioles elongate and brittle; roots bushy but reduced in quantity. Offending herbicide could not be traced (H.N.W. Toms). Injury from 2,4-D was observed in 30,000 plants ready for transplanting to the field in Lincoln Co., Ont. Leaves were normal but there was severe hypertrophy of the crowns resulting in tumour-like swellings and rupture of the tissues in the area where the leaves were attached to the crown. Many plants were double the normal diameter. A similar condition was described by R.D. Wilson (Plant Dis. Reptr. 39:393. 1955) (J.K. Richardson).

BORON DEFIENCY had caused sev. damage to all heads of a lot of Danish Ball Head examined in storage in Queens Co., P.E.I., 7 Feb. 1955 (R.R. Hurst).

POTASH DEFICIENCY was observed in a 1/2-acre field of Penn State on a recently-purchased farm at Waterville, N.S. Lack of potash was confirmed by chemical analysis by the Kentville Farm staff. Part of the field on land formerly used as a garden was unaffected (K. A. Harrison).

CARROT

DAMPING-OFF (Alternaria dauci and Fusarium sp.) has been troublesome for the last two years in the Thedford marsh, Ont. A. dauci and a species of Fusarium have been repeatedly isolated, but only the Alternaria has proved pathogenic in greenhouse tests (N. J. Whitney).

GREY MOLD (Botrytis cinerea) was troublesome in many lots of carrots late in the storage period in Kings Co., N.S. Loss estimated at 10% of the crop (K.A. Harrison).

LEAF SPOT (Cercospora carotae) was relatively heavy on sample of diseased leaves received via the University from Oakbank, Man. The growers suspect that the leaf spotting is associated with small brown root discolorations, which have been objected to in the wholesale trade. The hypothesis has not been tested experimentally (W.A.F. Hagborg, D.B.O. Savile) See Root Russet (P.D.S. 34:62-63). (I.L.C.).

CROWN ROT (Erwinia carotovora) was observed in 2 fields about 1 1/2 mi. apart in Lincoln Co., Ont. In one 7-acre field, 5-10% of the carrots were affected. When examined on 6 July infection appeared to have occurred in early June; some seedlings had been completely rotted, while others, only sl. affected,

partially recovered. The surviving roots were more or less constricted at the ground line. The tops of the more sev. affected were easily broken off. This field had been in carrots in 1954 and there had been considerable rot in the mature roots at harvest. The other, 3-acre field had been in a variety of vegetables, which appeared normal when harvested. Most of the injury was confined to a low portion of the field, which was very wet for 7-10 days in early June (J. K. Richardson). Soft Rot affected 10% of the Chantenay roots in two poorly drained fields on a river bank at Lethbridge, Nfld. (G. C. Morgan).

ROOT KNOT (Meloidogyne ?hapla). Carrots 1/2-1/3 in. in diam. received from Mascouche, Terrebonne Co., Que. were sev. affected (H. N. Racicot). Root knot is becoming a problem of increasing importance on Ile Jesus, near Montreal (E. Lavallee).

VIOLET ROOT ROT (Rhizoctonia crocorum). Up to 10% of the carrots were sev. affected in the Thedford marsh, Ont. in 1955 (N. J. Whitney).

SCLEROTINIA ROT (S. sclerotiorum) caused the total loss of a lot of Nantes carrots in storage at Kentville, N. S.; the grower attempted to select out the sound carrots for sale immediately, but to no avail (K. A. Harrison). About 5% of a bushel lot of Nantes long in storage at Charlottetown, P. E. I., showed decay in January (J. E. Campbell). In a lot of Chantenay in Feb. 17% of the roots were affected (R. R. Hurst).

Laurence H. Purdy (Phytopathology 45:421-427. 1955) has proposed that the species Sclerotinia sclerotiorum, S. trifoliorum, S. trifoliorium var. fabae, S. intermedia, S. minor and S. sativa be united into a single species under S. sclerotiorum. It is true that the group of species typified by S. sclerotiorum, in which the apothecia arise from sclerotia and the conidial state is absent, are difficult to separate. However, it seems doubtful that the author has presented evidence to warrant the reduction of all these important plant pathogens to a single species. For instance, the history of the isolates of S. sativa and the conditions under which the organism is pathogenic do not suggest that the fungus is synonymous with S. sclerotiorum. As early as 1934 M. W. Cormack (Can. J. Research 11:474-480. 1934) in discussing the identity of the fungus which had been encountered in the roots of alfalfa and sweet clover reported that the species of Sclerotinia "has not been definitely identified, but Dr. H. H. Whetzel, who has examined it, has suggested that it may be an undescribed species related to S. minor." When F. L. Drayton and J. W. Groves (Mycologia 35:517-528) described S. sativa, they did so after a careful comparison with S. minor and S. intermedia. It may also be noted that the late Prof. Whetzel in his posthumous paper (Mycologia 36:648-714. 1945) recognized all these species as distinct. For the present, at least, they will continue to be reported separately in the Survey (I. L. C.).

BACTERIAL BLIGHT (Xanthomonas carotae) was present in all fields being grown for seed in the Grand Forks district, B. C., in July 1954, but in no field examined was there any significant injury as infection was confined

largely to the basal leaves and the occasional unbellet (G. W. Woolliams). A sl. infection was present on a few varieties in the University plots, Winnipeg, Man. (W. A. F. Hagborg).

YELLOWS (Callistephus virus 1). Tr.-sl. infections were recorded in all 4 fields examined at Taber and Medicine Hat, Alta. (F. R. Harper). Although yellows was common and caused sl. damage, it was less abundant on carrots in 1955 than in any of the last 2 or 3 years. It also caused less damage to ornamental plants such as china aster, petunia and godetia than in 1954 (R. J. Ledingham). Carrot roots from Texas were found to be excessively hairy on examination in Winnipeg; the condition was attributed to yellows (J. E. Machacek). A mod. infection was noted on carrots in the University garden, Winnipeg, Man. (W. E. Sackston). A trace of aster yellows was found in most of the carrot fields in the Thedford marsh, Ont. (N. J. Whitney). The variety test conducted at Harrow in 1954 (P. D. S. 34:62) was repeated with the same 20 varieties in 1955, except the test consisted of 6 replicates instead of 2. Dr. N. J. Whitney kindly supplied his data on the rate of infection in each variety for each year. The average percentage infection of aster yellows was 6.1% in 1954 and 5.4% in 1955. Greater randomization in 1955 resulted in the level of infection in each variety to be nearer the mean value for the plot than in 1954. Moreover, there appeared to be little correlation between variety infection levels in the two years. Thus it appears that carrot varieties do not differ greatly in their resistance to aster yellows nor exert any measurable influence on the feeding habits of the leaf-hopper vectors (I. L. Conners). Yellows was common in commercial fields in York and Sunbury counties, N. B.; in the 9 fields examined, infection was 7-48% (D. J. MacLeod). A 5% infection was observed in one field in Kings Co., N. S., in September; yellows was not as sev. this year as usual (K. A. Harrison). Yellows (0.5% infection) was recorded in one planting in Queens Co., P. E. I. (R. R. Hurst). Sl. infections were noted in 3 commercial plantings in Conception Bay, Nfld. (G. C. Morgan).

CAULIFLOWER

YELLOWS (Fusarium oxysporum f. conglutinans). About 10% of the plants were infected in a planting at Middlechurch, Man.; infection occurred in the flats before the transplants were set in the field (J. E. Machacek).

CLUB ROOT (Plasmodiophora brassicae) was general on Ile Jesus, near Montreal, Que. Because cauliflower is more susceptible than other crucifers, losses are most pronounced in that crop (E. Lavallee). Club root caused sev. damage to a planting containing several 100 plants of Snowball in Queens Co., P. E. I. The plants showed sev. symptoms shortly after transplanting and the infection was traced to the compost in which the plants were started (J. E. Campbell).

BLACK ROT (Xanthomonas campestris) affected about 10% of the crop in a 2-acre field at Burlington, Ont.; infection started in leaves injured during tying operations. A sev. general infection was also noted in early September in a planting in Lincoln Co., Ont. The disease appeared following heavy rain and very high winds. Further spread was later checked by drier weather (J. K. Richardson).

CELERY

ROOT ROT (Paratylenchus macrophallus (de Man, 1880,) Goodey, 1934) was general on Epicure and Utah celery in the Thedford marsh, Ont. It is, however, much less severe in newly broken fields, where the populations of the pin nematode have not yet built up to the extent they have in the older fields (N. J. Whitney, W. B. Mountain). The nematode is not a Pratylenchus, as erroneously reported in P. D. S. 34:63 (I. L. C.).

VIOLET ROOT ROT (Rhizoctonia crocorum) was sev. on a few plants in one or two fields of Epicure in the Thedford marsh, Ont. (N. J. Whitney).

LATE BLIGHT (Septoria apii-graveolentis) was very sev. in a 2-acre field of the early spring crop at Leamington, Ont.; the infection originated in the plant beds and lack of thoroughness in applying the sprays permitted a sev. outbreak to develop (C. D. McKeen). On account of the dry weather, late blight was much less sev. than usual in the Montreal district, Que. (E. Lavallee).

YELLOWS (Callistephus virus 1, California strain). A sl. infection was noted at Burlington, Ont., on 20 July (J. K. Richardson). There was some increase of the disease as the season progressed, but on none of the three farms where counts were made was the infection more than 0.5%. This figure was much less than in 1954, when several growers estimated the loss to be 5% of the crop. This reduction in infection appears in no way correlated with leaf hopper populations because one of the vector species was extremely abundant (J. A. George). Only a trace was observed on celery in 1955 in the Ottawa district. In 1953 and 1954 it appeared that the disease would soon become of economic importance. Although leaf hoppers were abundant and yellows was prevalent on wild hosts, the incidence in celery was markedly less than in 1954 (D. S. MacLachlan).

DAMPING-OFF (? Pythium sp.) caused the loss of about 10% of the seedlings in a greenhouse at Oromocto, N. B. (S. R. Colpitts).

CUCUMBER

LEAF SPOT (Alternaria sp.) was observed in two greenhouse crops in the Harrow area, Ont. (C. D. McKeen).

GREY MOLD (Botrytis cinerea) was much less prevalent in greenhouse crops in Essex Co., Ont., than in any year in the last seven. Freedom from disease is attributed to the small amount of cloudy weather in April and May (C.D. McK.).

SCAB (Cladosporium cucumerinum). A sev. outbreak has occurred for 2 successive years in a backyard garden at Ottawa, Ont. (K.M. Graham). The disease was seen in a few fields about St. Martin and Ste. Dorothee, Que.; much less sev. than last year (E. Lavallee). Scab affected about 25% of the fruits at Ste. Anne de la Pocatiere; it was present on most varieties in the Farm plots (L.J. Coulombe). Some infection was present in all plantings examined in N.B. but early plots were less sev. infected than late fields. A 70% infection recorded at Hampstead (S.R. Colpitts). Scab was sev. in several garden patches at Kentville, N.S.; fields planted with the resistant varieties of pickling cucumbers were free of disease (K.A. Harrison). In a market garden in Queens Co., P.E.I., on 22 Aug. an early planting of Straight Eight was sev. infected whereas a later planting of the resistant variety Highmoor was clean (J.E. Campbell).

ANTHRACNOSE (Colletotrichum lagenarium) sev. affected a small field planting at Leamington, Ont.; a light infection was also noted in 3 greenhouse crops in the area (C.D. McKeen).

BACTERIAL WILT (Erwinia tracheiphila) was observed in a garden in Edmonton, Alta. (L.E. Tyner). A sl. infection was noted on 2 varieties in the plots, Ste. Anne de la Pocatiere and a trace at L'Islet, Que. (L.J. Coulombe). A few infected plants were seen at Kentville, N.S. (K.A. Harrison).

POWDERY MILDEW (Erysiphe cichoracearum) was prevalent in most greenhouse crops in Essex Co., Ont., sometime during the cropping season. It was effectively controlled with Karathane in spray, dust and smoke form. Greenhouse studies revealed that the older the mildew mycelium, the more resistant it is to the eradicant action of Karathane smoke (C.D. McKeen). Powdery mildew mod. infected Straight Eight at Ste. Foy, Que. on 13 Sept. (D. Leblond).

WILT (Fusarium sp.) wiped out nearly all plants in a garden at Lethbridge, Alta., and killed a few plants in a commercial planting at Cassils (F.R. Harper). Affected plants were sent in from Esterhazy, Sask.; it was reported to have also been prevalent in 1954 (T.C. Vanterpool).

STEM CANKER (Phomopsis sp. and Mycosphaerella melonis (Pass.) Chiu & Walker). Both organisms have been isolated from plants showing stem canker, but the two fungi have never been detected in the same greenhouse. Although they both cause a destructive stem canker, the fungi are morphologically quite distinct (C.D. McKeen).

ANGULAR LEAF SPOT (Pseudomonas lachrymans) caused mod. damage in the Westbank and Osoyoos districts, B. C. (W.R.F.) A mod. infection was noted in a commercial planting at Medicine Hat, Alta., in late July, but no further spread was found when the field was re-examined a month later. Tr. leaf infections were observed in 2 other fields in s. Alta.; no fruit rotting was found (F.R. Harper). The disease affected a few plants in one greenhouse at Leamington, Ont. (C.D. McKeen).

DOWNY MILDEW (Pseudoperonospora cubensis). A light infection was observed in a greenhouse in s.w. Ont. early in November. Application of zineb as a spray checked the disease and no loss occurred (C.D. McKeen).

FOLIAGE ROT (Trichothecium roseum) caused light injury in a few greenhouses at Leamington, Ont. (C.D. McK.).

MOSAIC (virus) was reported by the district horticulturalist to have affected a large proportion of the plants growing about Westbank, B.C.; the disease was diagnosed from specimens received with the report (G.E. Woolliams). A sev. leaf infection was observed at Normandin, Que., on 16 Aug. (D. Leblond). Varieties in an extensive test at the Farm, Kentville, N.S., were sev. affected and in many of the plots every plant showed mosaic before the end of the season. Mosaic was also seen in 2 garden plots. The disease is rarely present in N.S. (K.A. Harrison).

RING SPOT (virus, unidentified strain). As in the last 3 years, the virus affected a few plants in several greenhouse crops in s.w. Ont. Additional evidence that the virus is seed-borne was obtained this year (C.D. McKeen).

COOL WEATHER INJURY. Affected fruits, shaped like an hour-glass, were reported from Milner, B.C., in late September; the affected fruit were unmarketable (H.N. Toms).

COLD POX. The disorder reported last year in Ont. as Cracking and Gummosis (P.D.S. 34:65) appears to be identical with Cold Pox as described and illustrated by R.S. Cox (Plant Dis. Reptr. 39:478-479. 1955). In Florida there was apparently more chlorotic blotching of the fruit than in Ont., but otherwise his description of the symptoms fit well the disorder observed by me (C.D. McKeen).

EGGPLANT

EARLY BLIGHT (Alternaria solani) caused sev. defoliation of eggplant in 3 fields at Harrow, Ont.; sev. outbreaks have not been observed previously on this crop (C.D. McKeen).

WILT (Verticillium albo-atrum) affected most plants being grown for home use on a vegetable farm at Kelowna, B. C., in 1954 (G. E. Woolliams).

HOP

BLACK ROT (? Phytophthora cactorum var. applanata) affected 35% of the plants in a 40-acre area in 108-acre field at Lillooet, B. C. The rot was first noticed in April as the plants were starting to renew growth. Most of the plants seemed to recover during the growing season and produce a crop, but in late fall the symptoms began to develop again and some plants were killed. The pathogen, which was isolated has not previously been observed affecting hops in the B. C. Interior (G. E. Woolliams).

WILT (Verticillium dahliae). Typical symptoms were observed on the occasional plant in the field noticed above at Lillooet (G. E. W.)

LETTUCE

GREY MOLD (Botrytis cinerea) developed in a greenhouse on seedlings to be used for early setting at Harrow, Ont.; as a result 80% of the affected plants failed to develop further in the field (C. D. McKeen). Grey mold was general in the lettuce crop in the Annapolis Valley, N. S., and caused a loss of 3-20% of the crop in individual plantings (K. A. Harrison). A few heads were sev. rotted in 2 gardens in St. John's, Nfld. (G. C. Morgan).

DOWNY MILDEW (Bremia lactucae) mod. affected the lower leaves of seed plants of New York N-12 at the Farm, Agassiz, B. C., in August. A sl. infection was also noted in the Univ. plots, Vancouver (H. N. W. Toms).

SOFT ROT (Erwinia carotovora). A tr. was found in 2 out of 4 crops being grown for seed inspected at Grand Forks, B. C. (G. E. Woolliams).

BACTERIAL ROT (Pseudomonas viridilivida (N. A. Brown) Holland) affected about 10% of the plants in a commercial planting of head lettuce at Oliver, B.C.. The rot showed up as the plants started to head (G. E. W.). This pathogen appears not to have been previously reported to the Survey.

DROP (Sclerotinia sclerotorium) affected a tr. to 1% of the plants in 4 seed-crop fields inspected at Grand Forks, B. C.; the plants were beginning to bolt (G. E. Woolliams). A few plants were destroyed in the University garden, Winnipeg, Man. (W. E. Sackston). Drop caused about 5% damage to hotbed lettuce at Ste. Dorothee, nr. Montreal, Que. Traces were observed in several small plantings in Annapolis and Kings counties, N. S. (K. A. Harrison).

YELLOWS (Callistephus virus 1). Sev. affected heads were received from Oliver, B. C., on 26 July 1954. The heads were puffy and when taken apart showed a curling of the inner leaves and blisters on the petioles. Interior of the head eventually breaks down. The symptoms corresponded to the description given for aster yellows by M. B. Linn (Cornell Agr. Exp. Sta. Bull. 742. 1940) (K. M. Graham). Yellows caused sev. damage in a commercial field of head lettuce at Maugerville, N. B.; 40% of the plants were unfit for use (D. J. MacLeod). A grower at Grande Pre, N. S., estimated a 40% loss in his fall crop of lettuce; a few affected heads were seen in the spring crops in Kings Co. (K. A. Harrison).

MELON

SCAB (Cladosporium cucumerinum) affected about 5% of the fruit in a local garden at Ste. Anne de la Pocatiere, Que. (L. J. Coulombe).

ANTHRACNOSE (Colletotrichum lagenarium) caused sev. spotting of fruits, stems and leaves in one field at Harrow, Ont. (C. D. McKeen).

POWDERY MILDEW (Erysiphe cichoracearum) was less sev. than usual in the Harrow-Leamington area, Ont. (C. D. McKeen).

MOSAIC (cucumber mosaic virus). Soon after a heavy infestation of the melon aphid, Aphis gossypii, many crops in the Harrow area, Ont., developed mosaic. Zucca melon was also affected. Infection by the virus seriously reduces the crop when infection occurs early in the cropping season (C. D. McK.). Mosaic symptoms were observed on a few plants near sev. infected cucumber plots at Kentville, N. S. (K. A. Harrison).

MUSHROOM

COBWEB (Dactylium ?dendroides Fr.) was observed at Surrey, B. C., in early November. Some patches were present on casing soil and on an occasional mushroom. The grower was careless about sanitation but was able to continue picking from the infested beds (H. N. W. Toms, J. W. Groves). This disease does not appear to have been recorded previously in Canada.

ONION

BLACK MOLD (Aspergillus niger). A high percentage of the crop was affected from one farm in the Erieau marsh, Ont., one month after the onions were placed in storage. The same grower reported a high incidence in a few other crops in the area (C. D. McKeen).

NECK ROT (Botrytis allii). The rot developed on the sides of young developing Sweet Spanish bulbs from plants imported from Walla Walla, Wash., into the Kelowna district, B.C. The rot usually affected only the two outer scales, but the injury was sufficient to cause lopsided bulbs. The disease was more prevalent in some sections of the field than others. The imported plants were from fall-sown seed and were grown by different growers. It appears that the plants produced by some growers were much healthier on arrival than those produced by others (G. E. Woolliams). A more extensive survey of fields at Vernon and Kelowna revealed some damage in most fields and 10% loss of crop would occur in several (M. King). In 1954, out of a total crop of about 7,000 tons produced in the Kelowna, Vernon, Kamloops and Grand Forks areas, about 3,000 tons was lost by the end of December from neck rot, probably the highest loss ever experienced in the B.C. Interior. The loss was undoubtedly due to humid, rainy, cool weather that prevailed during harvest that prevented proper curing of the bulbs. Onions that were kept in cold storage and appeared sound when removed for shipment, developed a high percentage of rot in transit (G. E. Wooliams). Neck rot was present on 5% of the bulbs in a lot of locally grown onions in storage at Kentville, N.S., in March (K. A. Harrison). Neck rot was observed on onions both locally grown and imported from the United States at Charlottetown, P. E. I. (R. R. Hurst, J. E. Campbell).

BULB ROT (Fusarium oxysporum f. cepae) mod. infected a planting at Carberry, Man. (J. E. Machacek). Basal rot was present in Spanish onions at harvest in 2 areas in a 2-acre field in Jeanettes Creek marsh, Ont. (C. D. McKeen).

DOWNY MILDEW (Peronospora destructor) heavily infected White Creole, White Portugal and Australian White in small plots at the Farm, Agassiz, B.C.; foliage was killed and bulbs only fit for home use (H. N. W. Toms). Owing to climatic conditions during the growing season little downy mildew was present in the Okanagan Valley or in the Grand Forks district; only an occasional field showed some damage. In 1954, downy mildew was quite prevalent in some fields of Sweet Spanish onions at Kelowna, but its development came too late to affect yields noticeably. However, in crops of Yellow Globe Danvers, the disease began to develop in late July and caused a 10-25% loss. Onion seed crops both at Kelowna and Grand Forks were reduced 75% by the disease (G. E. Woolliams). The most sev. epidemic of downy mildew in recent years was observed in a 10-acre field of Spanish onions at Leamington, Ont.; the usual sprays containing zineb had been applied (C. D. McKeen). A tr. was observed on Mountain Danvers at St. Clothilde, Que. (R. L. Millar). Downy mildew was epidemic on several varieties on the Farm plots, Kentville, N.S.; the disease has not been reported in this area since its occurrence in 1925 (K. A. Harrison).

PINK ROOT (Pyrenochaeta terrestris, etc.) was much less serious in the onion growing marshes of Essex and Kent counties, Ont. than it was a few years ago. Why there has been this reduction in the disease is unknown, but it

has coincided with changes in cultural practices including heavier applications of commercial fertilizers and more extensive use of fungicide sprays (C. D. McKeen). Pink root (?Fusarium solani) mod. infected fields of Sweet Spanish onions at Kelowna, B. C. (M. King).

ROOT ROT (Pythium irregulare). Some root rot was present in 20% of Spanish onion seedlings in one greenhouse at Leamington, Ont. (C. D. McKeen).

SMUT (Urocystis cepulae) has so far been found in the Okanagan Valley, B. C. in only one isolated area on two farms located on opposite sides of the road. The disease was first observed in 1947 (P. D. S. 47:52-53). In one field the disease has been gradually increasing each year since then until in 1955 it affected about 50% of the plants in the seedling stage. Smut could also be found occasionally on mother bulbs late in the season. Treatment of the seed with Arasan was recommended, but because of improper application, practically no control was obtained. This field has been planted to onions almost continuously for over 40 years. (G. E. Woolliams).

YELLOW DWARF (virus) was quite prevalent in onion seed crops of Ebenezer at Grand Forks, B. C., in 1955; 10-20% of the plants were infected. In 1954, up to 90% of the plants were affected in some fields of this variety being grown for seed, whereas yellow dwarf was almost entirely absent in seed crop fields of other varieties of onions (G. E. Woolliams).

GAS INJURY. Gas completely wiped out a commercial planting of onion sets at Medicine Hat, Alta. An underground leak from a natural gas well a few hundred feet from the plot allows gas to seep to the surface. Growth of the roots was inhibited followed by collapse of the top growth. Peppers growing close by were also affected (R. R. Harper).

PARSNIP

SCURFY CROWN (?non-parasitic) resulted in the rejection of 2-5% of crop from East Delta, B. C., at the local marketing board. The roots show a scurfy condition of the shoulders of the roots (H. N. W. Toms).

YELLOWS (Callistephus virus 1) sev. affected 1% of the plants in a garden at Fredericton, N. B. (D. J. MacLeod).

PARSLEY

YELLOWS (Callistephus virus 1). A mod. infection was noted on parsley throughout the summer in the University garden, Winnipeg, Man. (W. E. Sackston).

PEA

Dr. V.R. Wallen has prepared a special report entitled, "Pea Disease Survey, 1955".

During last summer a number of pea fields in Ont.; Que., N.B. and N.S. were surveyed for disease.

At Ottawa, Ont., traces of Leaf and Pod Spot (Ascochyta pisi), Rust (Uromyces fabae) and Mosaic (virus) were present in 2 fields of Chancellor and one of Arthur field peas. A few plants of Laxton's Progress were infected by Root Rot (Fusarium sp.) and a trace of rust was noted in a field of Alton; no diseases were observed in the other 3 fields of garden peas examined.

At Smithfield, in a field of Director peas, Enation Pea Mosaic (virus) was found in trace amounts, as well as a few plants infected with Common Mosaic and Pea Streak (virus).

In the Peterborough area 13 fields of canning peas, comprising the varieties Alton, Wisconsin Early Sweet, Wyola, Canner King and Perfection, were examined. For the first time in several years this area was free of Leaf and Pod Spot infection. A tr. of Powdery Mildew (Erysiphe polygoni) was found in a field of Wisconsin Early Sweet.

In the Georgian Bay area, 17 fields of canning peas were examined; 6 (of Perfection or Alton) showed tr.-mod. infection of Leaf and Pod Spot. The original seed used for planting these 6 fields was found in every case to be infected with Ascochyta pisi. Records of the health condition of the seed sown in the other 11 fields showed that in every instance the seed had been free of Ascochyta. No other diseases appeared to be prevalent in the area.

In Que., the experimental plots at Ste. Anne de la Pocatiere were examined; only a trace of mosaic was observed.

In the Annapolis Valley, N.S., Ascochyta Blight (Mycosphaerella pinodes) was found in tr. amounts in 8/35 fields examined. Leaf and Pod Spot was found in one field at Berwick and few plants were infected by Pea Streak in another.

In the Northumberland Strait area the pea crop had been sown late and at the end of July no diseases had yet developed.

Near Tidnish, N.B., in 2 fields of field peas examined, no disease was observed.

Other Observations

LEAF AND POD SPOT (Ascochyta pisi) occurred in all but one field being grown for seed inspected on the Creston Flats, B.C.; infection varied from a tr. to 90% of the plants, mostly 10-25%. The disease was mostly on the lower leaves and sometimes on the basal part of the stem. In 1954, a small amount of leaf infection only was found in a couple of seed crop fields (G.E. Woolliams). Sev. damage was reported in garden peas by a grower at Liberty, Sask. (R.J. Ledingham). A mod. infection on leaves and pods was present on plants from a field at Ste. Anne de la Pocatiere, Que. (L.J. Coulombe). A tr. was observed in one field at Nictaux, Annapolis Co., N.S.;

the disease appeared to be scarce this year (K.A. Harrison). Infection was heavy in a 15-acre block of canning peas at Bedeque, P.E.I. (J.E. Campbell); it was also heavy on peas in a garden at Charlottetown (R.R. Hurst).

POWDERY MILDEW (Erysiphe polygoni). Infection was mod. in several gardens in s. Alta. (M.W. Cormack); tr. in a garden at Kentville, N.S. (K.A. Harrison).

FUSARIUM WILT (?F. orthoceras var. pisi) was so sev. at Ladner, B.C., in a 4-acre field of canning peas that the crop was abandoned. The condition was similar to that in another field in the area observed in 1950. From the latter field a Fusarium sp. was isolated. Aphanomyces has not yet been recorded on peas in coastal B.C. (N.S. Wright, H.N.W. Toms). A foot rot and wilt (Fusarium sp.) was mod. on peas at the Farm, Normandin, Que. (D. Leblond). Root rot and wilt affected about 10% of plants in several fields in Kings Co., N.S., the disease was less sev. than usual, probably because the spring was dry (K.A. Harrison).

DOWNY MILDEW (Peronospora pisi) occurred in all fields examined in the Creston Flats, B.C., but the infection was not severe. The disease appeared to be somewhat heavier in 1954, but it did not cause much damage (G.E. Woolliams).

BACTERIAL BLIGHT (Pseudomonas pisi). A mod. pod infection was seen in 1 field of canning peas in s. Alta. (F.R. Harper).

DAMPING-OFF (Pythium spp.) caused sev. damage in several fields at Taber, Alta., during a long period of cold wet weather in the spring (M.W. Cormack).

ROOT ROT (Rhizoctonia solani) killed or caused sev. stunting and unthriftiness of pea plants in 1 field at Creston, B.C. In the affected patches, about 10% of the area, all the plants were diseased (G.E. Woolliams).

LEAF BLOTCH (Septoria pisi) caused sev. infection of the lower leaves of several varieties in the plots at Lethbridge, Alta. (M.W. Cormack) and in a planting at Altona, Man. (J.E. Machacek). It was heavy on the leaves in a field of Perfection at Nictaux, N.S. (K.A. Harrison).

RUST (Uromyces fabae). A trace was seen in a garden patch of Fenland Wonder at Kentville, N.S., after most of the crop had been harvested (K.A.H.). Rust was heavy on a planting of Laxton's Progress in Queens Co., P.E.I. The crop had been planted early and was nearly through bearing; no rust had yet developed on later plantings (J.E. Campbell).

MOSAIC (virus). Common pea mosaic affected about 25% of the plants in a home garden at Richmond, B.C. The virus was transmitted by rubbing from pea to pea and pean to bean (N.S. Wright). A trace of mosaic was found

in one seed crop field examined on the Creston Flats, B.C. in 1954 (G.E. Woolliams). Traces of mosaic was seen in several fields in the Annapolis Valley, N.S., after heavy aphid infestation (K.A. Harrison).

ROOT ROT (cause undetermined) was found in peas growing on the Creston Flats, B.C., in 1954. The fields are on dyked reclaimed land, where the water table was high. The diseased plants were growing in quite damp soil. In most fields only an occasional plant was affected but in one 230-acre block of Perfection, 70-90% of the plants were diseased in several sections which totaled about 50 acres (G.E. Woolliams).

APICAL TUFT (cold wet weather) affected peas on the Farm, Agassiz, B.C. Leaves and flower buds at the top of the terminal shoot had only partially unfolded giving a definite tufted appearance to the shoot. After a time the plants recovered and then grew normally (H.N.W. Toms).

PEPPER

DAMPING-OFF (?Pythium spp.) was sev. in 4 transplanting beds at Ste. Dorothee, Que. (E. Lavallee).

WILT (Verticillium albo-atrum) infected 50% of the plants in a planting at Lillooet, B.C. (G.E. Woolliams).

BACTERIAL SPOT (Xanthomonas vesicatoria). The organism was isolated from diseased fruit sent in from Cawston, B.C., by the District Horticulturist (G.E.W.). The disease affected fruits and leaves in one 3-acre field at Harrow, Ont.; damage was mod. (C.D. McKeen).

MOSAIC (virus). Pepper crops in Essex Co., Ont., suffered more heavily from virus infection this year than in any season since the 1949-50 epidemic. The green peach aphid, Myzus persicae, invaded the crops in late June and introduced the virus or viruses; some crops were a total loss (C.D. McKeen).

BLOSSOM-END ROT (non-parasitic) caused about 10% damage in 1 field at Ste. Dorothee, Que. (E. Lavallee).

POTATO

The data in Tables 4-7 on Seed Potato Certification were supplied by the Plant Protection Division, Science Service.

Both the acreage entered for certification and the acreage that passed inspection declined slightly from the 1954 figures. Bacterial ring rot was an important cause of rejection in N.B. and Que. and for the first time it was recorded during field inspection in P.E.I., although the disease has been

reported in that province as a result of special surveys. Sebago, mostly grown in P.E.I., is the leading variety being certified, while Netted Gem has moved into fourth position ahead of Green Mountain.

Table 4. Seed Potato Certification: Fields and Acres Inspected and Passed, 1955

Province	Number of Fields Inspected	Number of Fields Passed	Fields Passed %	Number of Acres Inspected	Number of Acres Passed	Acres Passed %
P.E.I.	6,249	5,428	86.9	26,749	23,453	87.7
N.S.	271	244	90.0	522	439	84.1
N.B.	2,635	2,188	83.0	15,052	10,512	69.8
Que.	1,102	781	70.9	3,514	2,499	71.1
Ont.	677	634	93.6	1,928	1,716	89.0
Man.	125	121	96.8	538	533	99.1
Sask.	48	43	89.6	114	96	84.2
Alta.	228	214	93.9	1,004	965	96.1
B.C.	668	586	87.7	2,206	1,960	88.8
Total	12,003	10,239	85.3	51,627	42,173	81.7
Previous Yearly Totals						
1954	13,783	11,959	86.8	59,360	50,686	85.4
1953	14,411	11,875	82.4	60,173	47,706	79.3
1952	12,169	10,985	90.3	45,988	41,315	89.8
1951	12,093	10,580	87.5	46,176	40,402	87.5

Acres Entered		Acres Passed	
1955	51,627	1955	42,173
1954	59,360	1954	50,686
Decrease of 7,733 or 13.0%		Decrease of 8,513 or 16.8%	

EARLY BLIGHT (Alternaria solani). Infection was 197-sl. 28-mod. 5-sev./668 fields inspected in B.C.; in most fields in s.e. B.C. and the Okanagan, where its presence seems to hasten the maturity of early varieties; sev. in the Cariboo in one field which had been planted to potatoes for several successive years (N. Mayers). Found in 14 (16%) of the fields inspected in s. Alta., all in the Calgary and Brooks areas (R.P. Stogryn). Recorded in 32 (23%) of the fields inspected in central and n. Alta.; most prevalent in the early varieties (J.W. Marritt). Some fields of early varieties affected in Sask., but less prevalent than usual (A. Charlebois). Occurred in negligible amounts in Man. and n.w. Ont. (D.J. Petty). Sl. infection in fields of Irish Cobbler and Sebago about Scotland and Waterford in s.w. Ont. (F.J. Hudson). Some damage reported in fields of Canso table stock in district 2 (W.L.S. Kemp).

Table 5. Seed Potato Certification: Acreage Passed by Varieties, 1955

Variety	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.-Alta.	B.C.	Total
Sebago	16,792	30	455	34	153		3	17,467
Katahdin	1,346	53	6,235	272	765	6	22	8,699
Irish Cobbler	3,074	73	421	143	141	60	5	3,917
Netted Gem	55	42	559		1	913	1,507	3,077
Green Mountain	1,011	29	234	1,557	64	10	47	2,952
Kennebec	398	64	1,026	351	4	46	26	1,915
Pontiac	88	2	489			55	30	664
Keswick	184	22	111	67	149	6	1	540
Canso	305	12	92	41	65	1		516
Russet Rural	31		373	1	26			431
Warba	104	27	3	9	17	112	101	373
Bliss Triumph	8	46	274			21	1	350
Red Pontiac			205			76		281
Chippewa	13	8	17		207			245
White Rose							129	129
Ontario	3		12		111			126
Columbia Russet					2	114	4	120
Cherokee	15	19	5		4			43
Others (20)	26	12	1	24	7	174	84	328
Total	23,453	439	10,512	2,499	1,716	1,594	1,960	42,173

Despite hot dry weather in district 3, little early blight developed; most prevalent on Keswick and Irish Cobbler, particularly in the Cochrane and Temiskaming areas (H.W. Whiteside). Infection 18-sl. 2-mod./41 fields inspected in e. Ont.; one field of Irish Cobbler on gravelly soil yielded a poor crop on account of drought and early blight (E.H. Peters). Infection 292-sl. 84-mod. 7-sev./1102 fields inspected in Que.; most prevalent in n.e. Que. and sev. infections noted on Kennebec and on Teton, the latter in two fields on light soil (B. Baribeau). Commoner than usual in unsprayed fields about Quebec City (D. Leblond). Sl. infection reported in only a few fields in N.B.; less prevalent than last year (C.H. Godwin). Despite a hot dry season, only sl.-mod. infections occurred in a few scattered fields in N.S. As most growers are now spraying with nabam and maneb it is possible the use of these fungicides has reduced the prevalence of early blight (R.C. Layton). Only sl. infections noted in P.E.I. (H.L. McLaren). Tr. of Alternaria tuber rot seen on Irish Cobbler in a bin examined 8 April in Queens Co. (R.R. Hurst). Early blight found in many fields in e. Nfld., but it caused little damage (G.C. Morgan).

GREY MOLD (Botrytis cinerea) lightly affected about 20% of the plants in a plot of blight resistant seedlings at the Farm, Agassiz, B.C.; at first glance the symptoms resembled a light infection of late blight (H.N.W. Toms). A sl. infection was seen on very rank tender growth in a field of Keswick at

Table 6. Seed Potato Certification: Fields Rejected on Field Inspection, 1955

Province	Leaf Roll	Mosaic	Ring Rot in field	Ring Rot on farm	Black Leg	Wilts	Adjacent Diseased Fields	Foreign Var.	Misc.	Total
P.E.I.	19	117	13	14	119	28	36	308	167	821
N.S.	-	5	1	-	4	2	6	9	-	27
N.B.	5	13	192	97	9	-	10	105	16	447
Que.	18	7	156	20	21	-	34	56	9	321
Ont.	3	-	6	12	6	9	1	3	3	43
Man.	1	-	-	-	1	-	-	-	2	4
Sask.	-	-	1	-	4	-	-	-	-	5
Alta.	-	-	1	4	9	-	-	-	-	14
B.C.	16	8	-	-	10	-	12	2	34	82
Total	62	150	370	147	183	39	99	483	231	1,764
Rejection as a percentage of fields:										
Inspected	0.5	1.3	3.1	1.2	1.5	0.3	0.8	4.1	1.9	14.7
Rejected	3.5	8.5	21.0	8.3	10.4	2.2	5.6	27.4	13.1	100%

Table 7. Seed Potato Certification: Average Percentage of Disease found in Fields, 1955

Average Percentage disease found in	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Fields entered (first inspection)									
Black Leg	.25	.05	.08	.10	.05	.08	.56	.23	.07
Leaf Roll	.06	.04	.02	.05	.02	.01	.08	.12	.08
Mosaic	.12	.13	.05	.03	-	-	.04	.01	.05
Fields passed (final inspection)									
Black Leg	.15	.02	.07	.08	.01	-	.08	.12	.04
Leaf Roll	.02	.04	.01	.02	.02	.01	.03	.01	.04
Mosaic	.03	.08	.03	.02	-	-	.01	.01	.02

Mavillette, N.S. (K.A. Harrison). A sl. infection was reported in a field of Sebago from Summerside from which specimens were received (J.E. Campbell). A tr. of grey mold was present on greenhouse plants at Charlottetown in February (R.R. Hurst).

BLACK DOT (Colletotrichum atramentarium) In many fields about Ste. Anne de la Pocatiere, Que., the plants died down prematurely apparently on account of the drought, but the bases of the stem frequently showed symptoms of black dot. The disease also mod. affected McIntyre Blue in a local garden; the organism was isolated from the tubers as well as the base of the stems. (H. Genereux). A heavy infection was noted late in the season in a field of

Irish Cobbler in Queens Co., P.E.I.; damage nil (R.R. Hurst).

BACTERIAL RING ROT (Corynebacterium sepedonicum) was reported in one lot of Warba at Grand Forks in the spring of 1955. Measures were taken to prevent the planting of the seed and to disinfect the premises. The disease was not seen again in field or on bin inspection in the area (N. Mayers). Ring rot was detected in sl. amounts in 12 crops, four grown in 1954 and eight in 1955 (W.R. Foster).

Ring rot was found in s. Alta. in a seed grower's plot on a farm where the disease was found in 1953; fresh seed was planted in 1954, but the disease was not detected in the crop during field or bin inspection. A 10% infection was found in a planting of Early Gem, U.S. Certified Seed from Minnesota; it is highly probable that this seed was infected when imported (R.P. Stogryn). Ring rot was found in table stock fields only, in central and n. Alta. (J.W. Marritt). The annual provincial survey for ring rot was carried out in Alta. under excellent conditions. The survey revealed that the percentage of farms on which ring rot was found was about the same as in 1952 and 1953, but the acreage affected was less. The figures for 1955 were slightly higher than 1954, but the 1954 crop was very late and in some fields the disease probably escaped detection. It is anticipated that the thorough inspection which the fields received this year will result in a reduction of ring rot in 1956. Probably most significant is the fact that in over 95% of the fields inspected only one or two diseased plants were found in each. Undoubtedly the annual survey has resulted in a steady improvement in the health condition of the potato stocks produced (W. Lobay).

Ring rot was found in a field of Pontiac entered for certification near Saskatoon, Sask. (A. Charlebois) and diseased specimens were received from Weyburn (R.J. Ledingham). The disease was not observed during field or bin inspections in Man. or n.w. Ont. (D.J. Petty), in the London district (F.J. Hudson) or in e. Ont. (E.H. Peters). In district 2, ring rot was detected in the crop from 5 fields, in one crop at digging and in crops of two other growers on bin inspection. The disease apparently was introduced into these seed crops by growers loaning their machinery to neighbors, who had the disease in fields of table stock and then using this machinery again without properly disinfecting it (W.L.S. Kemp). In district 3, ring rot was detected in 6 fields. It may be noted that in one instance potatoes known to have been infected in 1954, were planted in 1955 and over 50% of the resulting plants were infected. The loss at digging time was surprisingly small, being about one barrel per 100 barrels graded. However, about 6 weeks later some of these potatoes were put under detention by Fruit and Vegetable Inspectors because about 15% of the tubers were showing rot (H.W. Whiteside). As a result of the 13th annual provincial survey for ring rot in Ont., 219 cases of ring rot were reported in table stock fields in Ont. This figure represents a decrease from the 1954 figure of 232 and from the 12-year average of 323 cases. In most fields, infection was only a trace (D.S. MacLachlan).

Ring rot caused the rejection of 156 (14.1%) of the fields inspected in Que., an appreciable increase over last year. The disease was particularly prevalent in the St. John district. The late blight epidemic last year caused the premature destruction of the foliage and made the detection of ring rot virtually

impossible. Undoubtedly the disease escaped detection in some crops. This year growing conditions were ideal for symptom expression. Volunteer plants were also responsible for the rejection of a few fields (B. Baribeau). A 10% infection was recorded in a field of Green Mountain at Charny (L. J. Coulombe).

Bacterial ring rot caused the rejection of 192 fields upon inspection in N. B. and of an additional 97 fields because the disease was present in table stock fields on the same farm. As pointed out last year severe late blight infection made detection of ring rot almost impossible especially in Victoria Co., where symptoms may not be visible until late August or early September. Also last year unusually high table stock prices in April tempted some growers into disposing of seed stock at prevailing prices and planting potatoes of inferior quality. As a result ring rot was more prevalent than usual in the seed crop in N. B. (C. H. Godwin). Ring rot caused the rejection of one field entered for certification in N. S.; the seed had been imported from P. E. I. A survey by the provincial department uncovered 5 cases of ring rot, scattered in Colchester, Pictou and Hants counties; no cases were found in Cumberland or Halifax counties. The source of infection could not be determined but none had been planted with seed certified in N. S. in 1954 (R. C. Layton). Bacterial ring rot caused the rejection of a few fields on second inspection in P. E. I. and of several crops at harvest (see table 6) (H. L. McLaren). By 30 Nov., 56 cases of ring rot had been found in the 1955 crop, compared to 30 cases in 1954. This increase is probably of no significance except that this past season appeared to favor symptom expression and it was easier to detect the disease (J. E. Campbell). Two 3-acre fields of Arran Victory at Torbay, Nfld., were found sl. infected. In the West Coast survey; of 20 suspected cases, 17 proved to be positive on examination at Ottawa (G. C. Morgan). These fields were located at Jeffreys, the same district where ring rot was found in 1953 (D. S. MacLachlan).

BLACK LEG (Erwinia atroseptica) was found in 108 (16. 1%) of the fields inspected in B. C. and caused the rejection of 10; it was slightly more prevalent in the Cariboo and Kootenays probably because of weather conditions favorable for the disease (N. Mayers). In s. Alta. black leg was found in 46 (53%) of the fields inspected and one of Irish Cobbler was rejected. The marked decrease in its prevalence in this irrigated area is attributed to the use of captan and to a lesser extent to that of whole seed (R. P. Stogryn). In central and n. Alta., black leg was present in 72 (51%) of the fields inspected and 8 were rejected. Use of whole seed appeared to be the best precautionary measure (J. W. Marritt). Mod. infection was noted in 2 gardens in Edmonton (W. P. C.). Black leg was recorded in nearly 40% of the fields inspected in Sask. and caused 4 rejections (A. Charlebois). It was quite prevalent in many parts of Sask. in 1955; cool weather and wet soils in the early season favored the disease (R. J. Ledingham). Tubers examined 5 Aug. from Muenster showed sev. injury from black leg infection; weather in the area had been cool and very wet (D. S. MacLachlan). In Man. 10% of the fields inspected showed a trace and one with a 10% infection was rejected (D. J. Petty). Mod. infection was seen in a field at Carmen (J. E. Machacek).

In the Thedford marsh, Ont., traces of black leg were found in many fields and a 1% infection in one of Sebago (N. J. Whitney). Black leg was recorded in fields in several parts of the London district; it appeared to be most prevalent in Sebago fields planted with eastern seed (F. J. Hudson). A few diseased plants were observed in several fields, mostly of Sebago, in district 2; the overall incidence of the disease has declined in seed crops because few fields are now entered from Waterloo Co., where it is a common practice to plant potatoes beside fields of corn (W. L. S. Kemp). Black leg caused the rejection of 6 fields in district 3; Sebago and Russet Rural appeared most susceptible (H.W. Whiteside). The disease was recorded in 10/41 fields in e. Ont. (E.H. Peters).

Black leg was present in 539 (49%) of the fields examined in Que. and caused the rejection of 21, a much smaller percentage than in recent years (B. Baribeau). The disease was observed in fields of the more susceptible varieties this year in N.B.; but only 9 fields were rejected compared to 40 in 1954 (C.H. Godwin). Black leg was recorded in 41/271 fields inspected in N.S. and caused rejection of 4, one of which showed 5% infection; it was most sev. in Sebago, Irish Cobbler and Cherokee (R.C. Layton). The disease caused the rejection of 119 fields in P.E.I. in 1955 compared to 214 in 1954 (H. L. McLaren). Black leg appears to be increasing in importance in Nfld.; this year sl.-mod. infections were found in 75% of the fields visited (G.C. Morgan).

SOFT ROT (?Erwinia carotovora). Some soft rot was observed in district 3, Ont., in various crops the first week after harvest; it was invariably associated with damaged tubers (H.W. Whiteside). The disease was sev. in a lot of Sebago brought in for examination from Queens Co., P.E.I. (R.R.Hurst).

In 1954, frequent heavy rains during the growing season caused super-saturated conditions in many soils in N.B. In consequence spring planting was considerably delayed, and in many fields the soil remained very wet throughout the summer. As a result the crop developed poorly and in many instances the tubers were characterized by enlarged lenticels, lack of maturity and "off-flavor" quality. In addition, many tubers were enveloped by a mantle of clay when placed in storage. Such tubers kept poorly and usually in time became affected by a bacterial soft rot.

Examination revealed that infection of the tubers was usually through the enlarged lenticels. In some cases development of cork layers about the lenticels effectively walled-off the infection but in many instances the infection broke down the natural barriers. In such cases the tubers tended to rot rapidly when taken out of storage, particularly if they were washed before marketing. The causal pathogen appeared to be principally E. carotovora (J. L. Howatt).

POWDERY MILDEW (?Erysiphe cichoracearum) was troublesome on breeding stock at Fredericton, N.B.; it tends to defoliate the plants (J. E. Howatt).

WILT (Fusarium oxysporum, Verticillium albo-atrum) was recorded in only 2/668 fields inspected in B.C. (N. Mayers). Wilt was present in 25 (29%) of the fields inspected in s. Alta.; up to 30% of plants were infected at first inspection in fields planted with eyes of Pontiac and Warba from Man. (R.P. Stogryn).

Wilt, usually only a tr., was recorded in 6 (5%) of the fields inspected in n. Alta. (J.W. Marritt). Sl. infections were observed in 6% of the fields inspected in Sask. (A. Charlebois) and in a field at Arden, Man. (J.E. Machacek). Tr.-sl. amounts were noted in 11% of the fields inspected in Man. and in 1/7 in n.e. Ont. (D.J. Petty).

Wilt was found to some extent in most fields inspected in the London district, Ont.; it was more prevalent in Canso and Red Pontiac than other varieties (F. J. Hudson). In district 2, one field was rejected for wilt and the disease was present in a few other fields (W.L.S. Kemp). Wilt was recorded in many fields in district 3, particularly in Chippewa and Sebago in the Cochrane area; 3 fields were rejected (H.W. Whiteside). The disease was found in 5/41 fields inspected in e. Ont. (E.H. Peters). Wilt was reported in several fields in N.B. and 2 (in Irish Cobbler and Cherokee) were rejected (C.H. Godwin). Wilt was about as prevalent as usual in P.E.I.; 28 fields were rejected (H.L. McLaren). Fusarium wilt has caused some trouble in the greenhouse in soils containing too much peat moss (J.L. Howatt).

DRY ROT (Fusarium spp.). Several Katahdin tubers showing small dark depressed areas, 1/16-1 1/2 in. in diam., were received from Middlesex Co., Ont. Isolations consistently yielded Fusarium sp. (J.K. Richardson). A Fusarium sp. was isolated from sl. affected Irish Cobbler tubers from Belleville, Ont. Small sunken discolored areas around many of the lenticels were present on Katahdin tubers from Penetang; a Fusarium was isolated (D.S. MacLachlan). From 2 to 4% of the tubers were affected by dry rot in a few 1954 lots of Keswick examined in the spring in Que.; a sl. infection was also noted in some lots of Green Mountain (B. Baribeau). The 1954 crop in N.B. did not store well because of adverse growing and harvesting conditions; Fusarium dry rot was observed along with other types of breakdown in many bins during last winter and spring (C.H. Godwin). Typical dry rot was observed in numerous samples of tubers from N.S. and also of seed potatoes from outside the province; infection was 1-5% (K.A. Harrison). Tuber decay caused by F. sambucinum f. 6 and F. coeruleum was generally sl. in P.E.I. in 1954-55. One lot of Keswick was affected by both species (G.W. Ayers). Losses from dry rot observed in Nfld. were in Sebago; 2 lots (1200 bags) showed 2% infection (G.C. Morgan).

RHIZOCTONIA (Pellicularia filamentosa (R. solani). Infection was 436-sl. 122-mod. 30-sev./668 fields inspected in B.C. In general scurf development was heavier than usual. On Vancouver Island the loss was estimated at 100 tons worth $5,000, less 50 tons of sound culls worth $750, a net loss of $4,250 or 2-3% of the crop (N. Mayers). Sl. infections were recorded in 147/288 fields inspected in Alta. Killing frosts were early. In s. Alta. digging was early and scurf infection was very sl. but elsewhere digging was delayed by wet weather and tuber infection was more than usual (R.P. Stogryn, J.W. Marritt). Despite the dry season the perfect state of the fungus was found in tr. amounts in gardens at Saskatoon and on 3 hills in a field in Asquith, Sask. Little scurf developed on tubers about Saskatoon (T.C. Vanterpool). Sl. infections occurred in most fields in Man. and n.w. Ont. (D.J. Petty), in the London district (F.H. Hudson) and in 16/41 fields in e. Ont. (E.H. Peters). In district 2, most

affected fields were on the light porous soils in York, Ontario and Durham counties; also reported to have been heavy on a crop grown on land which had not been in potatoes for over 25 years (W. L. S. Kemp). Little plant infection occurred in district 3, but tuber infection was more prevalent than usual in several districts, where harvesting was delayed (H. W. Whiteside). Rhizoctonia was noted in 91 (8.2%) of the fields inspected mostly in n.w. Que. Tuber infection was generally sl., but scurf development was sev. in 3 cases (B. Baribeau). Sl. infections were noted in a few fields in N.B. and scurf development was also very sl. (C.H. Godwin). Only sl. infections were noted in fields inspected in N.S. Scurf development was somewhat higher, the infection being high in some lots; in one lot 40% infection occurred (R.C. Layton). Sprouts were sev. attacked and the stand very poor in a field at Canning, N.S., 10 June (K.A. Harrison). Rhizoctonia infection was mod. in P.E.I. (H.L. McLaren). Scurf development was very heavy on one lot of Irish Cobbler tubers brought in from Queens Co. for examination (R.R. Hurst). The disease was widespread in the field and scurf development was sev. on the tubers in e. Nfld.; cool moist weather prevailed during the summer (G.C. Morgan).

PINK ROT (Phytophthora erythroseptica). In a sample of 20 tubers from Woodstock, N.B., 8 showed symptoms of pink rot; the organism was isolated (D.S. MacLachlan).

LATE BLIGHT (Phytophthora infestans) was mostly confined in B.C. to the Lower Fraser Valley and Vancouver Island. In the Lower Fraser Valley it was first observed on 18 July in a field of White Rose. For the first time in many years it caused considerable damage to early potatoes, especially Early Epicure and Warba, and also second earlies, but losses in the main crop were negligible. On Vancouver I., late blight developed early and spread rapidly. Many crops were partially defoliated by early August and mechanical damage by spraying and dusting machinery was considerable. As a result of early defoliation much of the crop consisted of undersize tubers. The estimated loss was $17,500 or 10-15% of the normal crop. The weather was fine later in the season with the result that little tuber rot developed (N. Mayers).

Late blight was recorded in 3 (2%) of the fields inspected in central and n. Alta. On a farm at Spruce Grove a field of Warba was completely defoliated and some tubers were infected. Lesser infections were seen in Netted Gem. Diagnosis was confirmed by microscopic examination. Despite these outbreaks little spread occurred. As it is probable that many infected tubers were used for seed in and about Edmonton, it is remarkable that so few diseased fields were found (J.W. Marritt, A.W. Henry). An infected specimen was received from Galahad on 18 July (W.P. Skoropad).

Late blight was recorded in potatoes at Indian Head, Broadview and Wishart, Sask.; dry weather in July and August evidently kept the disease in check. (R.J. Ledingham). Late blight was rather destructive to a field of Netted Gem, sev. injured by hail in late August at Norquay. Sl. infections were also noted about Kamsack, Calder and Yorkton in late August (A. Charlebois). Late blight was first found on 6 Aug. near Gonor, Man., near Winnipeg and then at Portage la Prairie (J.E. Machacek). By late August, sl.-sev. infections

could be found in most areas of Man. Very little tuber rot occurred chiefly because of excellent weather before and during harvest (D. J. Petty).

Little late blight was observed in district 2, Ont., on account of the hot dry summer. An occasional affected tuber was seen in about 20 lots at bin inspection, but in one lot each of Katahdin and Rural New Yorker 10-15% of the tubers were affected (W. L. S. Kemp). Late blight was not observed in the field in district 3; a few affected tubers were found in a lot of Katahdin in the Sudbury district (H. W. Whiteside). Although a late blight warning service was maintained in Ont. in 1955, late blight was first recorded on potatoes in Dufferin Co. on 10 Sept. in the low parts of a field. A survey on 12 Sept. revealed additional fields infected; it probably caused some tuber rot in fields where little or no fungicide had been used (C. B. Kelly).

Late blight was first reported in Que. in Compton Co. on 27 July in a field of Kennebec. Because of hot dry weather during the summer, the disease spread very slowly. From mid-August onward the disease was observed in a few scattered fields, chiefly of Green Mountain. Conditions in late August and early September were more favorable for its spread but soon cool spells and frosts checked its further dissemination. At harvest, traces of tuber rot were found in about 15% of the bins inspected (B. Baribeau, H. Genereux).

Late blight was first found in N. B. on a cull pile in Victoria Co. on 19 July and in a potato field in York Co. on 2 Aug. The disease developed slowly until late August when it could be found in half the fields in some areas. Infection was generally light and only a few fields which were not properly sprayed were completely killed. Rot in the harvested crop was not serious, although some early shipments of table stock were turned down at destination because of breakdown by blight in transit.

Late blight was first found in N. S. on 28 July in the Scotts Bay area. Scattered outbreaks of late blight began to be observed from 11 Aug. on. It became fairly sev. in Yarmouth and Digby counties on all varieties except Keswick. Dry weather held blight in check in most parts of the province but by mid-September it was present in most unsprayed fields. It was easily controlled by spraying and there was little loss from tuber rot in commercial areas. Late blight resistant varieties have not stood up as well this year as previously, but little tuber rot developed except in Kennebec. The exact cause of this rot is not known, but some pathologists have attributed the rot to bacteria following infection by Verticillium (R. C. Layton, K. A. Harrison).

Late blight was first reported in P. E. I. on 1 Aug., when it was discovered by an inspector in an early unsprayed planting of Irish Cobbler at Argyle Shore, Queens Co. When the area was surveyed on 3 Aug. the crop had been lifted, but some spread had occurred. Traces were found in a field of Sebago, about 200 yards to the n. w. As the lesions were few but evenly spaced, it appeared that the infection was from spores that had drifted there from the Irish Cobbler field. Only one other infection was found - a single lesion in a field of Irish Cobbler 600 yards to the s. of the original field. The appearance of late blight on 1 Aug. was 10 days later than normal, and its delayed appearance was probably due to the comparatively dry weather through July.

Cumulative rainfall, although an admirable index for the forecasting of late blight in certain regions, is not an accurate criterion in P. E. I. The mean rainfall from July-September in P. E. I. is slightly over 10 in., yet in 1954 and 1955 when the rainfall was 8.85 and 8.78 in. respectively, late blight was extremely sev. The cumulative rainfall from 1 July to Aug. 18 was only 2.94 in., or much below normal, yet the disease was developing and spreading rapidly by mid-August. In the next two weeks the cumulative rainfall had risen to 5.30 in. but was still below that for the same period in 1954. At the same time, relative humidities which had previously shown weekly means in the low seventies rose for the weeks ending 18 Aug., 25 Aug. and 1 Sept. to 85.5, 83.5, and 83.6. During these 3 weeks there occurred several long periods when the relative humidity was in the high nineties. Dews were frequent, and because of extremely humid conditions foliage remained wet until noon or later on many days. When these conditions set in, the development and spread of late blight was forecast and growers were advised. Those who maintained their spray programs as suggested were able to protect their crops, fields that were not sprayed died in a few days and fields that were sprayed in a haphazard fashion were sev. defoliated (L. C. Callbeck). Although late blight appeared a month later than in 1954, it caused considerable damage to potato foliage in the eastern half of P. E. I. (H. L. McLaren).

Table 8. Distribution by Provinces of Physiologic Races of Phytophthora infestans in Canada in 1955

Physiologic Race	Provinces							
	P. E. I.	N. B.	N. S.	Que.	Man.	Sask.	B. C.	Total
0			2					2
1	1	1						2
2			2					2
3	19	13	6	4			8	50
4	59	50	12	14	3	1	8	147
1.2		2						2
1.3		7	1	2				10
1.4		21	5	1			1	28
2.4	2	1						3
3.4	13	22	3	3				41
1.3.4			12	5				17
Total	94	117	43	29	3	1	17	304

Late blight did not appear on the foliage in Nfld. until much later than last year. Losses in the early crop were much lighter than last year. In the late crops, infection in the tubers was fairly heavy, about 10% in Green Mountain and Katahdin, but early destruction of the vines by frost prevented heavier losses (G. C. Morgan).

For a second year a survey was carried out at Fredericton, N. B., to determine the races of Phytophthora infestans occurring on potato and tomato crops in Canada. Because of less favorable weather conditions, late blight was

less prevalent than last year. However, 194 collections were secured from potato foliage and tubers and tomato fruits from seven provinces; some 17 varieties of potatoes were sampled in contrast to 31 in 1954.

The races present were determined by inoculating detached leaves of the genotypes. In many instances, difficulty was encountered in determining the specific race present. In these cases, the collection was assigned to what appeared the most likely race. In many cases the reaction of race 0 and other simple races may have been masked by that of the complex races. The results in the survey shown in accompanying table must be considered provisional in the light of these circumstances. Possibly these results might be considerably modified if monosporous isolations had been attempted with this material.

Inspection of Table 8 reveals that race 4 was the most prevalent one found in Canada. It is interesting to note that race (1.3.4) was encountered frequently in Nova Scotia this year and that this, in part, accounts for the susceptibility of the Keswick, Cherokee, and Kennebec varieties in that province.

The prevalence of race 0 has not been enumerated mainly because of the difficulty in determining this race in the presence of other races. There is reason to believe, however, that race 0 is being supplanted by race 4.

A feature of the survey was the prevalence of an apparent race 3. This race was found frequently on tomatoes in the extreme East and West (J.L. Howatt, P.N. Grainger).

LEAK (Pythium ultimum) appeared to be more prevalent than usual in the early crops on Vancouver Island, B.C.; the estimated loss was about 30 tons valued at $1,200. Traces were noticed in several fields of early crops in the Lower Fraser Valley and considerable breakdown occurred in one crop of Warba dug on a hot day and placed in a field root pit. About 1% of the tubers were also affected in early crops in s.e. B.C. (N. Mayers). From 5 to 10% of the tubers were affected in 3 separate plantings at Ste. Anne de la Pocatiere and St. Roch des Aulnaies, Que. (H. Genereux).

VIOLET ROOT ROT (Rhizoctonia crocorum) sev. affected up to 5% of the potatoes in the Thedford marsh, Ont.; the outbreak this year was the worst so far observed (N.J. Whitney).

SILVER SCURF (Spondylocladium atrovirens) was reported to be prevalent in the spring in district 3, Ont., especially on tubers that had been bagged for a long time (H.W. Whiteside). This defect was found in Que. in 6 lots of Green Mountain at bin inspection; infection was usually sl. (B. Baribeau). Only a sl. infection was noted in a few lots in N.S. (R.C. Layton). In the spring a 15-20% infection was noted on Kennebec and other white-skinned varieties in Kings Co.; damage was nil (K.A. Harrison). Sl. amounts were recorded on several varieties in March in P.E.I. (R.R. Hurst).

POWDERY SCAB (Spongospora subterranea). Although rarely recorded on Vancouver Island, B.C., powdery scab was observed in 2 White Rose crops grown on low-lying organic soil (N. Mayers). Sl. infections were recorded in 8 lots at bin inspection in Que. (B. Baribeau). A 1% infection was reported in

one Sebago lot in the Scotts Bay area, N.S.; this area is about the only one where we observed the disease (R.C. Layton). A mod. infection was found in 5 fields in Conception Bay, Nfld. (G.C. Morgan).

Root nodules caused by S. subterranea were observed on a few potted plants of U.S.D.A. seedling 41956 in the laboratory greenhouse, Vancouver, B.C. (N.S. Wright, W. Jones).

COMMON SCAB (Streptomyces scabies) was general in several districts in B.C. on white-skinned varieties, but no sev. affected fields were reported (N. Mayers). Scab was of little importance this year in s. Alta. but one field of Pontiac nr. Calgary was sev. affected (R.P. Stogryn). Elsewhere in Alta. scab was more prevalent than usual and in the Lacombe district, a sl. infection was seen on Netted Gem, which is normally free of scab (J.W. Marritt). Affected tubers were received from a garden at S. Battleford, Sask.; although the garden is located in the Black Soil Zone, the soil had been heavily manured in 1954 (T.C. Vanterpool). Scab was slightly more prevalent than usual in Man. and n.w. Ont., but loss was negligible (D.J. Petty). Scab was rarely observed in the London district, and only a few sev. infected tubers were seen (F.J. Hudson). Because of hot, dry weather, 50-75% of the crop grown in Dufferin and Wellington counties in district 2 were too scabby for seed grade; ordinarily about 25% of the crop has to be called out. On account of scab and off-type tubers, no lots of Irish Cobbler were suitable for seed (W.L.S. Kemp). As a result of the extreme heat and drought scab was more prevalent than usual in district 3; even the resistant varieties Ontario and Cherokee showed some infection. In a field trial where the varieties were read for scab by L.K. Richardson, the scab count on Chippewa and Irish Cobbler was over 20 and on Ontario 1.6 and Cherokee 6.8 (H.W. Whiteside). Scab was also more prevalent in e. Ont. than usual (E.H. Peters). Scab was about twice as prevalent this year as last in Que.; infection was 312-sl. 31-mod. 3-sev. In general the infection was sl. and occurred mostly along the lower St. Lawrence and in n.w. Que. (B. Baribeau). In a scab trial at Peribonka the least affected seedling (F4792) had 70% of the tubers scabby and 7% of the surface scabbed, compared to 100% of tubers and 85% of the surface in Green Mountain (H. Genereux). Scab was somewhat more prevalent than in recent years in N.B., but only one or two crops had to be rejected on account of the disease. Cherokee continues to show high resistance to scab infection (C.H. Godwin). Common scab was sev. in the scab trial plots at the Farm, Fredericton; 884 seedlings were tested this year and a considerable number had a tr. to 10% of the surface area scabbed compared to Green Mountain controls with 40% on the average. Seedling F4775 has proved to be highly resistant to scab in repeated tests (C.H. Lawrence). Scab was somewhat more prevalent than usual in N.S. (R.C. Layton). Many reports were received during the winter 1955 from Kings Co. of scab on potatoes grown on land formerly in orchard (K.A. Harrison). Scab infection was sl. in P.E.I. this year (H.L. McLaren). However, one sev. infected crop of Irish Cobbler was found in Queens Co. (R.R. Hurst). Scab was very prevalent in Nfld., particularly in the Clarkes Beach area; in many fields over 50% of the tubers were very scabby. It appears that since lime was subsidized, many farmers are applying heavy dressings of lime to the land without, in most cases, first having their soil tested. (G.C. Morgan).

WART (Synchytrium endobioticum). Losses from wart were the heaviest since 1949, particularly in the Conception Bay, Trinity Bay, and Bonavista Bay areas. Arran Victory showed the highest infection, followed by Green Mountain and Arran Comrade. Sebago was highly resistant and is becoming quite popular with growers in the Conception Bay and other areas where wart and late blight are the major cause of losses in the crop. Out of 213 crops of potato examined during a survey of the West Coast, wart was found in 3 fields. It may be noted that reports and diseased specimens were received from all parts of Nfld. except the West Coast. (G.C. Morgan).

WILT (Verticillium albo-atrum) affected 1-10% of the plants in different fields examined at Lillooet, Cache Creek and Ashcroft, B.C., in 1954 (G.E. Woolliams). Wilt was found in 66 (6%) of the fields examined in Que. and caused one to be rejected; it was most prevalent in Kennebec (B. Baribeau). Wilt was observed in 39/271 fields inspected in N.S. and 2 (of Kennebec) were rejected for wilt. Verticillium wilt was reported to have sev. affected some fields of table stock, but in the seed producing areas, where growers carefully treated their seed before planting, the disease was not sev. (R.C. Layton). Sl.-mod. infections were noted in Sebago, Irish Cobbler and Kennebec during a survey in P.E.I. (G.E. Ayers).

LEAF ROLL (virus) was reported in 150 (22.4%) of the fields inspected in B.C. and caused 16 to be rejected. There was a sharp reduction of its prevalence at Grand Forks over 1954; this improvement is attributed to better insect control, more careful roguing and use of recommended disease-free seed. On the other hand, it was more prevalent than usual in the Okanagan (N. Mayers). Leaf roll was found in 42 (18%) of the fields inspected in Alta., but in most instances only traces were present. The disease continues to be most prevalent in garden allotments about Edmonton. Tuber indexing along with careful seed plot selection is helping to eliminate the last traces from some of the best seed stocks of Netted Gem (R.P. Stogryn, J.W. Marritt). Leaf roll was recorded as a tr. to 0.5% in 14% of the fields in Man. and in 1/7 in n.w. Ont. (D.J. Petty). Plants affected by leaf roll were found occasionally in most varieties throughout the London district (F.J. Hudson). Little or no leaf roll was found in district 2 (W.L.S. Kemp). Although leaf roll was slightly less prevalent than in 1954 in district 3, its incidence on Green Mountain and Keswick was higher than usual; 2 fields were rejected (H.W. Whiteside). Only single plants were observed in 2/41 fields inspected in e. Ont. (E.H. Peters). Leaf roll was recorded in 314 (28.5%) of the fields inspected in Que. and caused 18 to be rejected (B. Baribeau). Only 5 fields were rejected on account of leaf roll in N.B. (C.H. Godwin). Leaf roll was reported in 70/271 fields inspected in N.S.; none were rejected (R.C. Layton). Leaf roll was less prevalent in P.E.I. than last year; 19 fields were rejected (H.L. McLaren). In table stock fields of Irish Cobbler and Green Mountain examined, leaf roll infection was usually only a trace (R.R. Hurst). From the severity of the reaction on Physalis floridana, a good indicator plant for leaf roll, two distinct strains of the virus were recognized; 92 collections of leaf roll were used from 19 different potato seedlings and 9 named varieties obtained from various parts of the Maritime Provinces (J.P. MacKinnon).

MOSAIC (virus) was recorded in 50 (7.4%) of the fields inspected in B.C. and caused 8 to be rejected. One field of White Rose in the Cariboo showed 12% infection (N. Mayers). Traces were recorded in 4/228 fields inspected in Alta. (R.P. Stogryn, J.W. Marritt). Small amounts of mosaic were recorded in 2% of the fields in Man. and in 3/7 in n.w. Ont. (D.J.Petty). A few plants in a field of Irish Cobbler at Clinton, Ont., were affected (F.J. Hudson). Only an odd plant was seen affected in district 2 (W.L.S.Kemp). Very little mosaic was observed in district 3, but it was probably masked by hot weather (H.W. Whiteside). Mild mosaic was recorded in only 2 fields in e. Ont. and traces of rugose mosaic was seen in 2 (E.H. Peters). Long periods of hot dry weather in e. Ont. and w. Que. caused a masking of symptoms of virus X infections (D.S. MacLachlan). Mosaic was recorded in 248 (22.5%) of the fields inspected in Que.; 7 were rejected compared to 65 in 1954 (B. Baribeau). Mosaic caused the rejection of 13 fields in N.B.; the disease continues to be prevalent in Green Mountain fields in Madawaska Co. (C.H. Godwin).

An examination of some 60 fields in non-seedgrowing areas in York and Charlotte counties has revealed that strains of potato virus X are still commonly causing severe mosaic in Green Mountain. The cause of the disease is usually attributed to potato virus Y, because it has been assumed that intensive roguing of seed stocks of the variety over the past 30 years would have eliminated the severe strains of virus X from the province (J. Munro).

Four plants in a commercial field in York Co. showed a mild form of mosaic caused by a strain of potato virus Y; potato virus X was not found in these plants. Also 15% of the plants in a commercial field of Keswick showed a severe form of mosaic; it proved also to be caused by virus Y (D.J. MacLeod).

Mosaic was reported in 109/271 fields in N.S. and caused 5 to be rejected. Symptoms of mild mosaic seemed to be on the increase (R.C. Layton). Mosaic was slightly less prevalent in P.E.I. than in 1954; 117 fields were rejected (H.L. McLaren). Mosaic and leaf roll are widely distributed in Nfld. and causing concern particularly among growers of Arran Victory. Mosaic infection in this variety was 25-75% compared to 10% in Green Mountain and Sebago (G.C. Morgan).

PURPLE or BUNCH TOP (virus). A tr. to 1% infection was noted in several fields of Katahdin and Netted Gem in 1954 at Salmon Arm, Kamloops, Oliver and Osoyoos, B.C. (G.E. Woolliams). Purple top occurred in tr. amounts in 9 (10%) of the fields inspected in s. Alta.; all varieties were affected (R.P. Stogryn). Infections up to 1% were observed in 31 (22%) of the fields in n. Alta., particularly in Netted Gem (J.W. Marritt). Infection in the gardens about Saskatoon, Sask., was sl. compared to 1954 (T.C. Vanterpool). Most fields in Man. and n.w. Ont. contained tr.-1% infection (D.J. Petty). Mere traces were noted in n. part of district 3, Ont. (H.W. Whiteside). Sl. amounts of purple top were reported in Que. in most varieties, especially in Keswick, Katahdin and Irish Cobbler (B. Baribeau). Small percentages of the disease were observed in a few fields in N.B. but the infection was not so widespread as in previous years (C.H. Godwin).

Bunch or purple top was found in fields in York Co. as follows: Kennebec, Bliss Triumph and Chippewa tr.; Irish Cobbler and Katahdin 1/2%; Green Mountain 1%; Sebago 1 1/2%; 2 seedlings 2 and 3%; also seedling 927-3, which is resistant to leaf roll, tr. Also late leaf roll was found in York and Sunbury counties in commercial fields as follows: Sebago 65%, Epicure 60%, Pontiac 50%, Bliss Triumph 47%, Ontario 27%, Irish Cobbler 24%, Warba 21%, Kennebec 8%, Sequoia 1 1/2%; it was also found in U.S.D.A. Seedling 41956 (12%) in a test plot. When scions from infected plants were grafted to tomato and Katahdin potato symptoms resembling those of bunch top (purple top) were produced (D. J. MacLeod).

Rarely more than a tr. of purple top was observed in fields in N.S. this year (R.C. Layton). A tr. to 15% infection was found in several table stock fields in P.E.I. (R.R. Hurst). The disease was of no importance in the seed crop (H.L. McLaren). Spongy, flabby tubers were found associated with purple top in Sebago at Upton (J.E. Campbell).

HAYWIRE (virus) was present in traces in 5 fields inspected in s. Alta. (R.P. Stogryn). Also tr. occurred in 10 (7%) of the fields, mostly of Netted Gem, in n. Alta. (J.W. Marritt).

SPINDLE TUBER (virus). One or two plants were seen in 3 different fields inspected in Man. (D.J. Petty). Spindle tuber was found in small amounts in Sebago, Canso and Katahdin in the London district, Ont. (F.J. Hudson). Examination of tubers at harvest indicated that some spindle tuber was present in district 3, but it was difficult to detect its presence because misshapen tubers were common this year on account of the dry season (H.W. Whiteside). A 2% infection was seen in Kennebec near Tweed; tubers from infected hills were small and spindle-shaped (D.S. MacLachlan). Spindle tuber was observed in Que. in a few fields of Kennebec during field inspection; it was also noted in 27/533 bins inspected in Green Mountain (1/2-1%) and Kennebec (1-2%) (B. Baribeau). Small amounts of spindle tuber were recorded in a few fields widely scattered in N.B.; in one field of Katahdin a 3% infection resulted in its rejection (C.H. Godwin). Spindle tuber appeared to have increased in N.S. particularly in Irish Cobbler, Sebago, Kennebec and Katahdin. Usually infection was a tr. but 1% infection was noted in a field of Sebago and 1/2% in one of Irish Cobbler (R.C. Layton). Spindle tuber continues to increase in P.E.I.; 30 fields were rejected (H.L. McLaren). A tr.-1% was recorded in several table stock fields of Irish Cobbler examined in P.E.I. (R.R. Hurst).

WITCHES' BROOM (virus) was found in 29 (4.3%) of the fields inspected in B.C. and caused 2 fields to be rejected. The disease is encountered most frequently in crops grown from tubers produced in the Cariboo. (N. Mayers). Witches' broom was recorded in 6 (4%) of the fields inspected in n. Alta.; it occurred in sl. amounts in Netted Gem only (J.W. Marritt). Two plants found infected in a field of Irish Cobbler in Kings Co., P.E.I. (R.R. Hurst).

YELLOW DWARF (virus). A tr. was found in Keswick and Columbia Russet at Melbourne, Ont. Tubers were small and showed necrosis of the phloem and considerable external cracking. Tubers planted in the greenhouse produced

sprouts and plants that were weak (D.S. MacLachlan). Small amounts were observed elsewhere on Sebago and Katahdin in the London district (F.J.Hudson) and on Sebago and Keswick in district 3 (H.W. Whiteside).

LATENT DISEASE (virus S). A latent virus was detected in plants of Epicure and U.S.D.A. Seedling 41956 by serological means by the writer in collaboration with Dr. R.H.E. Bradley, Entomology Laboratory, Fredericton, N.B. The virus was shown to be serologically identical with potato virus S (P.D.S. 34:88) described in Holland. Virus S antiserum and plants of the Dutch varieties Industrie and Profijt infected by the virus were obtained from Dr. R.H. Larson of the University of Wisconsin.

Subsequent tests revealed that potato virus S is widespread in American and Canadian potato varieties. Some plants at least of the following varieties have been shown to harbor the virus: Bliss Triumph, Cayuga, Cherokee, Chippewa, Chisago, Desota, Earlaine, Empire, Fillmore, Green Mountain, Irish Cobbler, Kasota, Ketahdin, Kennebec, Keswick, Ladoda, Netted Gem, Norkota, Pawnee, Pontiac, Red Warba, Russet Burbank and Teton.

Stocks of the following varieties, free from virus S, have been located: Canoga, Canso, Early Rose, Keswick, Saco and Sebago.

Virus S has been shown to be sap-transmissible from potato to potato seedlings, although no symptoms became apparent in the latter. Inoculation with infective potato sap of plants of Nicotiana repanda held at 20°C resulted after 14 to 21 days in an interveinal mottle followed by veinclearing of the middle leaves of the plant. Systemic infection of the host by virus S was demonstrated serologically and by successive transfers of the virus. Inoculation of the legume, guar (Cyamopsis tetragonalobus) resulted in localized necrotic lesions in 4-6 days; the symptoms are most distinct in plants held at 20° C (H. Bagnall).

BLACK HEART (nonparasitic). Affected specimens were received in late spring from North Battleford and Beechy, Sask. (T.C. Vanterpool). A tr. occurred in a lot of Green Mountain in Queens Co., P.E.I. in April (R.R.Hurst).

ENLARGED LENTICELS All the tubers in a lot of Sebago in damp storage in Queens Co., P.E.I., were mod. affected in April (R.R. Hurst).

FROST. Most bins showed sl. frost necrosis in the Pemberton district, B.C. Because of delay in harvesting a few late fields also suffered some injury in the Grand Forks area (N. Mayers). Frost injury to the tubers was practically absent in n. Alta.; early destruction of the vines by frost cut yields in a few fields (J.W. Marritt). Frost necrosis affected 10% of tubers in a lot of Warba from Holland, Man.; tubers indexed and found free of leaf roll (D.S. MacLachlan). Little frost injury occurred in e. Ont. (E.H. Peters). Some frost injury occurred in Que. mostly along the lower St. Lawrence and in the Lake St. John district (B. Baribeau). Many fields suffered 5-10% injury in Conception Bay, Nfld. (G.C. Morgan).

GIANT HILL occurred in sl. amounts in s.e. B.C. (N. Mayers). Trace amounts occurred in nearly 20% of the fields inspected in s. Alta. (R.P. Stogryn).

GROWTH CRACKS. About 20% of the tubers were affected in a field of Kennebec at Flat River, Kings Co., P.E.I. Lengthwise growth cracks occurred about the eye end of oversized tubers probably the result of fluctuations in growing conditions last summer (J.E. Campbell).

HEAT NECROSIS was observed in several fields on light soil in district 3, Ont.; Ontario was rather sev. affected. In some cases the whole tuber broke down (H. W. Whiteside). Tubers showing typical heat necrosis were received from the Renfrew area (H.N. Racicot). Seven samples of Kennebec were received this fall affected by heat necrosis. Rust-colored necrotic areas are found scattered through the interior of the tuber, which externally appears perfectly sound. One grower in the Eastern Townships reported that 35% of a 40,000 bushel crop was affected (B. Baribeau).

HOLLOW HEART. A slight amount occurred in some fields about Grand Forks, B.C. (N. Mayers). It also affected 1% of the tubers in 1954 in a lot of Irish Cobbler in Queens Co., P.E.I. (R.R. Hurst).

HOPPER BURN was both widespread and sev. in s. Man., particularly in early varieties; plantings dusted with DDT were practically free from injury (J.E. Machacek).

LOW TEMPERATURE INJURY was found in sl. amounts in lots of Sebago and Green Mountain after long storage at chilling temperatures in Queens Co., P.E.I. (R.R. Hurst).

MAGNESIUM DEFICIENCY caused considerable damage to a field of Irish Cobbler on light soil lacking in humus at South Granville, Prince Co., P.E.I. (R.R. Hurst).

MEASLES was first noticed in 1952 in the Grand Forks area, B.C.; this year it was found in nearly every crop in a small percentage of tubers (N. Mayers).

STEM-END BROWNING. A sl. amount was present in most lots grown in s.e. B.C. following early destruction of tops by frost (N. Mayers). It was rather sev. about Saskatoon, Sask. (R.J. Ledingham). Stem-end browning was rather prevalent in Canso grown in the s. part of district 3, Ont. (H. W. Whiteside). This trouble was observed in Que. in sl. amounts in a few lots of Green Mountain (B. Baribeau).

SUNBURN affected a few tubers of Sebago in a field at Graham's Road, Queens Co., P.E.I. (J.E. Campbell). Sunburn caused considerable injury to Sebago, Katahdin and Kennebec, particularly when grown in the shallow soils at Manuels, Kelligrews and Bay Roberts, Nfld. (G.C. Morgan).

PUMPKIN

POWDERY MILDEW (Erysiphe cichoracearum) developed late in the season throughout the Okanagan Valley, B.C.; it caused no injury (G.E. Woolliams).

LEAF SPOT (Septoria cucurbitacearum) caused sl. damage to plants at Kentville, N.S. (D.W. Creelman).

RADISH

SCAB (Streptomyces scabies) was heavy on one lot of radishes grown in Queens Co., P.E.I. (R.R. Hurst).

RHUBARB

CROWN GALL (Agrobacterium tumefaciens). Roots of a plant in a home garden at Summerland, B.C., were found in April 1954 with numerous large galls (G.E. Woolliams).

SOFT ROT (Erwinia carotovora). About 50% of the plants were sev. rotted in a 1/2-acre patch planted this spring in Lincoln Co., Ont.; the field was in carrots in 1954 (J.K. Richardson).

RED LEAF (cause unknown) was found in several plantings in s. Alta. (J.T. Slykhuis). Red leaf was again sev. in the variety plots at the Farm, Melfort, Sask.; the disease was also observed several times in the Saskatoon area (R.J. Ledingham).

SQUASH

ANTHRACNOSE (Colletotrichum lagenarium). The organism was isolated from lesions on sl. affected squash leaves from Kentville, N.S. (D.W. Creelman).

STORAGE ROT (Mycosphaerella melonis). A single Buttercup squash from a small garden at Kentville, N.S., developed this rot in storage (K.A. Harrison).

LEAF SPOT (Septoria cucurbitacearum) caused mod.-sev. damage to squash at Kentville, N.S. (D.W. Creelman).

SWEET CORN

SMUT (Ustilago maydis). About 1% of the ears were affected in a planting of Bantam at Montmagny, Que. (L. J. Coulombe). A tr. was also observed in a field at Rougemont (R. Crete). Diseased ears were received from St. Lambert and St. Henri (D. Leblond). Three growers in Kings Co., N. S., brought in affected ears (K. A. Harrison).

FERTILIZER INJURY. Fertilizer applied too closely to developing seedlings caused mod. injury in a 1/4 acre planting at Charlottetown, P. E. I. (J. E. Campbell).

TOBACCO

A special report on tobacco diseases in Ontario and Quebec in 1955 was prepared by Drs. Z. A. Patrick and L. W. Koch.

Seedbed Diseases

BLUE MOLD OR DOWNY MILDEW (Peronospora tabacina). The appearance of blue mold in the Old and New Tobacco Belts of Ont. is becoming less and less frequent and loss of tobacco seedlings from the disease has been negligible in the last few years. There were this year only a few mold outbreaks in the Cedar Springs area of Ont., which occurred late in the season around 20-25 May. As yet, this disease has not appeared in Que. However, the growers are still advised to follow a regular spray program for blue mold control as it is well known that the disease can assume epidemic proportions almost overnight if no preventative practices are followed. The recommended program for blue mold control (P. D. S. 34:95) has also been found to aid considerably in the control of damping-off organisms.

YELLOW PATCH (excessive nutrients) was a very common seedbed trouble in 1955, especially in the burley tobacco area where the growers very often tend to over-fertilize their seedbeds.

COLD INJURY was very common this year in ground seedbeds of burley tobacco.

DAMPING-OFF (Pythium spp. and Rhizoctonia solani) was very common this year causing mod. to heavy damage especially during the cold wet weather. Most sev. damage was caused where plants in the seedbed were too crowded and where water was applied in excess.

MUSHROOMS caused mild damage throughout the burley and dark tobacco areas of Kent county where outside seedbeds are used.

SLIME MOLDS were present in a few groundbeds in Kent county. The affected plants were enveloped entirely with a slimy incrustation varying in color,

but most often grey or yellow. The damage was not severe, however, and the mold disappeared under direct sunlight and as a result of adequate ventilation and drying-out of the bed surface.

CHEMICAL INJURY. Only a few cases of 2, 4-D injury were noted. It appeared to be due to spray drift from weed control operations rather than from the use of improperly cleaned sprayers.

A few cases of creosote toxicity were noted in new greenhouses where this wood preservative had been used.

Field Diseases

BLUE MOLD (Peronospora tabacina). No cases of blue mold in the field were observed in the tobacco areas of Ont. and Que. this year.

BROWN ROOT ROT (nematodes) is one of the most serious diseases of burley and flue varieties. The disease was widespread occurring in all the tobacco growing areas. It was most severe in light sandy soils following a rye rotation where it caused much stunting and reduction of yield and in most of the fields visited some brown root rot damage was noted. In all instances where damage was observed large populations of the root-lesion nematodes, Pratylenchus spp., were present in the soil.

BLACK ROOT ROT (Thielaviopsis basicola). Very few instances of black root rot damage was noted. Its low incidence is due to the widespread planting of resistant burley and flue varieties.

FRENCHING (?soil toxins). A few fields of tobacco were sl.-mod. damaged by frenching.

SOFT ROT (Pythium spp.) was found in a few fields soon after setting.

SORE SHIN (Rhizoctonia spp.), along with Pythium Soft Rot, caused mod. losses in the new transplants.

BACTERIAL BLACK STALK, a rather rare disease, was found in a number of tobacco fields in the Chatham area where up to 5% of the plants in 3 fields were affected. Only mature plants appear to be affected. These plants turn bright yellow and the lower leaves, many of which have decayed midveins, are wilted. The bark is blackened, commencing at the ground line and the stalk may be completely girdled. The pith is not decayed, but in the region of the older affected area it may appear grayish and often separates into grayish discs. The roots are not affected. Bacteria were isolated from the diseased tissue.

HOLLOW STALK (Erwinia carotovora and E. atroseptica). A few cases of stalk soft rot and hollow stalk were observed. Most of these were as a result of topping damage and the use of suckering oils.

NONPARASITIC LEAF SPOT (cause undetermined) was widespread in 1955 and sev. throughout most of the flue tobacco growing areas of Ont. The very hot dry weather during the summer contributed considerably to the seriousness of this condition resulting in mod.-sev. loss in yield.

MOSAIC (virus). Injury from TMV was widespread throughout the burley, dark and flue-cured tobacco growing areas of Ont. and Que.

ETCH (virus) caused sev. damage to burley tobacco in the Leamington-Harrow areas of Ont. Most of the fields were 100% infected. It was not observed on flue-cured tobacco.

OTHER VIRUS DISEASES. Several other viruses were present on tobacco plants in the field. However, very few plants were affected in each field and the losses were negligible. The viruses included the ring spot virus, streak virus, veing banding virus and several of the cucumber mosaic viruses.

Other Observations

In breeding tobacco for resistance to tobacco mosaic virus Nicotiana glutinosa has been used to impart resistance to commercial varieties of Nicotiana tabacum. It has been found that plants from such breeding, while resistant to TMV are extremely susceptible to crooked top or streak virus. Work in the Tobacco Division, Experimental Farms Service, during the last 3 years has shown that the wild tobacco species, N. ambalema, from South America, may be used to impart resistance to both mosaic virus and to crooked top or red streak virus. Attempts to combine resistance to both viruses are showing some progress; several strains at Ottawa show segregation for resistance to both virus diseases (F.H. White).

TOMATO

EARLY BLIGHT (Alternaria solani) was quite general in most commercial plantings in the North Okanagan and Thompson Valleys, B.C., in 1954. In general, leaf infection was not sev., but some fruits were affected (G.E. Woolliams). The worst epidemic of early blight observed in the decade occurred in canning crops in s.w. Ont. in 1955. In a few fields 75% of the crop was lost although some received the regular protective sprays. The hot summer hastened maturity and along with ideal infection conditions in late August favored the disease. In one field at Leamington 20% of the plants were destroyed by the collar rot phase; the plants had become infected while still in the plant beds (C.D. McKeen). Early blight was more sev. than usual in the Niagara Peninsula; it was present in most fields and extremely sev. in fields not regularly sprayed. In the laboratory plot at St. Catharines 500 staked plants suffered sev. infection on leaves and some of the fruits developed lesions at the calyx end (J.K. Richardson). A heavy infection developed in a block of vigorously growing tomatoes near Ottawa by 12 July; it caused sev. damage (K.M. Graham). Leaves and fruit of a few scattered plants were affected in an

acre field of Bounty at Charny, Que. (L. J. Coulombe). Early blight was general in tomato fields about Oromocto, N. B. Few fruit were affected but loss of foliage was considerable (S. R. Colpitts). Early blight was first seen in N. S. on an irrigated plot at Berwick on 28 June; regular applications of maneb kept the disease in check. Early blight occurred on many fields but it dit not cause serious defoliation this year (K. A. Harrison).

NAIL-HEAD SPOT (Alternaria tomato) affected fruit received in August 1944 from Hope, B. C. (G. E. Woolliams).

GREY MOLD (Botrytis cinerea) caused a stem canker of a number of plants in a greenhouse at Ridgeville, Ont. (J. K. Richardson). It affected a few tomatoes which had been left to ripen in a humid cellar at Ste. Anne de la Pocatiere, Que. (L. J. Coulombe). Several lots of ripe or nearly ripe imported tomatoes affected by this rot were received from fruit firms in Fredericton and St. John; tight packaging, careless handling and unsanitary conditions at local premises probably favored development of the rot (J. L. Howatt). Grey mold destroyed about 10% of the crop, more than that by any other disease, in the spray plots at Kentville, N. S., growth was very heavy. It was also troublesome in a spring greenhouse crop at Falmouth (K. A. Harrison).

LEAF MOLD (Cladosporium fulvum) was sev. in several greenhouses in June about Kelowna, B. C. (M. King). Because most growers in the Leamington area, Ont., now grow leaf-mold resistant varieties in the fall crop, the incidence of the disease was quite low. Vagabond and several unnamed selections originated by the Ont. Horticulture Station, Vineland, showed high resistance (C. D. McKeen). A few plants in a crop of Bay State showed traces of infection in a greenhouse in Kingston, N. S.; the grower had saved his own seed and it appeared that these plants had lost the factor or factors for resistance (K. A. Harrison).

ANTHRACNOSE (Colletotrichum phomoides) was prevalent in many crops in Essex and Kent counties, Ont.; the incidence was highest in crops grown on sandy soil (C. D. McKeen). Some anthracnose was present in canning tomatoes in Northumberland Co. (R. Wilcox). Anthracnose developed on a few crops left to mature in a cellar at Ste. Anne de la Pocatiere, Que. (L. J. Coulombe). Many spots developed on fruits from a field where anthracnose had occurred previously when they were held in storage at Kentville, N. S. The disease was even more sev. on fruits from a garden where anthracnose has occurred several times when held a week in storage (K. A. Harrison).

BACTERIAL CANKER (Corynebacterium michiganense). Infection was a tr. in a field at Ashcroft and sl. in one at Vernon, B. C., in 1954. Diseased plants were also received from Cawston (G. E. Woolliams). Two plants out of 50 were affected at Charney, Que.; 2 diseased plants were also seen at L'Islet. The identification was checked by smear preparations (L. J. Coulombe).

WILT (Fusarium lycopersici) was general about Oromocto and Hamstead, N.B.; in one field 80% of the plants were affected with loss of most of the crop (S. R. Colpitts). Some wilt also occurred in the canning crop in Northumberland Co., Ont. (R. Wilcox).

ROOT KNOT (Meloidogyne sp.) was so sev. in Japanese grower's greenhouse near Haney, B.C., that maturity of the crop was hastened and the grower had to abandon the crop (H.N.W. Toms). Root knot was sev. in a greenhouse crop at Mastai, Que. and cut the crop in half (D. Leblond).

PHOMA ROT (Phoma destructiva). A few diseased fruits were brought in from Ste. Anne de la Pocatiere, Que. (L.J. Coulombe). Although the disease was found late in the season about Quebec City, it was much less prevalent than last year (D. Leblond).

LATE BLIGHT (Phytophthora infestans) was observed in late August in the test plots at the University, Vancouver, B.C., and by the end of September was causing widespread infection (H.N.W. Toms). Late blight caused sev. damage in a planting at Indian Head, Sask. (J.E. Machacek). It was not recorded elsewhere in Sask. in 1955 (R.J. Ledingham). A number of fruits touching the ground were found infected in a small garden in Lincoln Co., Ont.; on 16 June (J.K. Richardson). This record was the first of late blight in 1955 (I.L.C.). Late blight affected a few fruits in the plots at St. Pacome, Que., but it was somewhat more prevalent on stored fruits (L.J. Coulombe). A 75% infection developed in the untreated plots at Kentville, N.S., but dry weather checked late blight development and losses were less than last year. Commercial growers sprayed their crops and no reports of loss were received. Maneb is replacing Bordeaux mixture for the control of blight on tomatoes (K.A. Harrison). Late blight was very destructive in many plantings of tomato in Queens Co., P.E.I. (R.R. Hurst).

DAMPING-OFF (Pythium sp.) was very prevalent in seedling beds and in the first transplanting in a greenhouse at Hampstead, N.B.; 15% of the crop was lost (S.R. Colpitts).

STEM ROT (Sclerotinia sclerotiorum) was prevalent in several greenhouses at Vernon, B.C., and caused 10% loss (M. King). Every plant was affected in a weedy part of a field at Nictaux, N.S., whereas only 5% were affected elsewhere. In October, many of the fruits were rotted and apothecia were found under the heavy foliage. Only a trace of stem rot was seen in the plots at Kentville (K.A. Harrison).

LEAF SPOT (Septoria lycopersici) was rather heavy on 18,000 plants of Stokesdale 4 before the plants were removed from the greenhouse at Kelowna, B.C. However, after they were set in the field the disease soon disappeared (G.E. Woolliams). Leaf spot was about as prevalent as usual in canning and early field crops in Essex county, Ont.; it caused sev. damage in a few greenhouse crops (C.D. McKeen).

LEAF SPOT (Stemphylium solani Weber). In 2 fields in s.w. Ont. a mixed infection of S. solani and Alternaria solani was found. This is the first time that I have encountered this fungus on tomato crops in s.w. Ont. (C.D. McKeen).

WILT (Verticillium albo-atrum) was prevalent in the Similkameen, Okanagan, Thompson and Upper Fraser Valleys in 1955; usually 10-35% of the plants were infected, but depending on the field and location infection ranged from a tr. to nearly 100%. In 1954 the infection was 75-100% at several points in the B.C. Interior, but on account of the unusually cool season, the plants suffered little from the disease (G.E. Woolliams). Wilt caused considerable damage to several plants in a greenhouse at Medicine Hat, Alta. (F.R. Harper). A light general infection occurred in 3 greenhouses at Kingston, N.S. (K.A. Harrison).

MOSAIC (virus) was present in most greenhouses and fields of tomatoes in the B.C. Interior; infection varied from a trace to 25% in a few cases. In 1954, 90% of the plants were sev. affected in a 10-acre field at Kamloops; the plants were grown from seed by Chinese growers, who smoked continuously while handling the plants. In other fields in the district, infection was about 1-5% (G.E. Woolliams). A few early field and canning crops were sev. affected by cucumber mosaic, tobacco etch, etc. in the Harrow-Leamington area, Ont. High virus incidence coincided with heavy aphid infestations (C.D. McKeen). As reported last year (P.D.S. 34:102), a milk spray is now being used to reduce virus infection in greenhouse tomatoes in N.S. The growers feel that the milk spray has helped to reduce the spread of mosaic, but there is a tendency for molds to grow on the milk residue and turn it black. Fruit so discolored has to be wiped. For this reason growers now discontinue spraying as the first truss is set. The subsequent spread of mosaic causes some damage (K.A. Harrison).

STREAK (double virus) was observed in 1954 affecting a few plants at Cawston, B.C. (G.E. Woolliams). About 0.5% of the Vulcan plants in a greenhouse at Edmonton, Alta., showed symptoms characteristic of double virus streak (A.W. Henry). Streak was found on two plants in a garden near a planting of potatoes at Saskatoon, Sask. Streak is rarely seen in Western Canada (T.C. Vanterpool). A sev. outbreak developed late in the fall in the spray plots at Kentville, N.S.; potatoes were being grown in an adjacent plot and mosaic was present on the tomatoes. Streak was not seen in commercial plantings (K.A. Harrison).

YELLOWS (Beta virus 1) only affected an occasional plant in the Okanagan Valley, B.C. It was more prevalent in 1954 when up to 10% of the plants were affected in some fields (G.E. Woolliams).

PURPLE TOP (virus). A disease of the yellows type was found affecting 3% of the milkweed plants examined along a highway leading to Fredericton, N.B. The virus was transmitted by means of dodder (Cuscuta gronovii) to tomato

and Green Mountain potato. The symptoms on these hosts resembled those of the bunch top (purple top) virus. All 27 plants of Datura tatula in an experimental plot at Fredericton showed symptoms of a disease of the yellows type. The virus was transmitted by grafting to tomato in which it produced typical symptoms of the bunch top virus (D. J. MacLeod).

BLOSSOM ABSCISSION. In a small garden patch of about 50 Beefsteak plants in Lincoln Co., Ont., less than a dozen fruits were developing. Soil analysis revealed that the soil was low in potash and high in nitrogen. Application of required fertilizer resulted in some improvement (J.K. Richardson).

BLOSSOM-END ROT (nonparasitic) was quite general in 1954 in the Okanagan and Thompson Valleys, B.C. The disorder appeared to be more prevalent than usual, particularly on fruit in the first trusses (G.E. Woolliams). In s.w. Ont. blossom-end rot took its usual toll of fruits that ripened early in the harvest period when transpiration was high and soil moisture low (C.D. McKeen). The disorder was apparently more general and more sev. than usual in the Niagara Peninsula, particularly in crops on heavy soils low in organic matter (J.K. Richardson). Blossom-end rot and sun scald was quite prevalent in the canning crop in early September in Northumberland and Prince Edward counties (R. Wilcox, J.E. Armand). Blossom-end rot was general in the Montreal district, Que., losses averaged about 5% (E. Lavallee). About 15% of the fruit were injured in a field at Rougemont (L. Cinq-Mars). The disorder was common about Quebec City when the first tomatoes were harvested, but it soon disappeared (D. Leblond). A few affected fruits were also noted at Ste. Anne de la Pocatiere (L.J. Coulombe). Blossom-end rot caused sl. damage in Queens Co., N.B., on account of extreme drought this year (S.R. Colpitts). The disorder was prevalent in fields in Kings Co., N.S., where the water holding capacity of the soil was low. Normal rainfall in August checked its development on the later crop (K.A. Harrison). Blossom-end rot was heavy in a local garden in Queens Co., P.E.I. (R.R. Hurst).

BLOTCHY RIPENING (nonparasitic) affected about 50% of the fruit on the first truss in a 2-acre field at Berwick, N.S., that was being irrigated frequently with nutrients added to the irrigation water; later trusses were normal (K.A. Harrison).

CHEMICAL INJURY. Less damage was noted about Saskatoon, Sask., on tomatoes and other sensitive plants than in any year since 2,4-D came into general use. Factors contributing to this improvement appeared to be (1) fewer grain fields sprayed in the area, (2) more chemicals of lower volatility being used, and (3) more careful handling of spray materials by city gardeners (R.J. Ledingham). Mod. injury noted at Hazelridge, Man. (J.E. Machacek). A few crops were injured in Essex Co., Ont., because of drift from roadside and fence-row spraying. Apart from visible fruit, leaf and stem distortion, the crop of plants mildly affected is reduced and harvesting is delayed by 2-3 weeks (C.D. McKeen).

Tomato seedlings, 600-800 per flat were sev. damaged in a greenhouse in Essex Co., Ont., when the plants were sprayed with Manzate, 1-1 1/2 lb. per 100 gal. The cortical cylinder of the hypocotyl was destroyed at the soil line and the seedling collapsed. As the vascular strands remained intact and uninjured, the seedlings survived, although stunted and deformed. Subsequent tests proved the toxicity of maneb preparations to tomato seedlings in the greenhouse (C.D. McKeen).

FRUIT CRACK (nonparasitic) caused sl. damage in Queens Co., N.B. (S.R. Colpitts). Fruit crack was also prevalent about Ottawa, Ont., if one may judge by tomatoes on the local market (I.L.C.).

NUTRIENT DEFICIENCY. Some 10,000 plants in shallow flats were left for 2 weeds under trees in an orchard at Pereau N.S., where they were exposed to heavy rains. The plants were pale and when exposed to the sun developed necrotic lesions that resembled spots caused by Septoria but no organism was found. An application of fertilizer corrected the condition, but the plants had received a severe check (K.A. Harrison).

SUN SCALD caused sl. damage in a planting at Hazelridge, Man. (J.E. Machacek).

TURNIP

CROWN GALL (Agrobacterium tumefaciens). Affected specimens were received from Milestone, Sask. (T.C. Vanterpool).

SOFT ROT (Erwinia carotovora) caused heavy losses to 1500 bags stored at Harbour Grace and St. John's, Nfld. (G.C. Morgan).

CLUB ROOT (Plasmodiophora brassicae) was found for the first time in the Terrace district, B.C. (W.R. Foster). Diseased swede turnips were received from Deschambault, Frampton and Thedford Mines, Que. (D. Leblond). Most farmers in Kent Co., N.S., are able to keep club root in control in swede turnips by following a 7-year rotation. Each year, however, 2 or 3 growers bring in samples of sev. infected plants (K.A. Harrison). Club root of swedes has been prevalent in the Pawnal, Hazelbrook, Vernon River and Brackley districts, Queens Co., P.E.I.; sev. infestations have been noted in these districts over the past several years (G.W. Ayers). Infection was heavy in garden plots in Conception and Trinity Bays, Nfld., and mod.-heavy in 5 commercial plantings at Conception Bay and 3 farms at Lethbridge, Bonavista Bay. One of the latter fields had only been cleared in 1954 (G.C. Morgan).

BLACK ROT (Xanthomonas campestris). About 1% of the plants were affected in a field of Laurentian at Guernsey Cove, Kings Co., P.E.I., ; the disease, in small amounts, appears to be scattered throughout the province (G.W. Ayers, J.E. Campbell).

STERILITY (virus). About 2% of the plants were affected in a seed plot of swede turnips in York Co., N.B. (D.J. MacLeod).

LATENT VIRUS. A latent virus was detected in stecklings of Laurentian swede grown in the field in York Co., N.B. in 1954. Although it produces no symptoms on infected swedes, it was transmitted by aphids and by grafting. When Physalis floridana plants are infected by the virus, the plants show a striking yellowing of the veins, which eventually forms a yellow net pattern on the leaves (J.P. MacKinnon).

BROWN HEART (boron deficiency) was detected in a shipment of swedes examined by a fruit and vegetable inspector at Glace Bay, N.S. in May. Two growers in Kings Co. brought in affected roots in October (K.A. Harrison). Brown heart affected 5% of the Laurentian turnips in 2 commercial fields at Lethbridge, Nfld. (G.C. Morgan).

CHEMICAL INJURY (2,4-D spray drift). Two cases of injury, received from Pictou and Truro, N.S., were traced back to application of weed killers in nearby grain fields; estimated damage was 25% (K.A. Harrison).

Survey of the Vegetable Market Gardens in the Lower Fraser Valley for Disease

H. N. W. Toms

The Lower Fraser Valley from Chilliwack to the islands of the Fraser River delta is the most concentrated vegetable growing area in B.C. and grows approximately one third of the produce required to supply the wholesale market of the Greater Vancouver area throughout the year. Although there is some overlapping, the local produce is replaced in spring and winter by comparatively low-priced imports from California, Texas and Mexico and in the spring by earlier crops from adjacent Washington and Oregon. The detailed figures will not be given here. For the individual crops, the percentages produced in the Lower Fraser Valley or elsewhere in B.C. reaching the Vancouver market naturally vary considerably but for the principal crops they are 20-40% of the total. The Vancouver market also receives substantial quantities of cucumbers, field onions, potatoes and tomatoes from elsewhere in B.C. The remainder are imported. These figures do not include canning crops.

The market gardens are almost entirely on flat terrain adjacent to the present channels of the river or in old channels long since silted up. Soils in use are predominantly clays (Monroe and Ladner types) or peat (muck soils of partially decomposed sphagnum moss) with an occasional garden extending up loam slopes. Since the war there has been a noticeable decrease in local vegetable production owing both to the high cost of land and to the conversion of farm lands to residential and industrial use. Such vegetables as beans and peas for canning, beets, corn, potatoes and turnips, are usually grown as rotation crops on mixed farms rather than in market gardens.

The three main growing areas are the Chilliwack, the Surrey-Cloverdale, and the Fraser River Delta, comprising some 75 market gardens which are all, with one exception, cultivated by Chinese tenant farmers, employing Chinese labor. A few of the younger growers, born in Canada, have bought their own gardens. The most noticeable feature is their intensive cultivation, crops being interplanted, and, as one crop reaches maturity and is harvested, the other is already well established.

The growers seem well-informed about application of fertilizers, probably because of frequent visits by trusted salesmen from agricultural chemical companies, but, in general, and mainly because of the language problem, the Chinese grower is not conversant with diseases and pests and their control.

Some 30 gardens were visited in 2 days during the last week of August in company with an agricultural chemicals salesman whose knowledge of the areas and the growers was very helpful.

Major Crops

Of the major crops examined, no disease was seen on carrots, green onions, radish or rhubarb.

Bean

Grey Mold (Botrytis cinerea) slightly affected pods of pole beans in a few gardens.

Cabbage

Club Root (Plasmodiophora brassicae) was present in a few fields but is controlled by proper rotation. However, it was heavy in owners' gardens, near houses, on cabbage, Chinese cabbage, a Chinese chard-like crucifer and light on a Chinese white turnip.

Head Splitting was seen in several gardens as a result of excess moisture following a dry period.

Cauliflower

Club Root (Plasmodiophora brassicae) was seen occasionally but the affected plants were heading up normally.

Root Rot (?Erwinia carotovora). About 3% of the plants were girdled following attack by maggots in one garden.

Whiptail (molybdenum deficiency). What appeared to be this disease was seen in one 5-acre field. There were several patches of depauperate plants with elongated striate leaves in low spots where the water table had remained high long after transplanting.

Celery

Late Blight (Septoria apii-graveolentis). Tr. infection was seen in one garden and the crop a total loss in another in which there seemed to have been no attempt to control the disease.

Cucumber

Leaf Spot (Alternaria sp. associated) was present in 3 gardens; the pathogen apparently was only weakly parasitic.

Chemical Injury. Burn from ammonium sulphate fertilizer was sev. in one garden.

Lettuce

Molds. Outer leaves of some plants were disfigured by saprophytic molds and Botrytis cinerea. There were some misses, the cause of which was undetermined.

Potato

Late Blight (Phytophthora infestans) was present in all gardens that were growing potatoes. Although most of the crop had been lifted, foliage of the unharvested crop was 100% infected; apparently no spraying was done.

Tomato

Late Blight (Phytophthora infestans). Foliage infection was general but not sev. whereas in some cases 50% of the fruit was infected. Only determinate, staked varieties are grown.

Stem-end Cracking was common as a result of recent rains.

Minor Crops

No disease was seen on broccoli, brussels sprouts, kale, spinach, Swiss chard and sweet corn.

Misses were observed in one small patch of beets which probably resulted from damping-off of plants in the seedling stage. Beets are only grown for harvesting as baby beets. Onions are not grown at the Coast in any quantity for bulbs. Saprophytic molds were fairly common on damaged and mature lower leaves. Fruits of sweet pepper were filling poorly owing to the cold wet weather of early summer but no diseases were seen.

Uncommon Crops

Uncommon crops are endive, kohlrobi, vegetable marrow, pumpkin, squash, pea and soybean. A trace of powdery mildew (Erysiphe polygoni) was seen on peas in two owners' gardens. A leaf spot, overgrown by Botrytis cinerea, was seen on over-mature plants. A necrotic leaf spot of undetermined origin was seen on old pumpkin leaves. The other crops were free of disease.

IV. DISEASES OF FRUIT CROPS

A. POME FRUITS

APPLE

CROWN GALL (Agrobacterium tumefaciens). High incidence of crown-gall was found in nursery stock of apple, pear, and peach at Kelowna and Vernon, B.C., when the trees were dug in the fall of 1954; in some cases, 75% of the trees were rejected upon inspection. (D.L. McIntosh)

FIRE BLIGHT (Erwinia amylovora) caused sev. damage to McIntosh and Wealthy trees at Kelowna, B.C.; a large number of new shoots was blighted (D.L. McIntosh). Fire blight was common on susceptible crab-apple varieties at Calgary and Lethbridge, Alta. (M.W. Cormack). It was also common on apple about Edmonton (W.P. Campbell). Fire blight was fairly common around Saskatoon, Sask., in 1955; specimens were also received from Swift Current (R.J. Ledingham). In a local garden, a wild crab that was not attacked a few years ago was sl.-mod. infected, while a common hybrid crab, mod. infected earlier, only showed tr. infection this year (T.C. Vanterpool). Specimen trees on home grounds at Winnipeg, Man., were mod.-sev. infected (W.A.F. Hogborg). Scattered twig blight infections were observed in McIntosh and Greening trees bordering a Bartlett pear orchard at St. Catharines, Ont. (G.C. Chamberlain). The outbreak of fire blight observed last year in orchards about Hemmingford and Franklin Center, Que., progressed but slightly in 1955. Although the same trees showed live cankers and some new infections, the disease was not observed in new areas. The weather was unfavorable for its spread (L. Cinq-Mars). Infection was trace on a McIntosh tree at Montgomery and very sev. on one at L'Islet (L.J. Coulombe).

RUST (Gymnosporangium spp.). About 25% of the leaves and the odd fruit of various varieties bore infection spots of G. juniperi-virginianae at the Horticulture Station, Smithfield, Ont. (H.N. Racicot, J.A. Parmelee). Traces of G. clavipes were present in most orchards visited in the Annapolis Valley, N.S., but 8% of the fruit were infected in one of Red Delicious (J.F. Hockey).

BROWN ROT (Monilinia fructicola). A few infected fruits were found at harvest and in storage at St. Catharines, Ont.; infection occurred through some injury (G.C. Chamberlain).

ANTHRACNOSE (Neofabraea malicorticis). A few cankers were found on occasional McIntosh trees in an orchard at Queens Bay, B.C. (D.L. McIntosh).

PERENNIAL CANKER (Neofabraea perennans). Scattered cankers were present in orchards on Newtown, Rome Beauty, and Wagener, at Kamloops, Vernon, Kelowna, and Penticton, B.C., being most apparent on poorly-cared-for or abandoned orchards. In some orchards, vigor of certain limbs was reduced (M.F. Welsh, F.W.L. Keane).

BLUE-MOLD ROT (Penicillium expansum). A sl. amount of rot was found in a shipment of apples from Ont. to Winnipeg (J.E. Machacek). Specimens were received from the market at Quebec (D. Leblond).

BLACK ROT (Physalospora obtusa) was much more prevalent than usual in N.S.; tr.-2% calyx-end infections were observed in many orchards (J.F. Hockey). Black rot was sev. in one lot of apples on the local market, Charlottetown, P.E.I., on 20 April (R.R. Hurst).

PHYTOPHTHORA ROT (P. cactorum). Fruit infections were observed on Delicious apple, Bartlett pear, and Moorpark apricot in one orchard at Oliver, B.C., where water from sprinklers played over the lower branches of the trees. In 1954, the organism was isolated from green McIntosh fruit lying on the orchard floor in orchards at Penticton and Rutland (D.L. McIntosh).

POWDERY MILDEW (Podosphaera leucotricha) was present throughout the Okanagan Valley. Leaves and one-year shoots were sev. infected, but fruit infection was not found (D.L. McIntosh). Powdery mildew was common in the Laboratory orchard, St. Catharines, Ont., where organic fungicides other than dichlone were used in the spray program. Sulphur was also effective. Terminal shoots were commonly stunted and foliage dried out (G.C. Chamberlain). Traces occurred on a few trees at the Horticulture Station, Smithfield (H.N. Racicot). Infection was mod. on seedling trees but very slight on nearby young apple trees in a nursery, St. Jean Baptiste, Que. (J. Ringuet). A sev. infected twig was received from Aulac, N.B. (D.W. Creelman). A tr. occurred on wild apple trees in Kings Co., P.E.I. (R.R. Hurst).

PINK-MOLD ROT (Trichothecium roseum) was rather common on McIntosh and Winesap apples, with a large number of scab lesions per fruit at Oliver, Kelowna, and Vernon, B.C., when examined 15 Dec. 1954. Some infection also occurred through the lenticels (D.L. McIntosh).

SCAB (Venturia inaequalis). In 1955, losses from apple scab in the B.C. interior were confined to the Salmon Arm and Kootenay districts. Unsprayed trees about Salmon Arm were heavily infected and fruit unmarketable. About Creston, heavy losses occurred as a result of heavy infection in early June, followed by abundant rainfall in June and July. In 1954, the Okanagan Valley suffered sev. losses from summer and late season scab (D.L. McIntosh). Scab was not common in Saskatchewan in 1955. It was seen in a Saskatoon garden (R.J. Ledingham), and scabby specimens were received from Fairlight (T.C. Vanterpool).

Scab infection was sev. on unsprayed trees in the Laboratory orchard, St. Catharines, Ont., but good control was obtained with all the fungicides tested except Consul colloidal sulphur. There were 4 well-marked infection periods, two occurring at the cluster-bud stage on 20 and 25 April. First infection on the leaves was observed on 11 May at early petal fall when a 3rd infection period occurred. A 14-hour wetting period on 25 May spread infection to the fruit, which was observed 9 June. From then on there was very little further development of scab. In general, scab was well controlled in local orchards, although sev. infection was observed in a few orchards. Last spring, it was common on Winesap apples received from Lambton Co. and in McIntosh from the Brighton district; it was also present on Winesap apples from B.C., taken at Toronto (G.C. Chamberlain). A tr. of scab occurred in 2 orchards examined at Smithfield, and 10-15% of the fruit were scabby in a third (H.N. Racicot).

In s.w. Que., weather conditions were unfavorable for scab development. The first ascospore discharge occurred 25 April, before the buds were open on trees in most districts. Light infection periods occurred on 8, 19, and 25 May and 12 June, but there was no difficulty in keeping the trees protected with fungicides. In consequence, most orchards were exceptionally clean. In a few, late scab developed in September from early infections that had not been properly controlled (L. Cinq-Mars).

Apple scab was sev. in orchards and garden stands examined at L'Islet, L'Isletville, Montmagny, and Charny, on the lower St. Lawrence. The trees had apparently not been sprayed; McIntosh was the most sev. affected (L.J. Coulombe).

In the Saint John River Valley, N.B., ascospores were mature on 17 May, and the first discharge took place on 26 May, when McIntosh buds were at the full pink stage. On 31 May, when the weather was very favorable for infection, a heavy discharge occurred during full bloom. Growers were advised to spray during the bloom period and, because it was prolonged, some growers applied 2 separate sprays. During the rest of the season, the weather was mostly fine and dry. Several large growers used concentrate mist sprayers and professed that they were well satisfied with the results. In general, the apple crop was exceptionally free of scab (S.F. Clarkson).

Ascospores of V. inaequalis were mature at Kentville, N.S., before the buds had broken at the tips. An 80-hr. infection period occurred as the earliest varieties were showing green tips. It was followed by another sev. infection period about 10 days later; whereupon no further infections were possible for 3 weeks. The infrequent wet periods did not interfere with spraying. Apple scab was not serious in 1955. Five well-timed applications were sufficient to counteract the sev. infection periods. Primary leaf infections were observed 22 May, and by mid-July, not over 11% scabby foliage was present on any sprayed plot, while in most plots, less than 1% was scabby. No appreciable amount of pin-point scab developed in the fall (J.F. Hockey).

There were only 2 heavy ascospore discharges in P.E.I. in 1955. Growers who sprayed regularly grew a crop showing little scab infection on leaves and fruit (G.W. Ayers). However, scab was severe in an unsprayed orchard examined in Queens Co. (W.L. Seaman).

MOSAIC (virus). Infection was 100% in trees newly grafted to Bough Sweet at Lakeville, N.S.; the infection was traced to the source of the scions (J.F. Hockey).

'PITTING' (?virus) was found affecting trees in orchards in 5 districts in the Okanagan Valley, B.C. So affected were about 80% of all trees where Virginia Crab was used for the framework. These trees are weakened, framework limbs are bent and twisted, and the bark on the trunk is longitudinally depressed. The diagnostic symptom is an irregular growth of wood beneath the cambium so that the bared surface resembles that of a peach pit. The presence of this pitting apparently accounts for the breakdown of Virginia Crab as a framework stock in B.C. and other parts of North America. Transmission of the disease is being attempted (M.F. Welsh, F.W.L. Keane).

MAGNESIUM DEFICIENCY. Typical symptoms of magnesium deficiency was observed on McIntosh and Melba in an orchard at St. Laurent (Ile d'Orleans), Que.; leaves were mod. injured (J. Ringuet, H.N. Racicot)

RUSSETTING (spray injury) was very prevalent in the Saint John River Valley, N.B.; 25-30% of the harvested fruit was affected (J.L. Howatt).

SCALD. Scattered fruits and leaves showed extensive scald areas on McIntosh in an orchard in Welland Co., Ont.; temperatures had been high and a heavy residue of sulphur paste was present (G.C. Chamberlain).

PEAR

FIRE BLIGHT (Erwinia amylovora) affected a small percentage of Bartlett fruits in several orchards at Naramata, B.C. The infections were noted following a hail storm that damaged the fruit. The rot in these fruits was firm and typical of symptoms observed when green pears are inoculated with E. amylovora. In 1954, fire blight was general in an orchard of Anjou at Kelowna and caused the death of a large number of limbs in the affected trees (D.L. McIntosh). Scattered infections were observed on Bartlett in an orchard at Bronte and one of young trees at St. Catharines, Ont.; damage was sl.-mod. In experiments in 2 local orchards, satisfactory control of fire blight was obtained with 3 applications of streptomycin sulphate at 100 p.p.m. made during bloom. However, some injury was noted on the leaves on the lower part of the trees. In one orchard, chlorotic areas (Fig. 2) were conspicuous on scattered leaves for a week until they again assumed their normal green. Some leaves cracked about the chlorotic area and then became ragged. There was no defoliation. In the other orchard, where an air-blast sprayer was used, the injury was more prevalent and pronounced and chlorosis persisted longer. It is believed that the injury appeared where too much spray was applied (G.C. Chamberlain).

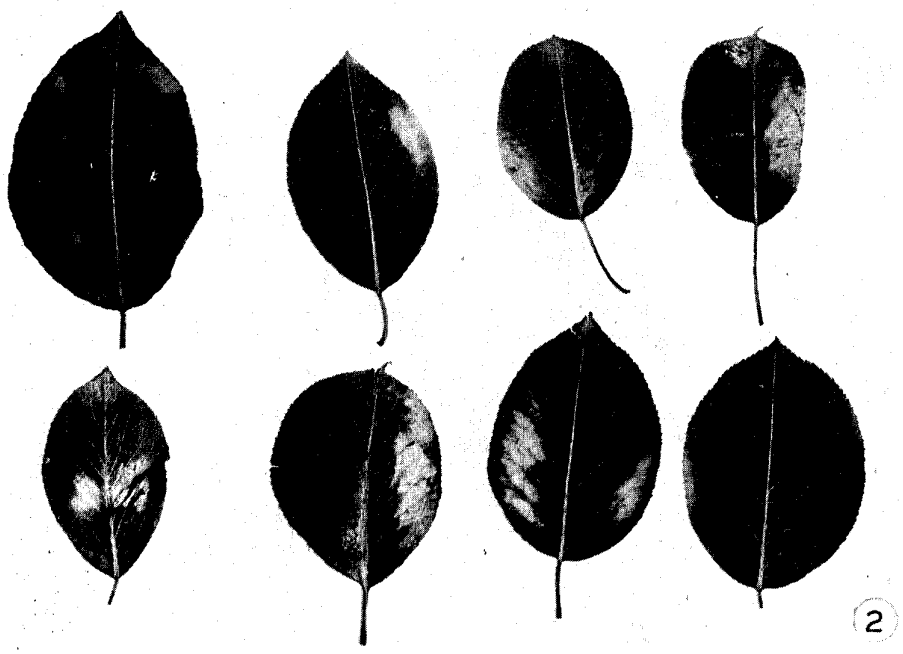

Fig. 2. Chlorotic areas on leaves of Bartlett pear as a result of application of streptomycin to the foliage.

SOOTY BLOTCH (Leptothyrium pomi) caused extensive blotching and clouding of Bartlett fruits in an orchard at Port Dalhousie, Ont. Sooty blotch was commonly observed on Kieffer and was reported from a number of orchards in the district (G. C. C.).

BROWN ROT (Monilinia fruticola) affected a few Bosc fruits showing insect or other injuries at St. Catharines, Ont. (G. C. C.).

PHYTOPHTHORA ROT (P. cactorum) affected a few low-hanging clusters of fruit at St. Catharines, Ont. (G. C. C.).

SCAB (Venturia pirina) sev. infected 75% of the fruit of Flemish Beauty in an orchard at St. Catharines, Ont.; foliage infection light. In Lincoln Co., about 20% of fruit on Bartlett trees in a sheltered part of the orchard were sev. blemished (G. C. Chamberlain). Scab affected 2% of the fruit on Bartlett pear at Kentville, N. S. (C. O. Gourley). The only pear tree in an orchard at Brackley Point, P. E. I., was severely defoliated by scab (W. L. Seaman).

STONY PIT (virus). An inspector, who submitted affected Anjou pears, reported 9% of the fruit in a car lot shipment from B. C. received in Ottawa were so affected (H. N. Racicot). What appeared to be stony pit was found affecting 13 out of 20 Flemish Beauty trees in an orchard at Summerland, B. C.; all fruits unmarketable. Although not recorded previously on this variety, the symptoms were identical with those of stony pit on Bosc; transmission attempted (M. F. Welsh, F. W. L. Keane). Fruit from two affected Anjou trees at St. Catharines, Ont., were unmarketable (G. C. Chamberlain).

DIE-BACK (non-parasitic) was prevalent on Kieffer trees at Vineland, Ont. A die-back of young branches and of fruiting branches during bloom was associated with poor drainage and damage of the crown (G. C. C.).

SPRAY INJURY. A mod. amount of foliage injury occurred in a Bartlett orchard at Port Dalhousie, Ont., following application of parathion when the temperature was 90°F. (G. C. C.).

QUINCE

LEAF BLIGHT (Fabraea maculata). Sev. infected leaves were received from Kitchener, Ont. (H. N. Racicot) and from a nursery near St. Thomas (H. S. Thompson).

RUST (Gymnosporangium clavipes) affected a few fruits at Kentville, N. S. (C. O. Gourley).

B. STONE FRUITS

APRICOT

BLACK ROT (Dibotryon morbosum). A tr. infection was observed at the Farm, Kentville, N. S. (C. O. Gourley).

WILT (Verticillium albo-atrum). A small percentage of trees were found affected in some orchards in the South Okanagan Valley, B. C. (G. E. Woolliams).

RING POX (virus). See Twisted Leaf of Cherry.

CHERRY

BLACK KNOT (Dibotryon morbosum) was mod. infecting young cherry trees in plantings at Loretteville and St. Cyrille, Que. (L. J. Coulombe). A sl. infection was observed on P. virginiana along a fence at St. Thomas d' Aquin (R. Crete). A sev. infection was recorded on sour cherry at Charlottetown, P. E. I. (J. E. Campbell).

LEAF SPOT (Higginsia hiemalis) caused moderate defoliation of sour cherries in the Collingwood district, Ont., where growers had not sprayed. Sev. premature defoliation occurred also in unsprayed blocks of sour cherries at St. Catharines (T. R. Davidson). The disease was more prevalent in the district than usual as it continued to develop quite late in the season (G. C. Chamberlain). Leaf spot appeared to be general on P. pensylvanica about Fredericton, N.B. (R.H. Bagnall). Sl. defoliation was noted on sweet cherry at Tupperville, N.S. (C.O. Gourley).

BROWN ROT (Monilinia fruticola) caused almost complete loss of the sweet cherry crop in the West Kootenay, B.C.; the spring was wet and cool, and rains were heavy at picking time (J. M. Wilks). Brown rot was not an important disease of cherries in the Niagara Peninsula, Ont. About 10% of the fruit were destroyed on unsprayed sweet cherry trees at St. Catharines; it also caused mod. damage in a sour cherry orchard at Port Dalhousie where the fruit was bruised by a storm and the cherry fruit fly was not well controlled (G. C. Chamberlain). A tr. of blossom blight was noted on one sweet cherry variety at Kentville, N.S. (C.O. Gourley).

CROWN ROT (Phytophthora cactorum). Only 2 cases of crown rot were observed on Van cherry this year at Eriksson, B.C., in comparison to a very heavy infection in 1954. In both cases, the trees were showing some decline and the rot had started to move up the trunk (J. M. Wilks).

POWDERY MILDEW (Podosphaera oxyacanthae) affected about 20% of the fruit in a Lambert cherry orchard at Okanagan Falls, B.C. (D. L. McIntosh).

WILT (Verticillium albo-atrum). About 25% of the sweet cherries in a block at the Farm, Summerland, B.C., are affected in varying degrees. The condition of the trees was somewhat improved over that of 1954 (G. E. Woolliams).

BLACK CANKER (virus). What appears to be this virus disease was found for the first time in the Kootenays, B.C., when it was observed sev. infecting 3 Lambert trees and spreading into an adjacent one in an isolated orchard at Broadwater, B.C. The trunk and lateral branches were affected by large black cankers. Removal of trees was recommended (J. M. Wilks). Although the disease has not previously been reported to the Survey, it was first found in the Okanagan Valley in a number of Royal Ann trees at Penticton. Transmission was obtained in one tree inoculated in 1939, symptoms appearing in 1942 (T. B. Lott).

LITTLE CHERRY (virus). Symptoms were much milder this season in the Creston Valley, B.C., than for several years. Sev. symptoms were less prevalent and fruit attained a better size and stage but were still lacking flavor (J. M. Wilks). This serious disease is still unreported in the Okanagan Valley (T. B. Lott).

MOTTLE LEAF (virus). Two Bing trees were found mildly infected in the Creston Valley, one at Wynndel and the other at Erickson, B.C.; two trees were found previously (J.M. Wilks).

NECROTIC RUSTY MOTTLE (virus) was found for the first time in the Kootenays, B.C.; one tree at Renata was affected by a sev. strain which caused almost complete defoliation, whereas the other at Eriksson was affected by a mild strain. Removal of trees recommended (J.M. Wilks). Some workers consider necrotic rusty mottle to be the same as Lambert mottle which has been recorded at least once previously in the Kootenays (M.F. Welsh).

RASP LEAF (virus). This very slow-acting virus disease was found in 1954 in one old tree and in about 12 young trees in an orchard at Vernon, B.C.; this orchard is about 40 mi. n. of the nearest previously known infection in the Okanagan Valley (T.B. Lott).

SMALL BITTER CHERRY (virus). One Bing tree was found in the Okanagan Valley in 1955. It is now recognized that small bitter cherry in sweet cherry is caused by the same virus which causes Western X-disease in peaches and chokecherry. For some years, Western X-disease has been less conspicuous than formerly in the Okanagan Valley (T.B. Lott).

Paul R. Fridlund and T.H. King (Plant Dis. Reptr. 39: 540-546. 1955) report finding chokecherries infected with X-disease virus in 76 out of the 87 counties in Minnesota. They conclude that "it probably is present in all adjacent States and Canadian Provinces". It has been reported in Wisconsin by E.M. Stoddard (Plant Dis. Reptr. 22: 386. 1939).

TWIST LEAF (virus) of Sweet Cherry (Fig. 3) and RING POX (virus) of Apricot (Fig. 4) have shown slow but steady spread in recent years in the Okanagan and Similkameen Valleys, B.C. It is of commercial importance in only a few orchards. Under natural conditions, they have shown a strong tendency to occur in the same orchards or the same locality. Experimentally twisted leaf has been obtained in cherry by budding from apricot naturally infected with ring pox. Ring pox or a disease very similar to ring pox was obtained in apricot when the reciprocal experiment was made. The relationship between the two diseases is not yet clear. Twisted leaf is now known to infect sweet cherry with or without symptoms, sour cherry with or without symptoms, and peach and apricot with symptoms not yet determined. In 1954, in one sweet cherry orchard of 700 trees, about 10% were affected; some trees very severely (T.B. Lott). Twisted leaf was observed on a Bing tree at Erickson, the first report in the Kootenays. Fruit symptoms, which are rarely observed, were also present (J.M. Wilks).

YELLOWS (virus). Symptoms of yellows were very prevalent and appeared earlier than usual in Lincoln Co., Ont. Affected sour cherry trees ranged from zero to 45% in the various orchards. Defoliation in affected trees ranged from a tr. to 50% of the leaves. Old trees appeared to be more sev. affected by yellows than young ones. The very early spring, which induced early

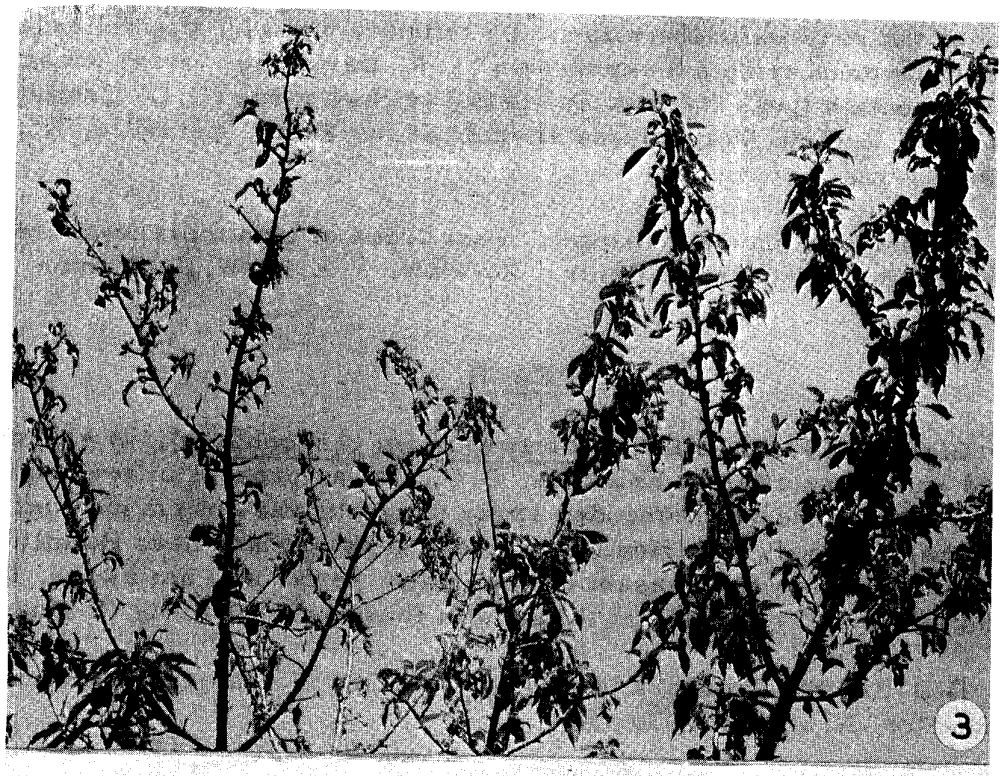

Fig. 3. Effect of infection by twisted leaf on sweet cherry trees.

Fig. 4. Apricot fruit from tree affected by apricot ring pox.

unfolding of the buds while the mean daily temperature was slightly under 60°F., undoubtedly favored symptom expression (T. R. Davidson). Many orchards in the district contain trees infected by cherry yellows virus (G. C. Chamberlain). An odd tree of English Morello was affected at the Farm, Kentville, N. S. (C. O. Gourley).

GUMMOSIS (cause unknown). Four trees of Montmorency were mod. - sev. affected in an orchard at Central Royality, P. E. I. (W. L. Seaman).

PEACH

CORYNEUM BLIGHT (Clasterosporium carpophilum). A sl. infection was noted on all varieties at Erickson, B. C.; it was present in sev. form only in orchards where the recommended spray program was not carried out (J. M. Wilks). A mod. infection was present in an orchard near Hamilton, Ont.; many minute lesions were present on the fruit. As far as I am aware, this is the first time in many years that it has been found in s. Ont. (G. C. Chamberlain).

DIE-BACK (Cytospora leucostoma) caused sl. damage in an orchard nr. Grand Pre, N. S. (C. O. Gourley).

SCAB (Fusicladium carpophilum) disfigured 50% of the Red Haven fruit in an orchard at Annapolis, N. S. (C. O. G.).

BLACK KNOT (Dibotryon morbosum). Stromata were present in orchards at Grand Pre, Avenport, and Canard, N. S., although few mature perithecia with ascospores were found (C. O. G.).

BROWN ROT (Monilinia fructicola) caused sev. damage to a carlot of Elberta peaches from California examined at Lethbridge, Alta. (M. W. Cormack). Brown rot caused extensive losses to packaged fruit from the Niagara Peninsula in storage, during transit, and at market outlets. Delay in disposing of the fruit increased the loss. About 5-15% of the fruit rotted in the orchard, following damage by hurricane Connie, but by far the greatest loss occurred in harvested fruit (G. C. Chamberlain). Brown rot caused 10% loss of fruit in an orchard at Tupperville, N. S. (C. O. G.).

CANKER (Nectria cinnabarina). Trace observed in an orchard at Grand Pre, N. S. (C. O. G.).

POWDERY MILDEW (Sphaerotheca pannosa) was quite general on some early varieties at St. Catharines, Ont.; most terminal twigs were infected on one variety only (G. C. Chamberlain).

LEAF CURL (Taphrina deformans) occurred on unsprayed trees growing nr. Okanagan Lake, B. C., where humidity of the air is higher than elsewhere in the area. About 1% of the foliage was affected (G. E. Woolliams). One of the

worst epidemics ever observed occurred in the Niagara Peninsula, Ont., in 1955. The disease was present in most orchards, and in some the trees were completely infected. In a few instances, twig and fruit infection occurred. On account of the early season, some growers did not spray their trees in time to protect them (G.C. Chamberlain). Infection was sev. on 3 trees in a home garden at Beaverton (H.N. Racicot). A tr. was observed in several orchards in Kings Co., N.S. (C.O. Gourley).

WILT (Verticillium sp.) was observed on a single tree at St. Catharines, Ont. In a nursery planting of 2-year-old trees of 2-3 acres, 10 trees were affected at Fonthill (G.C. Chamberlain).

BACTERIAL SPOT (Xanthomonas pruni) developed and spread rapidly in the St. Catharines-Jordan area, Ont., as a result of wind-blown rain and damp weather in August. Infection was mod.-sev. on leaves, causing partial defoliation, and sl. on the fruit (G.C. Chamberlain). Traces present on the leaves at Grand Pre, N.S. (C.O. Gourley).

YELLOWS (virus). An affected branch was received from Simcoe, Ont.; a single tree said to be affected in the orchard (G.C. Chamberlain).

CHEMICAL INJURY. Trees in the first 3-4 rows along the edge in an orchard at St. Catharines, Ont., suffered rather sev. foliage injury from drift of powdered cyanamid applied to an asparagus planting alongside (G.C. Chamberlain).

PLUM

BLACK KNOT (Dibotryon morbosum) had infected 29 of 40 trees in a nursery at Rougemont, Que. (J. Ringuet). Diseased specimens were received from Ste. Scholastique (H.N. Racicot). Neglected or uncared-for cultivated plums as well as wild chokecherry were 100% infected about Kentville and Wolfeville, N.S. New infections appeared about 10 June, and about 25% of the new growth had to be pruned out to remove these infections (C.O. Gourley). Affected branches of Damson plum were received from Jamestown, Bonavista Bay, Nfld. (H.N. Racicot).

SCAB (Fusicladium carpophilum). Affected specimens were received from Ste. Scholastique, Que. (H.N. Racicot).

SHOT HOLE (Higginsia prunophorae). What appeared to be this disease caused mod. damage in a 2-acre planting of Italian prune nr. Abbotsford, B.C.; no fungicide had been applied (R. Stace-Smith).

BROWN ROT (Monilinia fruticola). Tr. infections of blossom blight and later of brown rot were observed on plum at the Farm, Kentville, N.S. (C.O. Gourley).

POWDERY MILDEW (Podosphaera oxyacanthae) specimens received from Manning, Alta. (A.W. Henry).

PLUM POCKETS (Taphrina communis). Specimens were received from 3 widely scattered places in Sask. (R.J. Ledingham, T.C. Vanterpool), from Victoriaville and St. Damien in Que. (D. Leblond) and from a garden at Moncton, N.B. (P. Grainger). A small block of unsprayed Burbank trees were completely affected at the Farm, Kentville, N.S. The disease was widespread in the Annapolis Valley, and where no control measures were applied most of the fruit were infected. (C.O. Gourley).

PRUNE DWARF (virus) affected the odd Burbank tree at the Farm, Kentville, N.S. (C.O. Gourley).

CHLOROSIS (lime-induced) was sev. on plum and mod.-sev. on sand cherry at Oak Bluff, Man. (J.E. Machacek).

SCALD (high temperatures) affected 25% of the fruit of Shiro plum in an orchard at St. Catharines, Ont.; damaged fruit developed brown rot (G.C. Chamberlain).

SAND CHERRY

POWDERY MILDEW (Podosphaera oxycanthae). Specimens received from Manning, Alta. (A.W. Henry).

C. RIBES FRUITS

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola) sev. infected black currants at Montmagny and L'Islet and caused premature defoliation; a poor crop was harvested (L.J. Coulombe). Rust was heavy in garden patch at Moncton, N.B. (S.R. Colpitts). Rust was already causing defoliation of Kerry and Clipper black currants at the Farm, Kentville, N.S., by 20 July (C.O. Gourley). At the Farm, Charlottetown, P.E.I., rust was absent on Crusader and very heavy on Climax, Niagara and Saunders black currants; and tr. on Stephens and Red Cascade and mod. on Red Lake red currants (R.R. Hurst). A mod. infection was noted on black currants at Springfield (J.E. Campbell).

ANTHRACNOSE (Drepanopeziza ribis). A 10% infection was recorded on red currant at East Lawrencetown, N.S. (C.O. Gourley). Infection was mod.-sev. on Red Lake currants in a garden in Queens Co., P.E.I. (R.R. Hurst).

LEAF SPOT (Mycosphaerella ribis). A tr. infection was seen on currants and gooseberries at the Farm, Kentville, N.S. (C.O. Gourley).

POWDERY MILDEW (Sphaerotheca mors-uvae) was sl.-mod. on black and red currants in gardens at Lethbridge and sev. on a black currant specimen received from Medicine Hat, Alta. (F.R. Harper).

GOOSEBERRY

BERRY ROT (Glomerella cingulata) affected most of the fruit on a few bushes in a home garden at Ottawa, Ont. This parasite appears to be rare on cultivated gooseberry although reported by Weiss on currants in the U.S. (D.B.O. Savile).

LEAF SPOT (Mycosphaerella ribis (Fckl.) Feltg.) mod. infected O271 in the plots at Charlottetown, P.E.I. (R.R. Hurst, D.B.O. Savile).

RUST (Puccinia caricina) Pycnia and aecia found on gooseberry leaves received from Beaverlodge, Alta. (W.P. Campbell). A tr. was found on Captivator at the Station, Kentville, N.S. (C.O. Gourley).

POWDERY MILDEW (Sphaerotheca mors-uvae) was noted on a few bushes at Medicine Hat, Alta. (F.R. Harper). In a White Smith planting at Waterville, N.S., 85% of the fruit in an estimated crop of 2000 qt. was worthless on account of mildew. All young shoot growth was infected in this and a 1/2-acre planting of non-bearing bushes. This variety is very susceptible (C.O. Gourley).

D. RUBUS FRUITS

RASPBERRY

CROWN GALL (Agrobacterium tumefaciens) affected 10% of the Trent and 1% of the Newburgh plants in a nursery at Compton, Que., and 55% of the Newburgh plants in a 2-acre planting at St. Amable (J. Ringuet).

GREY MOLD (Botrytis cinerea) was generally present on fruit in the Lower Fraser Valley, B.C.; losses were up to 20% in some plantings (H.N.W. Toms). About 20% of the plants were affected by a wilt in a planting at Truro, N.S.; isolations yielded B. cinerea (D.W. Creelman).

SPUR BLIGHT (Didymella applanata) caused mod. infection of all varieties in the Lower Fraser Valley, B.C. (R. Stace-Smith). The disease was heavy in a garden patch at Edgewood (M.F. Welsh). Spur blight was observed in several gardens in Saskatoon, Sask., and diseased specimens were received from Prince Albert (R.J. Ledingham). A tr. was found on commercial varieties and seedlings at Smithfield, Ont. (H.N. Racicot). Spur blight was common, causing tr.-sev. infections in Que.; sev. infected specimens received from Nicolet and Giffard (D. Leblond). Infection was tr. on Newburgh

at Berwick, N.S. (C.O. Gourley), tr. on Rideau and very sev. on Madawaska in a garden at Charlottetown, P.E.I. (R.R. Hurst).

ANTHRACNOSE (Elsinoe veneta) was present on specimens received from St. Louis, Sask. (T.C. Vanterpool), and tr. infection on Rideau in a garden at Charlottetown, P.E.I. (R.R. Hurst).

CANE BLIGHT (Leptosphaeria coniothyrium). Diseased specimens received from Meadow Lake, Sask. (T.C. Vanterpool). Sl. infection in a planting at Altona, Man. (J.E. Machacek). A few Viking canes infected in a garden at Kentville, N.S. (K.A. Harrison).

YELLOW RUST (Phragmidium rubi-idaei). Sl. infection observed on Washington in the Lower Fraser Valley, B.C. (R. Stace-Smith).

LATE YELLOW RUST (Pucciniastrum americanum) was fairly heavy on Viking, Newburgh, and Indian Summer at Berwick, N.S. (C.O. Gourley).

LEAF SPOT (Septoria rubi) caused about 50% defoliation of the lower leaves of Trent at Berwick, N.S. (C.O.G.)

POWDERY MILDEW (Sphaerotheca humuli) mod.-sev. infected commercial varieties and seedlings in the plots at Smithfield, Ont. (H.N. Racicot).

WILT (Verticillium sp.) caused mod. damage in a planting at Medicine Hat, Alta. (M.W. Cormack). Wilt was sev. in one row in a home garden at Normandin, Que., where the soil had remained wet for some time early in the season (D. Leblond). It caused mod. damage to Latham in the plots at the Farm, Ste. Anne de la Pocatiere (L.J. Coulombe).

MOSAIC (virus). A general sl. infection was present in a nursery at Calgary, Alta. (R.P. Stogryn). Mod.-sev. infections were noticed at Montmagny and St. Pacome, Que. (L.J. Coulombe). Traces of aucuba mosaic and leaf curl were observed on Viking at Berwick, N.S. About 2% of the plants were also affected by common mosaic (C.O. Gourley).

CHLOROSIS (lime-induced) was mod.-sev. in plantings examined at Arden, Grandview, Oak Bluff, and Pine Falls, Man. (J.E. Machacek).

E. OTHER FRUITS

BLUEBERRY

BLOSSOM and TWIG BLIGHT (Botrytis cinerea and Monilinia vaccinii-corymbosi) was prevalent in many fields in Cumberland and Kings counties, N.S. A 7% ferbam dust gave good commercial control (J.F. Hockey). In Charlotte Co., N.B., infection ranged as high as 70% in second-crop fields and was about 15%

in first-crop fields. Mostly the leaves were affected (I. V. Hall).

GRAPE

DEAD ARM (Fusicoccum viticola) is common in vineyards in the Niagara Peninsula, Ont. As high as 35% of the vines may be infected, and probably some infection may be found in any vineyard 1 acre or more in extent (G. C. Chamberlain). This fungus is actually a Phomopsis, and Goidanich in 1937 made the transfer. This binomial, however, is a later homonym of P. viticola Sacc. 1915.

DOWNY MILDEW (Plasmopara viticola) was prevalent in vineyards of Fredonia about St. Catharines, Ont. (G. C. C.).

POWDERY MILDEW (Uncinula necator) A sl. infection was observed on foliage of Seneca at St. Davids, Ont. (G. C. Chamberlain). One variety was sev. infected at the Farm, Kentville, N. S. (D. W. Creelman).

STRAWBERRY

GREY MOLD (Botrytis cinerea) caused a loss of 30% of the crop in the Lower Fraser Valley, B. C. Captan was ineffective owing to abnormally wet weather before and at harvest (H. N. W. T.). Affected specimens received from Naicam, Sask. (T. C. Vanterpool). Grey mold caused about 1% loss of fruit in Kings Co., N. S. (C. O. Gourley).

LEAF BLIGHT (Dendrophoma obscurans) caused considerable infection in a 3-year-old planting of Premier at Port Waller, Ont. (G. C. Chamberlain). Three plants with the older leaves sev. infected received from the Montreal district, Que. (H. N. Racicot) A tr. was found on Senator Dunlap at Port Williams, N. S. (C. O. Gourley).

LEAF SCORCH (Diplocarpon earliana) sev. infected a representative collection of commercial varieties at Smithfield, Ont. (H. N. Racicot). A sl. infection was noted on Louise at Waterville, N. S. (C. O. Gourley). Infection in the Farm plots, Charlottetown, P. E. I., was as follows: McKenzie, very heavy; Louise, heavy; Temple, Premier, Fairland and Robinson, tr.; and Senator Dunlap, Dresden, Midland, Red Rich, Swanee, Sparkle, Catskill, King, Dorsett, Valetine, and Pathfinder, none (R. R. Hurst).

LEAF BLOTCH (Gnomonia fruticola) Tr. infection observed at Port Williams, N. S. (C. O. Gourley).

ROOT KNOT NEMATODE (Melidogyne sp.) was observed on virus-free Senator Dunlap and Premier plants imported from the eastern U. S. and planted at Kentville, Berwick, and Melvern Square, N. S. Root nodules were present

when the plants arrived in April 1955 (C.O. Gourley). M. hapla was numerous on strawberry roots from Kentville, N.S. (A.D. Baker).

LEAF SPOT (Mycosphaerella fragariae) caused sl. infection in a planting at Altona, Man. (J.E. Machacek). Leaf spot was widespread in strawberry-growing areas at Woodstock, Gagetown, Memramcook, N.S. It was sev. if the plantings were not treated or burnt over (S.R. Colpitts). Tr. infection on Senator Dunlap at Port Williams, N.S. (C.O. Gourley). Infection in the Farm plots, Charlottetown, P.E.I., was as follows: Sparkle, mod.; Red Rich, Senator Dunlap, Louise, Catskill, Dorsett, Valentine, Fairland, Robinson, and McKenzie, tr.; and nil on the other 7 varieties listed above (R.R. Hurst).

POWDERY MILDEW (Sphaerotheca humuli). A sl. infection on strawberry seedlings was observed at the Farm, Kentville, N.S. (C.O. Gourley).

ROOT ROT (fungus complex). Sev. damage occurred in patches in plantings at Lethbridge and Taber, Alta. (M.W. Cormack). Black root rot was prevalent in plantings where good drainage was lacking about St. Catharines, Ont. A number of complaints were received of poor growth and dying of plants at fruiting (G.C. Chamberlain). Root rot was general in plantings about Woodstock, Gagetown, and Memramcook, and became progressively worse as the season advanced; it caused sev. injury as a drought occurred during the picking period (S.R. Colpitts).

GREEN PETAL (?virus) affected about 5% of the plantings of Senator Dunlap and Catskill about Blomidon, N.S. An account of the disease is given in the Plant Dis. Reptr. 39:808-809. 1955. (C.O. Gourley).

XANTHOSIS (virus). A tr. infection was observed about Berwick, N.S., on Premier (C.O.G.)

CHEMICAL INJURY. Five applications of Crag Herbicide (3,4-dichlorophenoxyethyl sulphate) at about 4 lb. per acre were applied to planting of Premier at Beamsville, Ont., instead of 2-3 applications of 2 lb. per acre. As a result, some plants were markedly stunted with aborted buds at the crown; usually only the leaves were deformed, typical of hormone injury (G.C. Chamberlain).

JUNE YELLOWS (genetic breakdown) was evident on the new growth in many plantings about St. Catharines, Ont.; in some, 5-10% of the plants were affected (G.C. Chamberlain). Some 25% of the Sparkle plants were affected in a planting at Norton, N.B. (S.R. Colpitts).

V. DISEASES OF TREES AND SHRUBS

ABIES - Fir

Witches' Broom (Melampsorella caryophyllacearum). A tr. infection was general on A. balsamea in w. Lunenburg Co., N.S. (D.W. Creelman).

Rhizothyrium abietis Naum. was found on needles of A. balsamea collected at McGirney Junction, N.B., by R.H. Cochrane, 26 July 1955. A second collection was made at Wilton-Dale, St. Barbe district, Nfld. This fungus does not appear to have been reported previously in North America. The fungus sometimes occurs in association with another member of the Phomales, Rhizophaera abietis Mang. & Hariot. The latter attacks current season or one-year-old needles; the affected needles are completely necrotic and a few to all needles on a branch may be attacked (J.A. Parmelee).

ACER - Maple

Leaf Spot (Gloeosporium apocryptum) was sev. on young shoots of A. saccharum at St. Gabriel, Que. Ascervuli visible on both sides of the leaf; spores 6-10 x 3-4 microns (D. Leblond). This pathogen caused mod. damage in early summer at Kentville, N.S. (D.W. Creelman).

Die-back (Nectria cinnabarina) affected about 100 maples in a nursery nr. ?St. John's, Nfld. (G.C. Morgan, H.S. Thompson).

Leaf Spot (Phleospora aceris), the most common on maple in N.S., was general in Kings, Annapolis and Lunenburg counties (D.W. Creelman).

Tar Spot (Rhytisma acerinum). Sev. on A. rubrum in the forest at St. Gabriel, Que. (D. Leblond); common in Kings and Lunenburg counties, N.S. (D.W. Creelman); sl. infections on A. rubrum and A. saccharum at Upton, P.E.I. (W.L. Seaman). Rhytisma punctatum was observed on A. spicatum in Lunenburg Co., N.S. (D.W.C.).

Leaf Spot (Taphrina dearnesii) was sev. on A. rubrum at Chateau d'Eau, Quebec Co., Que. The fungus in the specimens collected 15 June was nearly spent (D. Leblond, D.B.O. Savile).

2,4-D Injury. The damage on A. negundo was the least observed in recent years at Saskatoon, Sask. Apparently greater care is being taken in applying the herbicide (T.C. Vanterpool).

AESCULUS - Horsechestnut

Leaf Blotch (Guignardia aesculi) caused slight defoliation of trees at Kentville, N.S. (C.O. Gourley).

BETULA - Birch

Leaf Spot (Marssonina betulae) was collected on B. papyrifera in York Co., N.B., about 6 mi. from where it was observed in 1954 (P.D.S. 34:122). According to C.A. Arthurs, about half the leaves on a half dozen small trees were affected (J.A. Parmelee).

CRATAEGUS - Hawthorn

Rust (Gymnosporangium globosum) was heavy on 9 Sept. on several Crataegus spp. in the Arboretum, Ottawa, Ont. It was particularly conspicuous

on C. glandulosa, C. caesia and two trees of C. sp. 25-30 yd. n.e. of two Juniperus virginiana. One of these trees bore fruiting galls in late May. South of the four hawthorns, infection gradually decreased until it was virtually absent. G. clavipes was still in evidence on fruits of hawthorn at this late date (D.B.O. Savile, J.A. Parmelee).

FORSYTHIA

Aerial Root Galls were numerous on a plant of F. ?suspensa in a home garden at Vancouver, B.C. They appeared to be larger and more numerous than those usually figured for the species (J. Royal Hort. Soc. 71:166-172. 1946) (H.N.W. Toms). When galls received from Mr. Toms were placed in a moist chamber there was a rapid development of a species of Phoma or possibly a Coniothyrium. It did not appear referable to published descriptions of species of Phoma reported on Forsythia (J.W. Groves).

FRAXINUS - Ash

Anthracnose (Gloeosporium aridum). Infection was heavy and damage considerable on F. americana at Lunenburg, N.S. (D.W. Creelman).

Rust (Puccinia sparganioides). All trees of F. americana observed from Bridgetown to Digby and Lower Granville, N.S., were defoliated by rust early in the summer. Many trees defoliated in 1954 failed to put out leaves over large portions of the tree and appeared to be dying (D.W. Creelman).

JUGLANS

White Mold (Microstroma juglandis). About 30% of the leaves on two small walnut trees were sev. deformed in a nursery at Bridgetown, N.S. (D.W.C.).

LIGUSTRUM - Privet

Crown Gall (Agrobacterium tumefaciens). Specimen of L. amurense from Riverview, N.B. was received for identification (J.E. Campbell).

LONICERA - Honeysuckle

Leaf Blight (Herpobasidium deformans) was heavy on specimens of L. tatarica var. rosea received from Port Burwell, Ont., and Village des Aulnies, Que., and on L. sp. from Ste. Foy during the Plant Protection nursery survey (H.S. Thompson). This disease was noticed in 21 nurseries in Que. Infection was sl.-mod.; no sev. infections were noted this year (J. Ringuet).

Powdery Mildew (Microsphaera alni var. lonicerae) has been quite heavy on honeysuckle at the forest nursery, Southport, P.E.I., for several years, but appears to cause very little damage (J.E. Campbell).

PICEA - Spruce

Rust (Chrysomyxa ledicola). Infection was mod. on a specimen of P. pungens received from Lower West Pubnico, N.S.; the tree, on private grounds, is reported to become infected each year about mid-July (H.S. Thompson).

Canker (Cytospora sp.) occurred in a planting of P. sp. at Berwyn, Alta. (A.W. Henry).

PINUS - Pine

Rust (Cronartium ribicola) was affecting about 50% of the trees of P. strobus in stands visited at Cambridge and Kentville, N.S., on 10 May. Blisters were just ready to burst. Many of the young trees had broken off at the trunk infection (C.O. Gourley).

POPULUS - Poplar

Sooty - Bark Canker (Cenangium singulure (Rehm. ex Starback) Davidson & Cash). The authors (Phytopathology 46:34-36. 1956) determined a specimen collected at S. Aurora, Ont., by H.S. Jackson 2 Oct. 1932 as this fungus (I.L.C.).

Ink Spot (Ciborinia whetzelii (Seaver) Seaver). In a recent paper (Can. J. Botany 33:577-590. 1955) J. Walton Groves and Constance A. Bowerman give an account of the species of Ciborinia known on Populus. C. whetzelii forms conspicuous black sclerotia on living leaves of Populus; hence, the name, ink spot. According to these authors the correct name of the sclerotial state is Sclerotium bifrons Ell. & Ev. ex Sacc. & Syd. The perfect state has been seen by them from specimens collected at Tenaga, Que., and nr. Ottawa, Ont. An associated species found by them in the Ottawa district is C. pseudobifrons Whetz. in Groves and Bowerman. It, unlike C. whetzelii, can be grown in culture (I.L.C.).

Leaf Speck (Marssonina populi). Infection was general and mod. on P. carolinensis in a nursery at Abbotsford, Que., on 15 July (J. Ringuet) and mod., causing yellowing and defoliation, on P. nigra var. italica at Quebec on 25 Aug. (D. Leblond).

Rust (Melampsora abietis-canadensis) was common and sometimes sev. in forest stands of P. tremuloides in Temiscouata Co., Que. (D. Leblond).

PRUNUS

Black Knot (Dibotryon morbosum) was present on a tree of P. padus planted at Red Deer, Alta. (A.W. Henry).

Leaf Curl (Taphrina deformans) infected most of the leaf terminals on 4 trees of a purple-leaved variety of P. persica in a garden at St. Catharines, Ont. (G.C. Chamberlain).

QUERCUS

Leaf Curl (Taphrina caerulescens) caused some early defoliation on ornamental trees at St. Jean Port Joli, Que. (L.J. Coulombe).

RHAMNUS

Crown Rust (Puccinia coronata) caused mod. infection on R. cathartica at Charlottetown, P.E.I.; aecia were beginning to discharge on 27 June (J.E. Campbell).

SALIX - Willow

Blight (Fusicladium saliciperdum and Physalospora miyabeana) was heavy on two trees at St. Cyrille, L'Islet, Co., Que. (L.J. Coulombe). An affected specimen was received from Carleton-by-the-Sea (D. Leblond). Infection was light on the French willows in the Memorial Park at Grand Pre, N.S.

As an economy measure, the railway company that maintains the park are considering the dropping of their present spray program, which has permitted these willows to survive (K.A. Harrison). Blight was sev. on susceptible trees in P.E.I. (J.E. Campbell).

SORBUS

Die-Back (Cytospora sp.) was reported from Red Deer, Alta. (A.W. Henry).

Fire Blight (Erwinia amylovora) was common in the Edmonton area, Alta. (W.P. Campbell).

Rust (Gymnosporangium clavipes) caused mod. infection on two trees of S. aucuparia in a private garden at Ottawa. This rust has been reported a few times on S. americana but this collection, made by F.L. Drayton, is the first Canadian record on the European rowan berry (J.A. Parmelee).

Rust (G. cornutum). Infection was very sev. on the leaves of Pyrus decora growing 50 feet from infected Juniperus communis var. depressa at Clearwater Bay, Ont. Infection was progressively less as the distance between the two hosts increased and was light at 150 feet (W.L. Gordon). Infection was mod. and general on S. americana in the district about Quebec City (D. Leblond).

TILIA

Leaf Spot (Cercospora microsora) mod. infected T. americana at St. Gabriel, Que. (D. Leblond). A mod. infection caused sl. damage on T. europea at Bridgetown and Lawrencetown, N.S. (D.W. Creelman).

Spot Anthracnose (Elsinoe tiliae Creelman) was again general on European lindens at Lunenburg, N.S. Also an outbreak was observed on 8 trees at Bridgetown and a few trees were found infected in a nursery at Annapolis Royal (D.W.C.).

Anthracnose (Gloeosporium tiliae) rather sev. infected a few trees of T. cordata at Halifax, N.S. (D.W.C.). Several ornamental linden trees were partly defoliated at Kensington, P.E.I. (W.L. Seaman).

Twig Die-Back (Phomopsis sp.). About 10% of the twigs on trees of T. europea at Lunenburg, N.S., bore cankers resulting in a die-back. When isolations were made, the predominant isolate was a Phomposis, not Sphaceloma as anticipated. (D.W. Creelman).

ULMUS

Dutch Elm Disease (Ceratostomella ulmi). Of the 613 specimens examined in 1955, 452 yielded the pathogen; 386 from Que. and 66 from Ont. In Ont. samples from infected trees were received from 5 countries as follows: Lambton 5, Middlesex 2, Norfolk 1, Oxford 1, and Wentworth 13. In Que. no less than 326 samples came from Sherbrooke (Ruth Macrae).

Canker (Nectria cinnabarina) was reported affecting a few plants in a hedge of Chinese elm at Ottawa, Ont. Diseased specimens were received from La Toque and Charlesbourg, Que. The fungus was identified as the imperfect state of Nectia cinnabarina, as Tubercularia ulmea does not appear to be distinct from this common species (H.S. Thompson).

VIBURNUM

Leaf Spot (Cercospora varia). A tr. infection was found on V. carlesii at Southport, N.S. (R.R. Hurst, D.B.O. Savile).

VI. DISEASES OF ORNAMENTAL PLANTS

ALTHAEA - Hollyhock

Rust (Puccinia malvacearum) was widespread in the Okanagan Valley, B.C.; infection sl. to sev. (G.E. Woolliams). Rust was fairly heavy on specimens received from Toronto and Perth, Ont., Montebello and St. Rose de Lima, Que. It was reported to be heavy in a garden at Lunenburg, N.S. (H.S. Thompson). Tr.-sev. infections were general about Quebec City (D. Leblond). A heavy infection was recorded at Southport, P.E.I. (J.E. Campbell).

ANTIRRHINUM - Snapdragon

Leaf Spot (Phyllosticta antirrhini) was found in 1954 at La Redemption, Matapedia Co., Que. (D. Leblond).

AQUILEGIA

Powdery Mildew (Erysiphe polygoni) was quite prevalent in the Okanagan Valley, B.C. (G.E. Woolliams).

BEGONIA

Foliar Nematode (Aphelenchoides sp.). All of 300 plants in a greenhouse at Hamilton, Ont., showed dark brown spots on the foliage. Many nematodes were found in leaf material when macerated in water (W.G. Kemp).

Powdery Mildew (Erysiphe cichoracearum). To judge from representative material received and from observations made at Ottawa, powdery mildew was very destructive in Ont. to tuberous begonias once the disease appeared. In one local nursery out of 1200 plants nearly half had been lost and of the 256 still in the nursery on 15 June, 20 were reduced to stems, which occasionally put out a new shoot. As a result of experiments conducted on these plants and others, it was found that 3 applications of Karathane used at the rate recommended by the manufacturer with a spreader-sticker sprayed on the plants at 3-day intervals controlled the disease. At weekly intervals control was less effective. Karathane dust proved about equally effective. Captan 50-W was also used but it only controlled the disease on the less sev. infected plants (H.S. Thompson). A tr. was observed on 32/150 plants in a greenhouse at Hamilton on 2 Dec. (W.G. Kemp).

Wilt and Leaf Spot (Xanthomonas begoniae). Diseased specimens received from Calgary, Alta. (A.W. Henry).

CALADIUM

Soft Rot (Erwinia carotovora). About 90% of the tubers in a Florida shipment intercepted at Niagara Falls, Ont. were badly affected. The bacterium was regularly isolated from the advancing margin of the rot (W.G. Kemp).

CALENDULA

Yellows (Callistephus virus 1) was sev. in 8 gardens in Fredericton, N.B.; infection was 21-68% (D.J. MacLeod). Early-planted Calendula were 100% infected whereas very few were attacked in a late planting 60 feet away in

the same garden at Kentville, N.S. (K.A. Harrison). Yellows was general in a garden at Charlottetown, P.E.I. (R.R. Hurst).

CALLISTEPHUS - China Aster

Wilt (Fusarium oxysporum f. callistephi). About 20% of the plants were wilting in a greenhouse at Ayer's Cliff, Que. (J. Ringuet).

Yellows (Callistephus virus 1) was prevalent in early plantings of China aster at Lethbridge, Alta. (M.W. Cormack). A mod. infection was present throughout the summer in the University garden, Winnipeg, Man. (W.E. Sackston). Infections of 47-70% were noticed in 7 gardens in Fredericton, N.B. (D.J. MacLeod). About half the plants were attacked in a bed at Charlottetown, P.E.I. (J.E. Campbell).

CAMPANULA

Grey Mold (Botrytis cinerea) was sev. on the leaves and especially the flowers of C. persicifolia at Gaspé, Que., in late August 1954 (D. Leblond).

CHEIRANTHUS - Wallflower

Downy Mildew (Peronospora ?cheiranthi) heavily infected older seedlings in a propagating bed at Vancouver, B.C., on 1 Sept.; however, it is thought that the plants will flower normally next spring (H.N.W. Toms).

CHRYSANTHEMUM

Foliar Nematode (Aphelenchoides sp.). A tr. infection was seen on several hardy varieties in a commercial propogating greenhouse in Essex Co., Ont.

Grey Mold (Botrytis cinerea). Water-soaked spots were prevalent on the florets on chrysanthemum at Falmouth, N.S.; B. cinerea isolated (K.A. Harrison).

Powdery Mildew (Erysiphe cichoracearum) was heavy on the lower leaves of 200 fully matured Starlite plants growing in ground beds in a greenhouse at Hamilton, Ont. on 25 Nov. It was also sev. in May on a few potted Shasta and Pinocchio plants at St. Catharines (W.G. Kemp). It was also heavy in a greenhouse at Quebec City in Nov. 1954 (D. Leblond).

Leaf Spot (Phyllosticta chrysanthemi) was mod. in a garden at Cap St. Ignace, Que. in 1954 (D. Leblond).

Stem Rot (Rhizoctonia solani). Plants in localized areas in a newly-planted chrysanthemum bench showed a black stem rot in Middlesex Co., Ont.; R. solani was recovered from 6/9 rooted cuttings brought to the laboratory (W.G. Kemp).

Leaf Spot (Septoria sp.). A mod. infection was observed on propogating stock of Starbright and Lollipop in Essex Co., Ont. (W.G.K.).

Stunt (virus) was observed in a nursery at Lethbridge, Alta. (R.P. Stogryn). Stunt sev. reduced the stem length of plants of Snowcap and Minstrel and of Good News and Detroit News in greenhouses in Essex Co., Ont. (W.G. Kemp).

Yellows (virus) affected a few plants in a nursery at Lethbridge, Alta. (R.P. Stogryn), and 2 plants in a garden at Charlottetown, P.E.I. (R.R. Hurst).

CONVALLARIA

Grey Mold (Botrytis cinerea) was sev. in plantings of C. majalis at Deschambault and Cap St. Ignace, Que. in 1954. Leaf Spot (Phyllosticta convallariae) was also present in these plantings (D. Leblond).

COSMOS

Yellows (Callistephus virus 1) was less prevalent in a garden at Saskatoon, Sask., in plants set out as young transplants than those from seed sown in the open (T. C. Vanterpool).

CYCLAMEN

Grey Mold (Botrytis cinerea). Sl. spotting of the petals was observed on a few plants in a greenhouse at Hamilton, Ont. (W. G. Kemp).

DAHLIA

Crown Gall (Agrobacterium tumefaciens). A single plant was infected in a large bed at the Farm, Charlottetown, P. E. I. (J. E. Campbell). However about 20% of the plants were affected at Central Royalty (G. W. Ayers).

Mosaic (virus). Several plants were sev. affected in a commercial garden at Charlottetown, P. E. I. (R. R. Hurst).

Ring Spot (virus) was conspicuous on two plants in a small garden at Summerside, P. E. I. (J. E. Campbell).

DELPHINIUM

Powdery Mildew (Erysiphe polygoni). Sl. infection was observed in a perennial border at Charlottetown, P. E. I. (J. E. Campbell). A few cleistotheca were present but Cicinnobolus was present and probably suppressed ascus formation (J. E. Campbell, D. B. O. Savile). Later rather heavy infections were seen (R. R. Hurst).

Bacterial Blight (Pseudomonas delphinii) caused mod. damage in a garden at Lethbridge, Alta. (M. W. Cormack). Tr. infections were noted in a garden at Charlottetown, P. E. I. (R. R. Hurst).

Stunt (virus) sev. affected several plants in 2 gardens at Lethbridge, Alta. (M. W. Cormack).

DIANTHUS

Leaf Spots (Alternaria dianthicola and Ascochyta dianthi). Traces at Ste. Foy, Que., 31 July 1954 on D. barbatus (D. Leblond).

Bud Blight (Fusarium ?poae) was sev. on carnations at Rimouski, Que. (D. L.).

Bacterial Spot (Pseudomonas woodsii). For the second year the disease was destructive in a small planting of Dianthus in a garden at Kentville, N. S.; apparently introduced with the seed, it overwintered in the dead leaves and stems (K. A. Harrison).

Stem Rot (Rhizoctonia solani). About 5% of the carnation plants in a bed of 2000 were killed in a greenhouse at Leamington, Ont.; the extreme heat during the summer months apparently favored the disease. A diseased plant was received from Clarkson and the pathogen isolated (W. G. Kemp).

Rust (Uromyces caryophyllinus) mod. infected Northland, whereas Victory Red, Midas, Apollo, Sydney Littlefield and Wm. Sim was free in a greenhouse at Leamington, Ont. (W.G.K.). Rust was heavy in a commercial greenhouse at Charlottetown, P.E.I. in Sept. (R.R. Hurst).

Mosaic (virus). All plants of Wm. Sim and Sydney Littlefield showed typical mosaic symptoms on the young foliage in a greenhouse at Leamington, Ont. in April (W.G. Kemp).

ECHINOCYSTIS

Leaf Spot (Septoria cucurbitacearum) seriously disfigured the foliage of E. lobata permitted to grow on the wall of a house at Gaspé, Que., in 1954 (D. Leblond).

EUPHORBIA

Stem Rot (Pythium sp.). A tr. of rot was found on poinsettia in a propogating bed in a greenhouse at Leamington, Ont., in October (W.G. Kemp).

GLADIOLUS

Core Rot (Botrytinia draytoni) caused sev. damage in corms stored by one grower at Nanton, Alta. (M.W. Cormack). The disease was very prevalent in one garden at Kentville, N.S.; about 30% of the corms were lost (J.F. Hockey). About 1% of the corms were destroyed in one lot examined in May (R.R. Hurst).

Fasciation (Corynebacterium fascians). Two corms showing typical symptoms were received from Prince Albert, Sask. Gladiolus had been grown in the plot for 3 years and the disease was first noticed last year. This year the disease was much more severe, some varieties being almost 100% infected. This is the second report of this disease in Sask. where it was found in 1950 (P.D.S. 30:125) (H.S. Thompson).

Leaf Spot and Corm Rot (Curvularia trifolii). Affected corms were received from London, Ont., where both Curvularia and Fusarium had affected about 20% of the crop. A few affected plants were also found in a small planting in a private garden at Ottawa by E.H. Peters. Leaf specimens were forwarded by a Montreal grower from a planting of 1000 or more corms at Essex, Vt. The corms from which the plants were grown were planted in new soil (H.S. Thompson). Both E.S. Luttrell (Plant Dis. Reptr. 40:57-60. 1956) and J.A. Parmelee (Proc. Can. Phytopath. Soc. 23:18-19. 1956) point out that the pathogen on gladiolus morphologically is indistinguishable from C. trifolii; it is not C. lunata as previously reported (I.L.C.)

Yellows (F. oxysporum f. gladioli) was sl. on Spot Light, mod. on Destiny and Red Charm and sev. on Margaret Hood, Ravel, Rosea and True Love in a planting at Ste. Foy, Que. (D. Leblond). About 5% of the plants were affected in a commercial garden at Charlottetown, P.E.I. Reports of similar infections were received from other centres (R.R. Hurst).

Dry Rot (Fusarium sp.) was observed at the University, Edmonton, Alta. (A.W. Henry).

Scab (Pseudomonas marginata). About 1% of the plants were sev. damaged by neck rot in a planting nr. Lethbridge, Alta. (M.W. Cormack).

Hard Rot (Septoria gladioli) affected a few corms in 2 lots brought in for examination from Queens Co., P.E.I. (R.R. Hurst).

Mosaic (Phaseolus virus 2) affected 3% of the plants in a garden in Fredericton, N.B. (D.J. MacLeod). Up to 25% of the plants were affected in several small plantings visited; the disease is increasing rapidly in N.S. gardens (J.F. Hockey).

GODETIA

Rust (Pucciniastrum epilobii) was found affecting plants being grown in outdoor concrete pots at La Redemption, Matapedia Co., Que. in Aug. 1954 (D. Leblond).

HYACINTHUS

Yellows (Xanthomonas hyacinthi) was found affecting 1/6 varieties of one grower on the mainland, B.C. (N. Mayers).

Rust (Uromyces scillarum (Grev.) Lév.) was heavy on a specimen collected "in garden" 14 May 1919 by J. Macoun at or nr. Sidney, B.C. and recently received for deposit in DAOM. Presumably the rust came from Europe on imported bulbs and persisted briefly without spreading. The rust, according to Arthur (Manual, p. 225. 1934) was collected on Scilla hispanica at Berkeley, Calif., by W.C. Blasdale in March 1931; apparently the circumstances were similar (D.B.O. Savile).

HYDRANGEA

Powdery Mildew (?Erysiphe cichoracearum). Newly potted plots were sl. infected 8 Aug. in a greenhouse at St. Catharines, Ont. (W.G. Kemp).

IRIS

Leaf Spot (Didymellina macrospora) affected 4/18 plantings of bulbous iris inspected on Vancouver Island, B.C.; infection was sl. (N. Mayers). The disease was heavy in a home garden and common at the University, Vancouver (H.N.W. Toms). The disease was heavy on all plantings in Battlefield Park, Quebec City, in September 1954 (D. Leblond).

Bulb Nematode (Ditylenchus dipsaci). A sl. infection was found in 2 plantings, causing their rejection, on Vancouver Island, B.C. (N. Mayers).

Soft Rot (Erwinia carotovora). Affected rhizomes were received from Gerald, Sask. (T.C. Vanterpool). Sl. infections were noted in single small plantings at Berwick, N.S. (K.A. Harrison), and Queens Co., P.E.I. (R.R. Hurst).

Mosaic (virus) was found in one planting of bulbous iris on Vancouver Island, B.C. (N. Mayers).

LATHYRUS

Root Rot (Fusarium sp.) caused sev. damage at Lethbridge, Alta., to L. odoratus, which were planted in the same location for the third season (M.W. Cormack).

LILIUM

Blight (Botrytis elliptica) was observed in the University plots, Edmonton, Alta. (L. E. Tyner). Blight was common and often sev. in Que. in 1954 (D. Leblond). Blight affected about 10% of the leaves on a few plants of L. regale at Kentville, N. S.; a sev. outbreak occurred in this garden in 1954, but careful removal of affected leaves and stalks plus a dry season kept the disease in check (K. A. Harrison).

Mosaic (virus) affected about 20% of the plants in a garden at Kentville, N. S. L. regale that had been growing for 20 years in an isolated garden became infected from lily varieties introduced from Ont.; the plants became very distorted and bore misshapen flowers (K. A. Harrison).

MAHONIA

Rust (Cummingsiella mirabilissima (Pk.) Nannf.) Apparently a single affected leaf was found by J. Paxton on some 50 plants of M. aquifolium in a nursery at Waterdown, Ont., during a general nursery survey; the rust was identified from the specimen (H. S. Thompson). The rust was recorded previously in Eastern Canada in eastern Que. in 1930 (P. D. S. 30:128) (I. L. C.).

NARCISSUS

Neck Rot or Smoulder (Botrytinia narcissicola (Gregory) Seaver, N. Amer. Cup-fungi (Inoperculates), p. 63. 1951) was noted in tr. amounts in 17% of plantings on Vancouver Island. The disease was seen in 28% of the plantings on the mainland; in one field 30% of the plants were affected, but in the others the infection was usually sl. (N. Mayers).

Bulb Nematode (Ditylenchus dipsaci) was found in one-third of the plantings inspected on Vancouver Island but the infestations were very sl. On the mainland it was found on 7% of the plantings, infestations being very sl. and localized (N. M.).

Basal Rot (Fusarium bulbigenum) was observed affecting 2% of the bulbs in one lot of commercial stock grown on Vancouver Island and examined at shipping time (N. M.).

Leaf Scorch (Stagonospora curtisii) was found in 33% of the plantings on the mainland, B. C.; infection was very sl. (N. M.).

White Streak and associated virus diseases were noted in every planting on Vancouver Island, B. C., and infection exceeded 2.5% in 17% of the plantings. On the mainland, these diseases were evident in 51% of the plantings and infection averaged 2%. Except that the plants lack vigor and tend to mature early, no symptoms are visible in other than the trumpet varieties (N. M.).

Mosaic (virus). A tr. was present in every planting on Vancouver Island but the infection never exceeded 0.5%. On the mainland 5% of the plantings were affected with an average infection of 0.1%. Early spring roguing effectively controls the disease (N. M.).

NASTURTIUM

Yellows (Callistephus virus 1). Symptoms similarly to those in calendula appeared in nasturiums growing in a row adjacent to calendula in a garden at Kentville, N. S., soon after yellows appeared the latter plant. Every plant became infected (K. A. Harrison).

PAEONIA - Peony

Blight (Botrytis paeoniae) was sl.-sev. in 3 nursery plantings of 3 1/2 acres at Calgary, Alta. (R.P. Stogryn) and in several gardens at Lethbridge (M.W. Cormack). Sl. infections of bud rot were observed at Quebec City in June and at Gaspé in August; in the second case the causal fungus appeared to be B. cinerea (D. Leblond). Blight sev. infected 7 plants in a garden at Charlottetown, P.E.I. (R.R. Hurst).

Ring Spot (virus). A single infected plant was seen in a garden at Charlottetown, P.E.I. (R.R.H.).

Stunt (undetermined): 13% of the plants in a test plot at the Farm, Fredericton, N.B., showed sev. stunting and an upward rolling of the leaves (D.J. MacLeod).

PELARGONIUM - Geranium

Basal Stem Rot (Botrytis cinerea and Pythium sp.) sev. injured 25-75% of the cuttings of P. zonale being rooted at Summerland, B.C. (G.E. Woolliams). Grey mold caused mod. damage to a shipment of cuttings from California examined at Calgary (R.P. Stogryn).

Oedema (nonparasitic). Leaves from house plants received from Kamloops, B.C., in March 1954 and 1955 were found affected (G.E. Woolliams).

PHILADELPHUS

Leaf Spot (Ascochyta philadelphi Sacc. & Speg.) mod. infected P. coronarius at Deschambault, Que., 4 Aug. 1954. Spores 5-10 x 2.4-3.5 microns, 0-1 septate; center of spots tend to weather away. Not previously reported in Canada (D. Leblond, D.B.O. Savile).

Leaf Spot (Septoria ?philadelphi) was sev. on a bush in a home garden at Queens Bay, B.C. on 4 Aug. (D.L. McIntosh).

PHLOX

Root and Stem Namatode (Ditylenchus dipsaci). Badly stunted P. paniculata were found sev. infested by nematodes in a nursery in Lincoln Co., Ont.; nematodes were present in both the roots and the lower part of the stem (W.G. Kemp).

Powdery Mildew (Erysiphe cichoracearum) was general on P. paniculata in the laboratory garden, St. Catharines, and noticed elsewhere in the area (W.G. Kemp). Observations made at Ottawa and specimens received from Limoges, Ont., and St. Hermas and St. Eustache sur le Lac, Que., indicated that infection was often mod.-sev. (H.S. Thompson). A mod. infection was observed in a garden at Aylmer East, Que. (R. Crete). Infection was heavy in a garden in Queens Co., P.E.I. (R.R. Hurst).

RIBES

Powdery Mildew (Sphaerotheca mors-uvae) was observed on R. alpina at the University, Edmonton, Alta. (A.W. Henry).

ROSA

Crown Gall (Agrobacterium tumefaciens). A grower at Winona, Ont., removed about 200 greenhouse plants of Pink Rosette on account of their extreme

unthriftiness. Many small galls were found on the fibrous roots and frequently large galls were present on the stem at the soil line. A large gall was found on the crown of a hybrid tea brought to the laboratory from Montabello Park, St. Catharines. A number of these roses showed lack of vigor the previous season (W.G. Kemp). A few galls were observed on stems of Crimson Rambler bushes at Avonport, N.S. (J.F. Hockey). Heavy infections were noted on both Dorothy Perkins and Crimson Rambler roses in Queens Co., P.E.I. (R.R.Hurst).

Grey Mold (Botrytis cinerea) was found causing sl. infections on buds at Rimouski, Que. (D. Leblond), and Georgetown, P.E.I. (J.E. Campbell).

Black Spot (Diplocarpon rosae) was sev. on hybrid teas in the laboratory garden at St. Catharines, Ont., many plants being badly defoliated by mid-July. In June a tr. was present on the lower leaves of floribunda rosea, Fashion and Edna Paulsen in a nursery in Lincoln Co. (W.G. Kemp). Black spot had half defoliated hybrid roses at Montmagny, Que., by mid-August. Defoliation was sev. on hybrid roses at St. Roch a month later with slightly less sev. infection on floribundas and polyanthas (L.J. Coulombe). The disease was common on R. eglanteria growing in an old pasture at Rougement (L. Cinq-Mars). Black spot was very prevalent and sev. by late September on hybrid teas with somewhat lighter infections on floribundas at Kentville, N.S. (J.F. Hockey). Black spot was present on practically all varieties of roses growing at the Farm, Charlottetown, P.E.I. (J.E. Campbell).

Rust (Phragmidium spp.) was heavy on the leaves of garden roses in a private garden at Victoria, B.C. (H.N.W. Toms). Lightly infected specimens received from Rockyford, Alta. (H.S. Thompson). Rust caused sev. defoliation on hybrid perpetuals in a garden at St. Roch, Que. (L.J. Coulombe). A light infection was noted at Charlottetown, P.E.I. (J.E. Campbell).

Powdery Mildew (Sphaerotheca pannosa). Sl. infected specimens were received from South Junction, Man., and on hybrid teas and floribunda roses from Toronto, Ont.; it was also heavy on Crimson Glory climber nr. Windsor (H.S. Thompson). The disease was sev. on floribunda roses in the laboratory at St. Catharines, Ont. (W.G. Kemp). Infection was mod. on R. multiflora in a nursery nr. Montreal, Que. (J. Ringuet). It was also heavy on hybrid perpetual and polyantha roses at St. Roch (L.J. Coulombe). Powdery mildew was sev. on climbing roses at Bridgetown, N.S. (D.W. Creelman), and a sl. infection was already present on 27 June on a climber on which it had been sev. in 1954 at Charlottetown, P.E.I. Mildew was also quite prevalent on hybrid teas at the Farm towards the end of the season (J.E. Campbell).

SAINTPAULIA

Physiological Ring Pattern. The condition has been under observation for a few years in 2 potted plants in the University greenhouse, Vancouver, B.C. Attempts by R. Stace-Smith to transmit a possible virus to cucumber by rubbing were negative. M. Hallings (Plant Path. 4:123-128. 1955) concludes that the condition is due to watering plants with cold water in sunlight (H.N.W. Toms).

SEDUM

Leaf Spot (Septoria sedi) was heavy on S. purpureum in a garden at St. Clement, Que., on 18 Aug. 1954 (D. Leblond).

SPIRAEA

Nectria Canker (N. cinnabarina). The imperfect stage was found fruiting on specimens of S. vanhouttei collected at Charlebourg, Que. (H. S. Thompson).

SYRINGA

Powdery Mildew (Microsphaera alni) was heavy in August on common lilac in Queens Co., P. E. I. (R. R. Hurst).

Bacterial Blight (Pseudomonas syringae) sev. affected several branches on lilac bushes at Lethbridge and Calgary, Alta. (M. W. Cormack).

TAGETES

Yellows (Callistephus virus 1) was common in T. erecta in many gardens in Edmonton, Alta. (W. P. Campbell).

TULIPA

Fire (Botrytis tulipae). Although plantings were constantly rogued some secondary infection was present in almost every planting inspected in coastal B. C. Spraying has not given consistent results (N. Mayers). Fire infection was heavy in one planting observed at Kentville, N. S. (J. F. Hockey). The disease was general throughout P. E. I. causing sl.-sev. damage (R. R. Hurst).

Bulb Rot (Penecillium sp.) was sev. in one planting observed at Edmonton, Alta. (A. W. Henry).

Break (virus) was observed in tr. amounts in plantings of tulips grown for certification in coastal B. C. (N. Mayers).

Topple (physiological) was observed in 4 gardens in Fredericton, N. B.; 50-60% of the plants were affected. Injured plants developed watersoaked spots with exudation of liquid on the lower parts of the flower stalks. These stalks then shrivelled and collapsed (D. J. MacLeod).

VERONICA

Powdery Mildew (Sphaerotheca humuli) was conspicuous on V. longifolia var. subsessilis at the end of the season in 1954 in a park at Quebec, P. Q. (D. Leblond).

VIOLA

Leaf Spot (Cercospora violae) was found by V. R. Preston in 1/3 beds of violets examined at Elgin Mills, Ont. (H. S. Thompson). A mod. infection was observed on V. tricolor var hortensis at Ste. Foy, Que. (D. Leblond).

Powdery Mildew (Sphaerotheca humuli var. fuliginea) mod. affected pansies in a bed at Ottawa, Ont.; plants exposed to little sunlight and poor air drainage (H. S. Thompson).

ZINNIA

Leaf Spot (Alternaria zinniae) was common everywhere on Z. elegans at Quebec, Que., in 1954; when the disease is sev. the symptoms are those of a blight (D. Leblond).

Grey Mold (Botrytis cinerea) was affecting heavily about 25% of the plants in several flats held for late orders at Centreville, N.S., on 24 June (K.A. Harrison).

Powdery Mildew (Erysiphe cichoracearum) was present in late September on most plants growing in the laboratory gardens at St. Catharines, Ont. (W.G. Kemp).

Yellows (Callistephus virus 1, western strain). About 2% of the plants were affected in a garden in Fredericton, N.B. (D.J. MacLeod). Yellows infections of 30 and 15% respectively were recorded at Summerside and Charlottetown (J.E. Campbell, R.R. Hurst).

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