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DEPARTMENT OF AGRICULTURE

SCIENCE SERVICE

DIVISION OF BOTANY AND PLANT PATHOLOGY

TWENTY-SEVENTH ANNUAL REPORT OF THE CANADIAN PLANT DISEASE SURVEY 1947

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FOREWORD

The present method of naming the author or compiler after the individual items in the Survey was recently criticized. However, when an expression of opinion was sought from the Laboratories of the Division, there was general agreement that the present practice should be continued. Where an individual contributes an item his name appears after it. At the Prairie Laboratories it is customary for one person to be responsible for summarizing the data collected by the several members of the Laboratory. If the observations on a disease or a group of diseases is virtually the work of a single individual his name is given. If the observations are a compilation, the compiler's initials follow the item.

We wish to take this opportunity to thank Dr. M.W. Cormack who has compiled the data for Alberta for many years including the observations of Dr. A.W. Henry and his associates. His place has now been taken by Mr. J.D. Gilpatrick. The compilers of the other Prairie Laboratories are Dr. H.W. Mead for Sask., and Dr. W.L. Gordon for Man. There has been a definite tendency in recent years for the various members of each Laboratory to take responsibility for all diseases on a crop or a group of related crops. The quality and authenticity of the reports have, as a result, been greatly improved. However, diseases on crops not of major interest are virtually neglected.

Several special accounts appear in this report. They are: "Survey of nursery material for plant diseases in 1947" by T. Johnson, B. Peturson, W.J. Cherewick, A.M. Brown and G.J. Green; "Physiologic races of cereal rusts in 1947" by T. Johnson and B. Peturson; "Flax diseases in Saskatchewan in 1947" by T.C. Vanterpool; "Flax diseases in Manitoba in 1947" by W.E. Sackston; "Soybean diseases in southwestern Ontario in 1947" by L.W. Koch and A.A. Hildebrand and a report on tobacco diseases by L.W. Koch.

Our thanks are due to all who contributed material to the survey. Principal contributors outside the Division of Botany and Plant Pathology were: Mr. Fernand Godbout, Mr. E. Lavallée, Mr. R. Desmarteau, Mr. L. Cinq-Mars and Mr. T. Simard; Mr. O. Caron and Mr. D. Leblond; Dr. J.E. Jacques; Prof. J.E. Howitt and Dr. J.D. MacLachlan; Prof. T.C. Vanterpool; and all the District Potato Inspectors. Several of the latter forwarded unusually interesting summaries. Dr. R.O. Lachance has translated the summary "New and Noteworthy Diseases" for the benefit of French readers.

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New or Noteworthy Diseases

Stem rust (Puccinia graminis) was unusually heavy on susceptible varieties of wheat in Man. and eastern Sask. The resistant varieties now commonly grown were free from rust or carried only a trace. Durum wheat was also lightly infected, while barley was more heavily rusted than usual and oats was rather severely rusted. In other parts of Canada stem rust was of minor importance except for a few isolated local epidemics.

Leaf rust of wheat (P. triticina) was generally quite severe in Canada except in Alta. and parts of Sask. Moreover, the varieties Regent, Redman and Renown, which were quite resistant to leaf rust when they were first developed were almost as heavily rusted in the central part of Canada as the susceptible varieties, Thatcher, Apex, and Saunders.

Crown rust of oats (P. coronata) was light to moderate in Man. and eastern Sask., but it was heavy in many localities in Eastern Canada.

Disease ratings of common root rot (Helminthosporium sativum and Fusarium spp.) on wheat in Sask. were lower than in 1946, but higher than in 1945. Again there was a fairly high negative correlation between yield and root-rot ratings.

Helminthosporium blight (H. victoriae Meehan & Murphy) a new oat disease in Canada, was found at Ottawa, Ont., in June 1947. Subsequently it was observed in every province except Alta. The disease is of considerable significance because the two new Canadian varieties, Beacon and Garry, are susceptible to the blight as are several American varieties that derive their resistance to crown rust from their Victoria parent. On account of the susceptibility of Beacon and Garry to the new blight, new varieties are urgently needed in Canada possessing their resistance to crown rust but without their susceptibility to the blight.

The root-gall nematode (Ditylenchus radicicola (Greef) Filipjev) was observed in Canada for the first time when it was found on wheat at Radisson, Sask. Its presence on Agropyron Smithii in a virgin meadow in the same district suggest that this nematode, known previously only from northern Europe, may be indigenous.

An examination of farmers' seed samples for smut in western Canada has revealed that over 70% of the wheat, almost 90% of the oat and over 95% of the barley samples for sowing in 1947 carried some smut. The percentage of cars of wheat graded smutty was likewise high in 1946 and no improvement has been noted in the 1947 crop so far as marketed. The introduction of the resistant Cornell 595 into southwestern Ont. should reduce losses from loose smut in winter wheat, where an average infection of 11% was observed in Dawson's Golden Chaff.

Winter crown rot (low-temperature basidiomycete) of alfalfa was in general less severe in Alta. than in 1946. The disease is largely confined to the northern moist sections of Sask., where the damage was again moderate in 1947. Bacterial wilt (Corynebacterum insidiosum) has

now spread into the Peace River District of Alta. and the Melfort section of Sask. The disease was less prevalent in some districts due to the most severely affected fields having been ploughed up. Wilt was also reported in B.C. and Man. Alfalfa rust (Uromyces Medicaginis) is a disease of minor importance in Canada, but it may be noted that its aecial stage, not previously reported in North America, was found on Euphorbia Cyparissias near Arnprior, Ont.

Flax suffered to some extent from disease in Man. and the eastern part of Sask., whereas heat and drought caused heavy losses from die-back and scorch in the dry central and western parts of Sask. Seedling blight (Rhizoctonia Solani, etc.) caused unusually severe losses in Man. and a slight thinning of stands in Sask. This year R. Solani was the dominant pathogen. Pasmo (Septoria Linicola) was widely distributed and severe in Man.; it was also more prevalent in southeastern Sask. than in the previous year, but it caused little damage.

Still another disease was added to the long list of soybean diseases reported in recent years when brown stem rot (Cephalosporium sp.) was found in a test plot at Ridgetown, Ont. Observations at Guelph and Ottawa indicate that in areas where bacterial blight (Pseudomonas glycinea) is of importance, the growing of resistant varieties should prove beneficial.

Bacterial ring rot (Corynebacterium sepedonicum) of potato was the third most important cause for the rejection of seed potato fields entered for certification and was the leading cause in Sask., Man., Ont., and Que. All potatoes were remarkably free from ring rot in P.E.I., N.S., and B.C. The provincial surveys in Alta. and Ont., have done much to reduce the prevalence and intensity of the disease. The experience of the Alta. authorities, however, has been that an educational programme is insufficient and must be combined with legal action against quarantine violators.

Late blight (Phytophthora infestans) was less destructive than usual in the important potato-growing sections in P.E.I. and N.B., but was relatively severe throughout Ont. and where the vines were not adequately sprayed it caused considerable loss in reduced yields and tuber rot.

Common scab (Actinomyces scabies) is a rather injurious disease in some counties in central Ont., where a scab-resistant variety is needed. The disease appears to be on the increase where heavy applications of commercial fertilizers are commonly used.

A few diseases of other vegetable crops also deserve mention. Bean rust (Uromyces appendiculatus), usually a minor disease, was widespread in southwestern Ont., and caused severe damage in some fields. Not only was root knot (Heterodera marioni) reported on carrots in new centres in the Montreal district, Que., but it was also found attacking parsnips and sugar beets. Carrot yellows (Calliatephus virus 1) was again fairly prevalent across Canada; rigorous roguing as the stecklings were harvested has reduced the incidence of the disease in the seed crop in the B.C. Interior. A new

aphid-transmitted virus disease has been described from N.B. and named carrot dwarf. Rust (Puccinia Porri) was definitely identified from chive specimens received from B.C. Downy mildew (Pseudoperonospora Humuli) is a serious disease in the hop district at Fournier, Ont.; but the disease can be effectively controlled with copper sprays. Onion smut (Urocystis Cepulae) was observed for the first time in the Okanagan Valley, B.C. Yellow dwarf (virus) appears to be well established in the Grand Forks and Vernon districts, B.C.; in the latter district 10% of the plants in seed crops and 1% in bulb crops were affected. Blue mould (Peronospora tabacina) was very destructive in the seed bed in the tobacco sections of Ont., and it also caused considerable damage in the field. In Norfolk Co., the disease was effectively controlled by spraying the seedlings with Fermate. Late blight was again prevalent in the tomato-growing areas in Ont. and was quite destructive in the Counties along Lake Ontario and in the Niagara Peninsula. A destructive outbreak of stem canker (Phytophthora parasitica) was again reported from Belle River, Ont. Blossom-end rot (non-parasitic) was unusually destructive to tomatoes in Canada on account of the dry weather during late summer.

Apple scab (Venturia inaequalis) was severe in Ont., western Que., N.B., and N.S., except in perfectly sprayed orchards. The presence of stony pit (virus) of pear in Ont. was confirmed. Little cherry (virus) now occurs in all important fruit-growing districts of the Kootenays, but it has not been found in the Okanagan Valley, B.C. New provincial regulations permit the immediate removal of any trees suspected of being infected by little cherry. Other virus diseases of stone fruits continue to be a major threat to the industry in B.C. and Ont. Leaf curl (Taphrina deformans) was epidemic in many peach orchards in the Niagara Peninsula, Ont., in which application of the spring dormant spray was delayed by frequent rains. Blossom blight or pedicel rot due to Sclerotinia fructicola caused severe losses in sweet and sour cherry orchards. Stunt, an important virus disease of blueberry, and canker (Godronia Cassandrae) were found in blueberry plantings in Western N.S., for the first time.

An interesting leaf spot (Pasalora bacilligera) was found on Alnus mollis var. crispa near Perce, Que.; first Canadian report. Die-back (cause unknown) of birch continues to cause heavy loss in the Gaspé Peninsula, Que., and the Maritime Provinces. Dutch elm disease (Ceratostomella Ulmi) has spread westward in Que. north of the Ottawa River to within 3 miles of the Ont. boundary.

Leaf blotch (Haplobasidium pavoninum) was found on Aquilegia in B.C.; previously known from Calif. and Europe. Chrysanthemum stunt (cause unknown, possibly virus), which apparently originated in a commercial greenhouse in N.Y., has become established in several greenhouses in Ont. and N.S. Leaf rot (Heterosetella valtellinensis), previously known only from Europe, was discovered on carnations from New Westminster, B.C., and at Seattle, Wash. Downy mildew (Peronospora Gei) severely damaged a seed crop of Geum chiloense at Keating, B.C. Nematode blight (Aphelenchoides ritzema-bosi) was severe on Lilium longiflorum in a greenhouse at Esquimalt, B.C.; although the nematode is well-known on chrysanthemum, it

has not been reported previously on lily in Canada. Rust (Puccinia Oxalidis), a tropical species, was found on Oxalis corymbosa growing as a weed in a greenhouse at Ottawa. Phytophthora blight (P. Paeoniae) was observed at Morin Heights, Que.; first Canadian report, but it may have been confused previously with Botrytis blight. Stem rot (Myrothecium roridum), recorded on pansy in B.C., is another new disease for Canada.

Maladies nouvelles ou d'importance notable

R.O. Lachance

Au Manitoba et dans l'Est de la Saskatchewan la rouille de la tige (Puccinia graminis) fut particulièrement grave sur les variétés de blé susceptibles à cette maladie, tandis que les variétés résistantes, dont la culture est maintenant très généralisée, furent exemptes de rouille ou n'en montrèrent que des traces. Le blé durum ne fut que légèrement infecté, tandis que l'orge fut plus rouillée que d'habitude, et que l'avoine, d'une façon générale, fut plutôt gravement atteinte. Dans les autres parties du Canada la rouille de la tige n'eut qu'une importance minime, sauf en quelques endroits où des épidémies locales furent observées.

La rouille des feuilles du blé (Puccinia triticina) fut en général assez grave au Canada sauf en Alta et dans certaines parties de la Sask. De plus les variétés Regent, Redman et Renown, qui étaient très résistantes à la rouille des feuilles lors de leur création, furent presque aussi gravement rouillées que les variétés susceptibles Thatcher, Apex et Saunders dans la partie centrale du Canada.

La rouille des feuilles de l'avoine (P. coronata) varia de légère à modérée au Man. et dans l'Est de la Sask., mais elle fut grave dans plusieurs localités de l'Est du Canada.

Les évaluations de la pourriture commune des racines du blé (Helminthosporium sativum et Fusarium spp.) en Sask. furent plus basses qu'en 1946 mais plus élevées, toutefois, qu'en 1945. Cette année, encore, on nota une forte corrélation négative entre les rendements et ces évaluations.

La brûlure des noeuds de l'avoine (Helminthosporium victoriae Meehan & Murphy), une maladie nouvelle au Canada, fut observée à Ottawa en juin 1947. Subséquemment on l'observa dans toutes les provinces sauf en Alta. Cette maladie a une importance considérable parce que les deux nouvelles variétés canadiennes Beacon et Garry sont susceptibles à cette brûlure, tout comme nombre de variétés américaines qui tirent leur résistance à la rouille des feuilles de leur parent Victoria. A cause de la susceptibilité de la Beacon et de la Garry à cette nouvelle brûlure il y a au Canada un besoin urgent de nouvelles variétés qui, tout en possédant la résistance à la rouille des feuilles, ne seront pas susceptibles à la brûlure des noeuds.

Le nématode (Ditylenchus radicicola (Greef) Filipjev), cause des tumeurs de racines, fut observé pour la première fois au Canada à Radisson, Sask., sur le blé. Sa présence sur Agropyron Smithii dans une prairie vierge, dans le même district, suggère que ce nématode, jusqu'ici observé uniquement dans le nord de l'Europe, est peut-être indigène.

L'examen d'échantillons de grains de semence des fermiers de l'ouest Canadien pour déceler la présence des charbons a révélé que plus de 70% du blé, presque 90% de l'avoine et plus de 95% de l'orge étaient infectés en 1947. Le pourcentage de wagons classés comme charbonné était élevé en 1946 et jusqu'à date aucune amélioration n'a été observée pour l'année 1947. L'introduction de la variété résistante Cornell 595 dans le sud-ouest de l'Ont. devrait réduire les pertes dues au charbon nu dans le blé d'automne. Une infection moyenne de 11% fut observée cette année dans les champs ensemencés avec le Dawson's Golden Chaff.

La pourriture hivernale de la luzerne (Basidiomycète croissant à basse température), fut, en général, moins grave en Alta qu'en 1946. En Sask. la maladie se limita aux régions humides du nord, où les dommages furent modérés. La flétrissure bactérienne de la luzerne (Corynebacterium insidiosum) a maintenant envahi le district de Rivière-à-la-Paix en Alta et celui de Melfort en Sask. La maladie fut moins grave dans certains districts à cause du fait que les champs les plus gravement atteints ont été labourés. On a également observé la flétrissure en C.-B. et au Man. La rouille de la luzerne (Uromyces Medicaginis) est une maladie peu importante au Canada, mais il est bon de noter que le stage écidien, jusqu'alors inconnu en Amérique du Nord, fut trouvé sur Euphorbia Cyparissias, près de Arnprior, Ont.

Au Man. et dans l'est de la Sask. le lin a souffert quelque peu des maladies en général, tandis que dans le centre et l'ouest de la Sask. de lourdes pertes ont résulté du dépérissement terminal et d'une brûlure occasionnée par la sécheresse et la chaleur. La brûlure des semis (Rhizoctonia Solani, etc.) a provoqué des pertes exceptionnelles au Man. et une faible diminution du rendement en Sask. Cette année, R. Solani fut le pathogène prépondérant. Le pasmo (Septoria linicola) fut très répandu et grave au Man.; dans le sud-est de la Sask. il fut également plus répandu que l'année précédente, mais il ne causa que peu de dommages.

Une autre maladie vient s'ajouter à la liste déjà longue des maladies observées sur la fève soya au cours des dernières années. Il s'agit de la pourriture brune des tiges (Cephalosporium sp.) observée dans les parcelles d'expérimentation à Ridgetown, Ont. Des observations faites à Guelph et à Ottawa indiquant que dans les régions où la brûlure bactérienne (Pseudomonas glycinea) est importante, la culture des variétés résistantes serait avantageuse.

La pourriture bactérienne du cerne (Corynebacterium sepedonicum) de la pomme de terre fut la troisième en importance des maladies responsables de refus de certification. Dans la Sask., le Man., l'Ont. et le Qué., ce fut la principale. Les pommes de terre de toutes catégories furent remarquablement exemptes de pourriture bactérienne du cerne dans l'I.-P.-E., la N.-E. et la C.-B. Les enquêtes provinciales poursuivies en Alta et en Ont. ont

contribué appréciablement à diminuer tant l'étendue que la gravité de la maladie. Suivant les autorités de l'Alta, une campagne d'éducation ne suffit pas pour donner des résultats satisfaisants; elle doit être appuyée par une loi qui permet de sévir contre les violateurs de quarantaines.

Le mildiou (Phytophthora infestans) fut moins dévastateur que d'habitude dans les principales régions de l'I.-P.-E. et du N.-B. En Ont., toutefois, il fut généralement grave et, là où des arrosages efficaces n'ont pas été faits, il en est résulté des pertes considérables à cause de la diminution de rendement et de la pourriture des tubercules.

La gale commune (Actinomyces scabies) des pommes de terre cause des ravages plutôt graves dans quelques comtés du centre de l'Ont. où il faudrait une variété résistante. Il semble que la maladie augmente là où l'on utilise généralement de fortes doses d'engrais chimique.

Quelques maladies sur d'autres légumes ont retenu l'attention des enquêteurs. La rouille des haricots (Uromyces appendiculatus), qui est généralement peu importante, fut très répandue dans le sud-ouest de l'Ontario et causa des dommages sérieux dans certains champs.

Les tumeurs des racines (Heterodera marioni), en plus d'avoir été signalés dans d'autres centres du district de Montréal, Qué. sur les carottes, l'a été sur les panais et la betterave sucrière. La jaunisse des carottes (virus Callistephus 1) fut de nouveau assez répandue à travers le Canada. Une sélection rigoureuse des racines lors de la récolte a réduit de façon appréciable le pourcentage de maladies dans les plantations pour la production de graines dans l'intérieur de la C.-B. Une nouvelle maladie à virus de la carotte fut décrite au N.-B. et nommée "naniame"; elle est transmise par les pucerons. La rouille de la ciboulette (Puccinia Porri) fut identifiée de façon définitive grâce à des spécimens reçus de la C.-B. Le mildiou est une maladie importante dans le district à houblon de Fournier en Ont.; la maladie, toutefois, se combat facilement par les arrosages au cuivre. Le charbon de l'oignon (Urocystis Cepulae) fut trouvé pour la première fois dans la vallée d'Okanagan en C.-B. La jaunisse naine de l'oignon (virus) semble bien établie dans les districts de Grand Forks et de Vernon en C.-B.; dans ce dernier district 10% des plants à graines et 1% des bulbes étaient atteints. Le mildiou du tabac (Peronospora tabacina) fut très dévastateur dans les couches dans les sections à tabac de l'Ont.; dans le comté de Norfolk, il a également causé des dommages dans le champ; on a obtenu un contrôle efficace de cette maladie en arrosant les plants au Fermate. Le mildiou fut très commun dans les districts où l'on cultive la tomate et il a causé des dommages sérieux dans les comtés bordant le lac Ontario et dans la Péninsule du Niagara. Une épidémie de pourriture phytophthoréenne (Phytophthora parasitica) fut signalée à Belle River, Ont. La pourriture apicale (non-parasitaire) fut plus destructive que d'habitude au Canada à cause de la sécheresse de la fin de l'été.

La tavelure (Venturia inaequalis) fut grave en Ont., au N.-B., en N.-E. et dans l'ouest du Qué., sauf dans les vergers parfaitement arrosés. La présence en Ontario de la pierre des poires (virus) fut confirmée. La maladie appelée "petites cerises" (virus) se rencontre maintenant dans tous les districts fruitiers des Kootenays, mais on ne l'a pas encore observée dans la vallée d'Okanagan, C.-B. De nouveaux règlements provinciaux permettent la destruction immédiate de tout arbre suspect d'être atteint de la petite cerise. D'autres maladies à virus des fruits constituent la principale menace à la culture des fruits en C.-B., et en Ont. La cloque (Taphrina deformans) devint épidémique dans plusieurs vergers de pêcher de la Péninsule du Niagara, Ont. où l'arrosage dormant avait été retardé par les pluies trop fréquentes. La brûlure des fleurs ou la pourriture des pédicelles causés par Sclerotinia fructicola ont provoqué des pertes considérables dans les vergers de cerises sucrées et sures. Le rabougrissement, une importante maladie à virus, et un chancre (Godronia Cassandrae) ont été trouvés pour la première fois dans les plantations de bleuets dans l'ouest de la N.-E.

Une tache fort intéressante, causée par Passalora bacillispora, fut observée sur Alnus mollis var. crispa près de Percé, Qué.; c'est un premier record pour le Canada. Le dépérissement terminal (cause inconnue) du bouleau continue de causer des pertes sérieuses dans la péninsule de Gaspé, Qué. et dans les provinces maritimes. La maladie Hollandaise de l'orme (Ceratostomatella Ulmi) s'est répandue vers l'ouest au nord de la rivière Ottawa, jusqu'à 3 milles de la frontière de l'Ont.

La tache des feuilles (Haplobasidium pavoninum) sur Aquilegia, qu'on ne connaissait qu'en Californie et en Europe a été observée en C.-B. Le rabougrissement des chrysanthèmes (cause inconnue, probablement un virus) qui apparemment a pris naissance dans une serre commerciale de New-York, a envahi plusieurs serres en Ont. et en N.-E. La pourriture des feuilles des oeillets (Heterosphaerella valtellinensis), qu'auparavant on ne connaissait qu'en Europe, a été observée à New-Westminster en C.-B. et à Seattle, Wash. Le mildiou (Peronospora Dei) a gravement endommagé une récolte de graine de Geum chiloense à Keating, C.-B. La brûlure causée par le nématode Aphelenchoides ritzema-bosi fut grave sur Lilium longiflorum dans une serre d'Esquimalt, C.-B.; bien que le nématode soit bien connu sur la chrysanthème, on ne l'a jamais rapporté auparavant sur le lis au Canada. La rouille (Puccinia Oxalidis), qui est une espèce tropicale, a été observée sur Oxalis corymbosa, croissant comme mauvaise herbe, dans une serre d'Ottawa. La brûlure phytophthoréenne (P. Paeoniae) fut observés à Morin Heights, Qué; c'est la première fois qu'on fait mention de cette maladie au Canada, mais il est possible qu'on l'ait jusqu'ici confondue avec la brûlure Botrytis. La pourriture des tiges (Myrothecium roridum) des pensées observée en C.-B. est également une maladie nouvelle au Canada.

The Weather and its Influence on Plant Diseases

On the lower mainland of B.C. the weather in 1947 was generally favourable for growth and harvest. The winter was more severe than usual. A near-record low for Vancouver of 4.8°F. occurred in January, but this did little damage other than to a few ornamental plants. The spring was early. Record highs of 75°F. and 83°F. occurred in April and May respectively, and there was reputed to be some loss in strawberry tonnage due to continued dry, hot weather in June (R.E. Fitzpatrick).

There were few abnormalities in the weather of the Okanagan Valley. Scab was severe in the Kamloops district, but very light at Salmon Arm. Downy mildew of onion appeared in the Kelowna area but was checked abruptly by hot, dry weather (H.R. McLarty).

In southern Alta., severe winter conditions caused extensive killing of winter wheat and alfalfa. Many other plants were apparently predisposed to attack by soil-borne pathogens. Damage to winter wheat was so severe in the Coutts-Foremost district that all fields were reseeded to spring wheat. In central and northern Alta., winter conditions were generally favourable for crop plants and there was not an unusual amount of snow mould or winter crown rot damage in grasses and legumes. However, root-rot damage was unusually severe in several fields of winter wheat in one area of the Peace River district, where the plants were possibly weakened by dry conditions in late fall and early spring. A cold, wet spring delayed seeding in most districts, but it was followed by dry weather, which prevailed in most areas until the end of July and caused serious deterioration of crops, particularly in the southeast. Although the drought delayed the incidence of many of the foliage and stem diseases, conditions later in the season were more favourable and considerable infection developed. Hail and frost damage were severe in some districts. Harvesting was delayed by continuous rains starting in late August, which resulted in serious reduction in yield and grade (M.W. Cormack).

At Saskatoon, Sask., rainfall was below normal in May, June and July, but above normal in August and September. Temperature was low in May and September, normal in June, and high in July and August. Sunshine was high in all months but June, the figure for July being a record. For the season as a whole, rainfall was normal or above in only the southeastern part of the province. A late spring delayed seeding and germination, encouraging weed growth. Low soil temperatures also favoured bunt of wheat. Heavy frosts in late May severely damaged fall rye, barley, oats and wheat, and greatly reduced the yield of wild fruits such as Amelanchier. A prolonged drought checked foliage diseases in most areas, but moister conditions in the east and southeast areas stimulated such diseases as leaf rust, speckled leaf blotch and bunt of wheat. Dry, hot weather in the northern alfalfa area checked black stem and encouraged bee activity. A heavy crop of seed was harvested. The drought favoured common root rot of cereals (H.W. Mead, T.C. Vanterpool).

Winter conditions were favourable for orchard fruits in the Niagara Peninsula, Ont., except for supercooled rain in late December and early January, which sheathed branches in ice and encouraged rabbit injury of young trees.

Frequent rain in April hindered timely application of dormant sprays, and leaf curl was epidemic in many peach orchards. Growers who sprayed in late fall or before April obtained excellent control.

Continued wet weather in early May kept orchard soils too wet for cultivation, and the undisturbed mummied peaches produced abundant brown rot apothecia 7-12 May. The sweet cherry bloom period at St. Catharines, 12-23 May, was extremely wet and heavy blossom infection occurred. Losses of peaches, plums and sour cherries were less severe, but were also high. Cool, wet weather delayed cherry fruit development and shedding of blossom remnants, and considerable rotting of green fruit resulted.

Carry-over of apple scab was light to moderate. Mature ascospores were seen 30 April and spore discharges occurred 2, 6 and 7 May; but low temperature hindered development. Heavy discharges 17-20 May with temperatures of 60-73° F. favoured primary infection, and a heavy 30-hour rain 1-2 June initiated widespread secondary infection. Further spread occurred 6-8 and 14-15 June. Rain on fifteen days in July kept the disease active, but hot, dry weather in August checked development on the fruit.

Clear, warm weather in late September curbed spread of late blight on tomato (G.C. Chamberlain).

The mean temperature at Ottawa was slightly high in January, low in February, and normal in March. Snowfall was normal in January and February, but was exceptionally heavy in March. Snow cover was abundant throughout the winter. April was very cool with high rain and snowfall. The ground was bare by 15 April, but was covered again from the 16th to 20th. Cool, wet weather with little sunshine persisted through May, June and early July. After a winter with 122 in. snow and high rainfall, these conditions made the drying out of low ground impossible, and the Ottawa River remained within a few inches of the record flood stage for two months. Nitrifying bacteria were suppressed in many fields and corn was markedly stunted. From mid July to the end of August the weather was warm and very dry, and the abrupt change caused considerable drought injury. Downy mildews, *Phytophthora* spp., *Botrytis* spp., and some anthracnoses were stimulated by the weather of May and June, but conditions were apparently too wet for the optimum development of some rusts. September was wet, October very warm and dry, November close to normal, and December cold and dry. A light snow cover persisted after 24 Nov. (D.B.O. Savile).

In eastern Quebec, a cold, rainy spring delayed the development of both plants and plant pathogens. The summer was warm, dry and rather short, from about 20 June to 20 Sept., but most cultivated plants reached maturity. The incidence of most diseases was low. Early in the summer

Pseudomonas syringae was abundant on lilac at Ste. Anne de la Pocatiere, for the first time since 1936. Rathay's disease of orchard grass was more widespread than in 1946, but dry weather killed the affected plants by the end of June.

Puccinia graminis and P. coronata were scarce on barberry and buckthorn, making heavy primary infections impossible. Light rains in mid August favoured development of cereal rusts, but too late for appreciable damage. Puccinia Ptarmicae was epidemic on Achillea Ptarmica where the weather was dry and hot, but infection was very slight in the moister places.

There were only isolated outbreaks of potato late blight. Pink rot (Phytophthora erythroseptica) of potato caused some concern in the plots of the Station and of the Laboratory at Ste. Anne. Infection appeared to have spread from one field to the other through ground water (A. Payette).

March was exceptionally open in N.S. with bare ground throughout and conditions favourable for injury to crowns of perennials. The spring and early summer were wet and favoured the development of many pathogens. Apple scab developed to serious proportions. Botrytis blights were common on tulip, peony, Prunus spp., and other plants. Grain seeding and potato planting were held up in many sections by wet soil and were not completed until the end of June.

Late in June, strawberry wilting occurred in many plantings. Much of this appeared to be due to winter injury to the crowns. The summer months were warm and dry although a rain of 2.5 in. in 24 hours made the total July precipitation somewhat above the 30 year average. August brought less than one inch of rain and October 0.4 in., a new low for that month. In September some good rains helped to size and mature the apple crop, but also spread late scab infections on fall and winter varieties.

Several fogs during the summer caused late blight epidemics on potato in coastal areas. A frost on 29 Sept. killed most potato tops and prevented further spread of late blight (J.F. Hockey).

Weather conditions during the year 1947 were abnormal in P.E.I. An unusually light snowfall left the land bare or ice-covered during the winter. Seeding of grain and planting of potatoes were delayed by heavy and prolonged rains in May and June. Apple scab spore discharge became general and heavy during early June, but carefully time spray applications prevented infection, which was heavy in unsprayed orchards and on wild trees. July and August were unusually dry. This factor, coupled with the highest mean temperature ever recorded for July, alleviated the threat of potato late blight and arrested development of stem rust, which did not develop until late in the season. Potato magnesium deficiency and turnip brown heart were more severe than in recent years because soil moisture was insufficient to make available the supplements in chemical fertilizers. The considerable amount of potato common scab in 1947 indicated a response of the pathogen to the hot, dry weather. Powdery scab and rhizoctonia, being wet season diseases, were of little consequence. Downy mildews were insignificant.

Rainfall of 4.72 in. in September brought on an incipient fall attack of late blight, which caused some injury to the stored potato crop. Between 24 and 29 Sept. frosts killed off most of the potato tops, making chemical killing unnecessary. Sharp frosts during the digging period caused some injury to potatoes left on the ground at night (R.R. Hurst).

Phenological Data - 1947

The data in the main table were compiled by B. Peturson at Winnipeg, R.C. Russell at Saskatoon, and M.W. Cormack at Edmonton. The second column under each locality shows the departure, in days, from the average time of flowering.

The first part of the 1947 season was late at all three places but especially so at Winnipeg. Dry weather tended to hasten the maturing of plants later on at Saskatoon and Edmonton and, judging by the records for wheat, the same situation developed at Winnipeg. Wheat was sown early at Saskatoon and, after lagging for some time in the early stages of growth, ripened early because of lack of moisture in June and July. At Edmonton, where moisture conditions were more favourable, wheat ripened slightly after the average date of harvesting (R.C. Russell).

Anthesis dates at Ottawa, with number of days departure from average, for 8 plants from the main list were as follows:

Populus tremuloides	26/4	10L	Anemone canadensis	12/6	7L
Acer Negundo	12/5	14L	Bromus inermis	28/6	8L
Prunus pennsylvanica	27/5	13L	Phleum pratense	29/6	4L
Smilacina stellata	30/5	10L	Solidago canadensis	10/8	11L

Anthesis dates for marker trees at Ottawa compared with previous years:

	Average (1936-45)	1945	1946	1947
Acer saccharinum	14/4	25/3	21/3	12/4
Ulmus americana	27/4	3/4	7/4	6/5
Acer saccharum	8/5	14/4	8/5	19/5
Pinus sylvestris	27/5	27/5	1/6	10/6

The season at Ottawa opened with the flowering of Acer saccharinum two days ahead of average. The season immediately began to lag, however, and by 1 May it was a week or more behind average. A lag of 8 to 12 days persisted throughout the season (W.H. Minshall).

SUMMARY OF PHENOLOGICAL DATA TAKEN AT WINNIPEG, SASKATOON, AND EDMONTON, IN 1947

		Winnipeg		Saskatoon		Edmonton	
Pulsatilla Ludoviciana		---	---	22/4	6L	---	---
Populus tremuloides		---	---	29/4	6L	26/4	4L
Phlox Hoodii		---	---	3/5	6L	---	---
Salix petiolaris		---	---	6/5	8L	---	---
Acer Negundo		17/5	11L	10/5	4L	7/5	6L
Betula papyrifera		---	---	13/5	4L	12/5	4L
Thermopsis rhombifolia		---	---	14/5	4L	---	---
Amelanchier alnifolia		28/5	12L	16/5	3L	20/5	6L
Prunus pennsylvanica		---	---	20/5	N	25/5	8L
Viola rugulosa (V. canadensis auct.)		---	---	15/5	7E	24/5	4L
Smilacina stellata		---	---	25/5	2L	buds frozen	
Prunus americana		22/5	6L	---	---	---	---
Hierochloe odorata		---	---	24/5	7L	---	---
Crataegus sp. (hawthorn)		9/6	13L	3/6	6L	31/5	1L
Prunus melanocarpa		10/6	13L	6/6	10L	1/6	6L
Viburnum Lentago		16/6	12L	---	---	---	---
Cornus sp. (dogwood)		---	---	6/6	7L	11/6	10L
Elaeagnus commutata		---	---	15/6	11L	12/6	8L
Lonicera glaucescens		---	---	22/6	14L	13/6	4L
Viburnum trilobum		---	---	---	---	buds frozen	
Viburnum pubescens		18/6	8L	---	---	---	---
Achillea lanulosa		---	---	16/6	6L	2/7	6L
Diholcos bisulcatus		---	---	17/6	6L	---	---
Anemone canadensis		19/6	11L	29/6	18L	23/6	1E
Galium boreale		---	---	24/6	10L	20/6	4L
Rosa alcea		---	---	23/6	5L	---	---
Bromus inermis		29/6	7L	29/6	5L	4/7	7L
Gaillardia aristata		---	---	1/7	8L	---	---
Campanula petiolata		---	---	2/7	9L	---	---
Spiraea alba		---	---	10/7	8L	---	---
Symphoricarpos occidentalis		---	---	2/7	3E	7/7	3L
Psoralidium argophyllum		---	---	12/7	3L	---	---
Chrysopsis hirsutissima		---	---	29/6	1E	---	---
Phleum pratense		---	---	---	---	14/7	7L
Lactuca pulchella		---	---	10/7	N	16/7	2L
Chamaenerion spicatum		---	---	---	---	14/7	4L
Agastache anethiodora		---	---	---	---	14/7	2L
Cirsium Flodmanii		---	---	17/7	2L	---	---
Solidago missouriensis		---	---	17/7	2L	---	---
Solidago canadensis		---	---	---	---	20/7	2L
Grindelia perennis		---	---	25/7	2L	---	---
Oligoneuron canescens		---	---	31/7	6L	---	---
Aster laevis (purple)		---	---	2/8	3L	30/7	1E
Thatcher Wheat:	Sown	28/4	4L	18/4	6E	28/4	2L
	Emerged	17/5	12L	6/5	3E	8/5	N
	Headed	8/7	10L	1/7	1L	5/7	4L
	Harvested	6/8	2L	29/7	8E	16/8	2L

I. DISEASES OF CEREAL CROPS

WHEAT

ALTERNARIA BLOTCH (*A. tenuis*) was prevalent in some districts of Man. on Regent, Renown, and Redman, heavy infection occurring in some fields. The disease seems to have been favoured by a hot dry period followed by wet weather. Samples of affected heads were received from farmers and agricultural representatives when the wheat was in the early dough stage (W.A.F. Hagborg).

ERGOT (*Claviceps purpurea*). Traces of ergot were more prevalent than usual in wheat and barley at Indian Head, Sask. (R.C. Russell). Ergot was readily found on wheat and barley in Man. It was also recorded on oats at Gilbert Plains (A.M. Brown). A few affected heads were brought to the laboratory from a field in Queens Co., P.E.I. (R.R. Hurst).

ANTHRACNOSE (*Colletotrichum graminicola*). A trace was present in a field of winter wheat at Port Hope, Ont. (I.L. Conners).

ROOT-GALL NEMATODE (*Ditylenchus radicicola* (Greeff) Filipjev). In Feb. 1947, wheat seedlings with nematode galls on the roots were received from Radisson, Sask. The seedlings had been grown in soil from a virgin meadow plowed in 1946. The identity of the nematode was confirmed by Dr. A.D. Baker. A light natural infection was found on wheat at Radisson in June. This nematode has not been previously recorded outside Northern Europe. For a fuller report see Sci. Agric. (T.C. Vanterpool).

POWDERY MILDEW (*Erysiphe graminis*) infection was light on Red Bobs, Kharkov, and Ridit and a trace on Jones Fife in the University plots, Vancouver, B.C. (I.C. MacSwan). There was little powdery mildew on the general crop in Alta., infection being 4-tr. 1-mod./135 fields; in the plots, however, infection was light to heavy on winter wheat, heavy on Federation, and light to moderate on other spring varieties at Lethbridge, moderate to heavy at Edmonton, and virtually nil at Olds and Lacombe. Powdery mildew, found on *Agropyron repens* at Edmonton by A.W. Henry, caused infection on wheat. (J.D.G.). Powdery mildew was moderate to heavy about Guelph, Ont., (J.D. MacLachlan). These local observations are almost identical with those made by Johnson *et al.* on the rust nursery material (see Table 3).

HEAD BLIGHT (*Fusarium* spp.). Two species of *Fusarium* have been isolated from the 10 specimens of head blight so far examined: *F. avenaceum* from Normandin, Que., and Kentville, N.S.; *F. Poae* from Alexandria and Appleton, Ont., and Macdonald College and Lennoxville, Que. (W.L. Gordon). A light infection was observed on winter wheat at Guelph (J.D. MacLachlan) and Chatham, Ont. (W.C. Broadfoot).

COMMON ROOT ROT (*Helminthosporium sativum* and *Fusarium* spp.). Damage from common root rot was similar to last year in spring wheat in Alta., being 27-tr. 20-sl. 8-mod./55 fields (J.D.G.). The disease was prevalent in most of the 37 fields of winter wheat examined in southern Alta. and the Peace River District (L.E. Tyner).

In Sask., 226 fields of wheat were sampled shortly before harvest and the root-rot data recorded. The mean disease rating for all fields was 9.80, which is less than in 1946 (10.68), but the difference was scarcely significant at the 5% level. The standard deviation was 4.31, indicating less vairability between fields than last year (5.36). As is usually the case there was a fairly high negative correlation between yield and root-rot ratings (Sci. Agric. 28(1):6-20. 1948). The first published estimate of wheat yields for crop districts 1 to 9 were respectively 19.5, 18.0, 13.9, 8.1, 23.0, 8.8, 8.3, 11.5, and 5.7 bu. per acre. The corresponding common root-rot ratings were 8.0, 10.0, 11.2, 12.5, 7.6, 9.8, 12.3, 10.5, and 8.3. A very severe drought in the Rosthern area caused marked stunting and premature ripening of the plants in large patches of the fields. There was some indication that the common root-rot organisms contributed to the condition (B.J. Sallans). In a sample of durum wheat from Laporte, Sask., received Aug. 6, the heads were not filling and the plants were turning white. Many culms showed mechanical bruises about 1 in. above the base with complete lack of any basal discoloration. Helminthosporium sativum only was isolated from the 'bruises' (T.C. Vanterpool). Common root-rot infection was a trace to light in nearly every field of winter wheat observed in Ont. (W.C. Broadfoot).

TAKE ALL (Ophiobolus graminis). Damage was recorded in spring wheat (1-tr. 1-sl. 2 mod./98 fields) in Alta. (J.D.G.) and in winter wheat (5-tr. 15-sl. 6-mod. 4-serv./37 fields) surveyed in southern Alta., and the Peace River District (L.E. Tyner). Take all caused slight damage in small patches in 8 fields in southeast Sask. (H.W.M.). A moderate infection occurred on winter wheat at Guelph, Ont. (J.D. MacLachlan). Damage varied from a trace to slight in fields observed at widely scattered points in Ont. In a field of Cornell 595 near Newmarket, damage was moderate in patches; perithecia were abundant on 25% of the diseased plants (W.C. Broadfoot, I.L. Conners). Traces were observed in the plots at Ste Anne de la Pocatière, Que. (A. Payette).

BASAL GLUME BLOTCH (Pseudomonas atrofaciens). A sample was received from Berwyn, Alta. (A.W. Henry).

STRIPE RUST (Puccinia glumarum). A widespread, but light infection was present in winter wheat in southern Alta. (L.E. Tyner).

STEM RUST (Puccinia graminis) was first observed in Alta. on 21 Aug. as a local primary infection on Red Bobs in the Lacombe plots. Heavy local infections were present on the same variety by 1 Sept. in the Edmonton plots. A trace of stem rust was found on Lembi at Lethbridge on 2 Sept. (J.D.G.). A light scattered infection (9-tr. 3-sl. 1-mod.) was noted in east-central and southeast Sask. (H.W.M.). Stem rust was fairly heavy on several varieties including Red Bobs, Kubanka, and Reward at Indian Head (R.C. Russell).

In 1947, scattered stem rust infections began to appear on susceptible barley and wheat varieties in southern Man. during the first week in July. The rust infections on susceptible wheats increased gradually throughout the remainder of the season and at harvest time, in mid-August, infection on these varieties averaged 70-80%. Barley

varieties, although more heavily rusted than usual, carried very much lighter infections than the susceptible wheats, owing chiefly to rust escape through earlier ripening. Most of the stem-rust inoculum present in Man. this year consisted of race 56 to which most durum wheats are resistant and for that reason durums became only lightly infected. The stem-rust resistant wheats, Thatcher, Regent, and Renown, which now comprise nearly all the bread-wheat acreage in Man., carried only very slight traces of rust or none at all and suffered no stem-rust damage (B. Peturson).

Traces of stem rust were observed on winter wheat at a few places in Ont. 10-18 July (I.L. Conners). Traces also developed on wheat in the plots at Ste Anne de la Pocatière, Que. (A. Payette). Stem rust varied from a trace to 15% and averaged 5% in the 3 counties of P.E.I. (R.R. Hurst).

LEAF RUST (Puccinia triticina). Infection was a trace on Red Bobs and light on Ridit and Jones Fife in the University plots, Vancouver, B.C. (I.C. MacSwan). Leaf rust was in general very light in Alta., infection being 15-tr. 5-sl. 1-mod./135 fields. A trace occurred on winter wheat at Lethbridge. It was observed at Edmonton on 31 July and a severe infection later developed in the late-sown plots of winter wheat (J.D.G.). Leaf rust was very general in east-central and southeast Sask., infection being 8-tr. 12-sl. 27-mod. 34-sev./226 fields. Yields were reduced considerably in the area east and south of Indian Head (H.W.M.).

Leaf rust of wheat was generally quite severe throughout Man. and susceptible varieties (Thatcher, Apex and Saunders) carried infections ranging upwards of 75%. The leaf rust inoculum present was composed very largely of races to which varieties having the Hope type of leaf-rust resistance are susceptible and these varieties, Regent, Redman, and Renown, became almost as heavily rusted as the leaf-rust susceptible ones. The damage caused by leaf rust is difficult to appraise. This year the amount of damage caused was greatly moderated by the fact that leaf rust, owing to dry weather which prevailed during most of July, was slow in developing and did not reach maximum intensity until shortly before harvest and, therefore, the actual yield reductions were no doubt less than indicated by the rust percentages observed. However, that substantial losses occurred owing to the action of leaf rust was indicated by the results of a controlled experiment carried out at Winnipeg. In this test naturally occurring leaf rust infection reduced the yield of Thatcher by 23%, its bushel weight by 2.8 pounds, and its grade by one commercial grade. Lower but substantial reductions were also recorded for Saunders and Redman in this test. As the varieties tested were sown on 22 May, about 10 days past the average seeding date in the Winnipeg district, the yield reductions here indicated no doubt exceeded the losses actually suffered in commercial fields in this area. Slight traces of leaf rust were general on durum wheat (B. Peturson).

Leaf rust infection usually varied from 40 to 60% in fields of winter wheat observed in southern and central Ont. Cornell 595 appeared to be as susceptible as Dawson's Golden Chaff. However, a hybrid line, D.G.C. x Caldwell 11, apparently possesses considerable leaf rust resistance although the line is still segregating for resistance as the infection on individual plants varied at Guelph from 10 to 40% (I.L. Conners). Leaf rust did not appear until mid-August at Ste Anne de la Pocatière, Que.; although a moderate infection developed no well marked differences in infection were noted on the varieties under observation (A. Payette). Leaf rust was more prevalent throughout P.E.I. in 1947 than for some time; it was present in all

fields examined and caused severe damage in the occasional field (R.R. Hurst).

BROWNING ROOT ROT (Pythium spp.). In most parts of Sask. browning root rot was again light in 1947. Moderate infections were found on 17 June at Smuts and Aberdeen. Late frosts may have interfered in the detection of the disease in some instances. Moderate infections were present on 30 June at Rosthern and northwest, west and southwest of Hague. A severe case was observed south of Duck Lake in an old browning root-rot field, with 75% of its area affected (T.C. Vanterpool).

GLUME BLOTCH (Septoria nodorum). Infections ranging from a trace to slight were reported in 4 fields in Alta. (J.D.G.). Affected heads were received from Weyburn, Sask. (T.C. Vanterpool). Further information is given on its distribution in Canada under the survey of nursery material (q.v.).

SPECKLED LEAF BLOTCH (Septoria spp.) was found in over half the fields examined in Alta., infection being 35-tr. 36-sl. 2-mod./135 fields. Infection was trace to light at Olds, light at Lacombe, and light to moderate at Edmonton (J.D.G.). The disease was common in the Kamsack-Humboldt area, Sask., infection being 1-tr. 2-sl. 2-mod. 4-sev. (H.W.M.). Infection by speckled leaf blotch was usually light to moderate on winter wheat in Ont., but it was even severe in the odd field (W.C. Broadfoot). It seems probable that most of the speckled leaf blotch reported above is caused by Septoria Avenae f.sp. triticea Johnson. A paper on this special form is in press (Can. Jour. Res. C.). From his survey of nursery material (q.v.), Johnson found that this fungus was generally distributed in the Prairie Provinces, Ont., and Que., in 1947. Moreover, a specimen collected at Rama, Sask., in 1947, was determined by him as S. Avenae f. sp. triticea (I.L.C.).

BUNT (Tilletia caries and T. foetida). In Table 1 are summarized the inspection records of the Western Inspection Division at Winnipeg for the crop year 1946-47 and for the first quarter of 1947-48 (W. Popp).

Table 1. Wheat Bunt in Western Canada

Class of Wheat	Aug.1, 1946 to July 31, 1947			Aug. 1 to Oct. 31, 1947		
	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty
Hard Red Spring	178,890	541	0.30	46,802	181	0.39
Amber Durum	4,807	198	4.12	3,150	47	1.49
White Spring	237	1	0.42	187	0	0.00
Alberta Red Winter	1,831	96	5.24	481	14	2.91
Garnet	3,074	3	0.10	275	0	0.00
Mixed Wheat	123	4	3.25	40	0	0.00
All Classes	188,962	843	0.45	50,935	242	0.48

The figures for the inspection year 1946-47 confirm those for the first quarter, Aug. 1 to Oct. 31, 1946. (P.D.S. 26:4), which indicated that the amount of bunt in the 1946 crop had increased sharply. The final

figures show that the percentage of cars grading smutty increased by a half, i.e., from 0.30% to 0.45%. This increase was mostly due to more smut in the Amber Durum and Alberta Red Winter classes, but a substantial increase of smut in Hard Red Spring Wheat also contributed to the all-over increase. If the figures for the first quarter, Aug. 1 to Oct. 31, 1947 of the current inspection year are indicative, there has been no improvement in the control of bunt in the 1947 crop of Hard Red Spring Wheat, while the amount of bunt in Amber Durum and Alberta Red Winter is less, but still high.

The amount of bunt in winter wheat appears to fluctuate widely from year to year. The problem of its control has become more important because the acreage in winter wheat has greatly increased in the last two years and because the currently grown varieties are susceptible to dwarf bunt. Seed treatment fails to protect the crop against this strain of bunt when the soil has once become infested. As dwarf bunt occurs in several of the neighboring States, a sharp look-out should be kept for this strain in winter wheat areas, particularly in Alta. and B.C. (I.L.C.).

In 1947, the Line Elevators Farm Service examined 12,288 farmers' seed samples for surface-borne smuts as part of its advisory service to farmers. When the seed was found to carry any smut spores, in accordance with recommendations of the Dominion Department of Agriculture seed treatment was recommended. The results are summarized in Table 2, which was supplied by Dr. F.J. Greaney, Director. It will be seen from these tests that over 70% of the wheat, almost 90% of the oat and over 95% of the barley samples carried some smut. A comparison of the findings for 1946 with those in 1945 offer no evidence of any betterment in the smut situation in the Prairie Provinces. Indeed, the lower percentage of wheat samples free from bunt spores was to be expected because the percentage of cars grading smutty in 1946 crop was greater than in 1945. Dr. Greaney writes: "What is needed in this country is a well organized and directed seed treatment campaign. The results of our own tests, and experience, emphasize the urgent need of farmers becoming better acquainted, not only with the enormous, though entirely needless, losses from smut, but also with the newer fungicides and methods for the control of smut and other seed-borne diseases". (I.L. Conners).

Bunt (almost entirely due to T. foetida) was found in 25 fields out of 203 inspected in Sask. Infection was a trace in 13 fields, 2% in 3, 4-7% in 6, 15% in 2, and 25% in one. Bunt was more in evidence this year than usual, particularly in the south-east (H.W.M.). Field experiments were again carried out this year in Sask. to determine how much smut may develop in the field when seed of known spore loads is planted. In wheat the average infection was a fraction of one per cent when a trace of smut was present on the seed. Seed artificially inoculated and sown at the same time yielded a crop with 70% of the heads bunted. Similar results were obtained with the smuts of oats and the covered smut of barley, although the smut infection in the artificially inoculated seed was only 11% in oats and 4% in barley (R.C. Russell).

In the 14 fields examined in Man., 5% of bunt was found in one field of durum (W.J. Cherewick).

Table 2. Prevalence of Surface-borne Smut in Samples of Wheat, Oats, and Barley from the 1946 Crop in Western Canada.

(Summary of tests on farmers' seed samples made by Line Elevators Farm Service, Winnipeg, Man.)

Crop and Province	Number of Samples Tested	Percentage of Samples Carrying			
		No smut (Clean)	Trace to light smut-load	Heavy smut load	Very heavy smut load 1/
		%	%	%	%
WHEAT					
Manitoba	101	31.7	41.6	26.7	0.0
Saskatchewan	6841	29.1	45.5	23.5	1.9
Alberta	1325	26.2	45.7	26.1	2.0
All Provinces	8267	28.6	45.5	23.9	1.9
OATS					
Manitoba	51	9.8	60.8	27.4	2.0
Saskatchewan	2056	10.1	47.2	41.4	1.3
Alberta	871	12.1	60.3	26.6	1.0
All Provinces	2978	10.7	51.2	36.9	1.2
BARLEY					
Manitoba	58	1.7	15.5	32.8	50.0
Saskatchewan	608	1.5	21.5	35.2	41.8
Alberta	377	7.4	39.0	40.6	13.0
All Provinces	1043	3.6	27.5	37.0	31.8

1/ Smut balls or fragments of smut balls

Bunt (T. caries) was found in Ont. affecting 8% of the heads in one field of Dawson's Golden Chaff out of 6 examined and a trace and 2% respectively in 2 fields out of 7 of Cornell 595. The Cornell 595 was carefully examined for possible infection by dwarf bunt, but none was found (W.C. Broadfoot).

LOOSE SMUT (Ustilago Tritici). A trace was found in Garnet and Red Bobs in the plots at Lacombe, Alta. (J.D.G.). Very little loose smut was seen in Sask. in 1947; traces were recorded in 2 fields out of 203 examined. (H.W.M.). In 14 fields examined in Man. loose smut varied from 0 to 3% and averaged 0.5% (W.J. Cherewick). A careful count for loose smut was made in fields of winter wheat at widely separated points in Ont. Infection was a trace to 24% in Dawson's Golden Chaff and averaged 11% whereas it was never more than a trace in Cornell 595, which has been introduced from New York State on account of its resistance to loose smut. There is a distinct need for a variety resistant to loose smut, but it should combine resistance to other diseases, including leaf rust. The 1947 crop in Ont. is estimated by the Dominion Bureau of Statistics to have been 18,235,000 bu. The loss from loose smut is accordingly estimated at 2,354,000 bu. At the 1946 farm price of $1.23 per bu., the loss amounts

$2,895,000. In the fields inspected, the loss to the individual grower varied from a nominal 35 cents per acre where a trace of loose smut was present to $8.50 per acre where 24% of the heads were destroyed (W.C. Broadfoot, I.L. Conners). Loose smut was moderate to severe about Guelph; it is increasing in prevalence in susceptible varieties such as Dawson's Golden Chaff (J.D. MacLachlan). Infection was usually a trace, but in some fields it was 1% in the 16 examined in Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL BLACK CHAFF (Xanthomonas translucens ff. spp.) was severe in Saunders wheat at Indian Head, Sask. (R.J. Ledingham, W.A.F. Hagborg).

?MOSAIC (virus). A sample of leaves bearing chlorotic flecks was sent by W.J. Breakey of the Station, Morden, Man., to Dr. H.H. McKinney, U.S. Department of Agriculture, on account of the resemblance to the virus infection which the latter had found previously in winter wheat. Although Dr. McKinney was unable to decide definitely from the material submitted he considered that it might be a mosaic due to virus. According to Mr. Breakey the disease was very severe at Morden on selections from Windum x Carleton crosses.

The sample received from Morden bore a marked similarity to the disease noted on Carleton wheat from time to time. I first encountered it at the Reclamation Station, Melita, 28 June 1945. The disease was severe on some of the plots at that time. In one plot sown 2 May, for example, all leaves were affected, with 40% of the leaf area chlorotic. The chlorosis was in the form of short linear streaks. A similar condition has been noted in Carleton and Carleton derivatives at Winnipeg (W.A.F. Hagborg).

LEAF BREAK (low temperature). A type of low temperature injury was observed in Alta. in cereal seedlings where the injury occurred on the first leaf at ground level. A few days later a chlorotic area developed and the leaf blade broke off at the point of injury. Damage was reported from several sections of Alta. and appeared to be most severe on wheat and oats although it did affect barley (J.D.G.).

OATS

HEAD BLIGHT (Alternaria and Fusarium spp.) affected about 5% of the spikelets in a plot of Ajax at Summerside, P.E.I.; it was present to about the same extent on several varieties in the Station plots, Charlottetown (D. Robinson).

ANTHRACNOSE (Colletotrichum graminicola). Specimens were received from Ridgetown, Ont. (OAC 751) (J.D. MacLachlan).

POWDERY MILDEW (Erysiphe graminis). A slight infection was observed in the University plots, Vancouver, B.C., on Alaska and Victory in 1946 (W. Jones) and on Victory in 1947 (I.C. MacSwan). A trace was observed in one field in the Montreal district, Que. (T. Simard).

COMMON ROOT ROT (Fusarium spp.). Damage from common root rot was 4-tr. 2-sl./70 fields in Alta. and 2-sl. 31-mod. 1-sev./34 fields in Sask. (B.J. Sallans). The prematurity blight phase caused moderate damage at the University, Saskatoon (H.W. Mead). F. culmorum was found fruiting on the leaf sheaths of Ajax oats affected by root rot received from Glenannon, Ont. (J.D. MacLachlan).

LEAF BLOTCH (Helminthosporium Avenae) was general on volunteer oats 25 April 1946 in North Saanich, B.C. (W. Jones). Infection was 18-tr. 11-sl. 2-mod./70 fields in Alta. Infection was also moderate to severe on several varieties at Edmonton, trace to light on all varieties at Lacombe and a trace at Olds. (J.D.G.). Traces of leaf blotch were present in most fields of oats examined in Ont., whereas infection was slight in a few fields and moderate in one of Beaver at Edgeley (D.G. Hamilton, W.C. Broadfoot). In the Montreal district, Que., infection was recorded as 26-tr. 24-sl. 3-mod. 1-sev./67 fields (T. Simard). In the Quebec Seed Board plots located at 16 widely scattered points in the principal grain-growing sections of Que., leaf blotch infection was usually a trace to light, but a moderate infection was recorded on all varieties at St. Flavien. (T. Simard, D. Leblond). Leaf blotch was prevalent in all oat fields examined and appears to be present everywhere in P.E.I. (D. Robinson).

HELMINTHOSPORIUM BLIGHT (H. victoriae Meehan & Murphy) was first observed at Ames, Iowa, in 1944 (cf. P.D.S. 26:7). During 1946 its occurrence was widespread in the United States on oat varieties and selections that hav- Victoria as a parent and possess its resistance to crown rust. In June 1947, the disease was found in Canada in the Cereal Division plots, Central Experimental Farm, Ottawa, Ont. During a survey conducted in July Helminthosporium blight was found in widely separated districts in Ont. on the new Canadian oat varieties, Beacon and Garry, and the American variety Vicland. Infection varied from a trace in many fields to a severe infection with 75% of the plants affected in a small strip of Beacon at Blenheim, Ont. (D.G. Hamilton and W.C. Broadfoot, Sci. Agric. 27(9): 446-447. 1947). Since its discovery Helminthosporium blight was found on Garry oats from a plot at Shipman, Sask. (P.M. Simmonds) and in fields of this variety at several points in Man. (J.E. Machacek). Infection was moderate to severe at O.A.C., Guelph, Ont., on Beacon, Vicland, and Garry (J.D. MacLachlan). It was observed at Ste. Anne de la Pocatière, Que., Fredericton, N.B., and Charlottetown, P.E.I. (J.H. Craigie). In the Q.S.B. plots it was recorded on Garry at seven places and on Beacon at three. At Lennoxville it was also observed on Ottawa 2797-H2 and believed to be present on 3054-73. No estimate of damage was made (T. Simard, D. Leblond). Helminthosporium blight severely attacked the variety Garry in the rod row plots at Upper Woodstock and Bulls Creek, N.B. Many of the plants were killed in the seedling stage. On the surviving plants heads failed to develop or were poorly filled. Many of the plants were lodged, breaking over at the infected nodes. The pathogen was identified by J.E. Machacek (S.F. Clarkson). Examination of the nursery material (q.v.) disclosed the presence of the blight in Eastern Canada. It has now been identified at Winnipeg on diseased plants from one or more points in all provinces of Canada except Alta. It has also been found in samples of Garry oat seed from widely distributed points in Man. and Sask. (J.E. Machecek).

In a test at Ottawa only the organic mercury compounds controlled the disease on naturally infected seed. None of the seed treatments was effective in controlling the blight when the seed was sown in either naturally or artificially infested soil. H. victoriae has been isolated from seed produced at Ottawa in the years 1945 to 1947, but it was not isolated from seed of the 1944 crop. It has also been isolated from soil on which a susceptible oat variety was grown in 1947 (W.C. Broadfoot).

HALO BLIGHT (Pseudomonas coronafaciens) was present in 31 out of 70 fields in Alta. infection being trace in 25 and slight in 6. A trace occurred on Legacy at Edmonton (J.D.G.). In Sask., infection was recorded as 2-tr. 1-sl. 2-mod. 2-sev./37 fields. The disease was easy to find in the Meadow Lake area (H.W.M.).

CROWN RUST (Puccinia coronata) was found only in southeast Sask., infection being 2-tr. 1-sl, 2-mod./37 fields (H.W.M.). A moderate infection of crown rust was present throughout Man. In early sown fields it occurred as trace infections, but in later fields it reached an intensity of upwards of 80% (B. Peturson). Only traces of crown rust were seen in early July in southern Ont., (I.L. Conners). Later a light to moderate infection developed at Guelph (J.D. (MacLachlan). In the Q.S.B. plots, crown rust was severe on Vanguard at L'Assomption, St. Hyacinthe, Wotton and Frampton. Among the crown rust resistant varieties not more than a trace developed on Garry, but heavier infections occurred frequently on the others (T. Simard, D. Leblond). In the Montreal district the infection was estimated as 8-tr. 27-sl. 14-mod. 2-sev./67 fields (T. Simard). Crown rust was abundant in oat fields in York, Sunbury, Carleton and Victoria Counties, N.B.; however, the damage was in general slight as most fields became infected as they were approaching maturity (J.L. Howatt). Crown rust was prevalent at several points about Charlottetown, P.E.I., whereas only traces were noted near Montague and Kensington (D. Robinson). Late in the season infection was heavy everywhere on late oats, and on volunteer oat plants in potato and turnip fields (R.R. Hurst). The rust nurseries (q.v.) showed that crown rust was heavy at most points in eastern Ont. and further east.

STEM RUST (Puccinia graminis) was first observed in Alta. at Thorsby. A trace was found on 4 fields in Alta. and on Legacy at Edmonton (J.D.G.). A light infection was recorded in a few fields in the eastern and southeastern parts of Sask. (H.W.M.).

A moderately severe rust infection (50-60%) developed on susceptible oat varieties in Man. The new stem rust resistant oat varieties carried considerable rust infection but were much less severely affected than the old susceptible ones. About one-third of the rust inoculum present in Man., as indicated by physiological race surveys, was composed of races 8, 10, and 11, and, owing to their susceptibility to these races, the new resistant varieties became infected. However, had the entire oat acreage in the province been seeded to Victory and Banner, the varieties formerly used, and which are susceptible to all the races of this rust present in the province this past summer, severe yield reductions undoubtedly would have occurred (B. Peturson).

A light to moderate infection developed on oats at Guelph, Ont. (J.D. MacLachlan). In the Q.S.B. plots, stem rust was usually only a trace; however a moderate infection developed on Ajax at St. Hyacinthe and Lennoxville, Que. (T. Simard, D. Leblond). Heavy stem rust infection was observed in the Frelighsburg and Sweetsburg districts where numerous barberry bushes have been found. In the Montreal district infection was usually a trace (T. Simard).

SPECKLED LEAF BLOTCH (Septoria Avenae). A slight infection was found in only one of the 70 fields examined in Alta. (J.D.G.). In the Q.S.B. plots infection was usually a trace to light, but it was moderate to severe on several varieties at St. Arsène, Normandin and Péribonka, Que. (T. Simard, D. Leblond). In the Montreal district infection was 24-tr. 3-sl./67 fields (T. Simard). Speckled leaf blotch was again the principal disease of oats at Ste. Anne de la Pocatière; however, the average infection rarely exceeded 10% and did not vary noticeably from one variety to the next (A. Payette). Its prevalence in Que. is confirmed by Johnson in his survey of nursery materials (q.v.).

OAT SMUTS (Loose Smut, Ustilago Avenae, and Covered Smut, U. Kolleri). Smut was found in 9 fields in Alta., infection being 1-tr. 8-sl./70 fields. (J.D.G.). Traces of loose smut were found in Sask. in 3 fields out of 37 examined. On the other hand covered smut infection was trace in 4 fields, 2% in 2, 5% in 3, 12% in one and 20% in one. Covered smut appeared to be a little more prevalent than last year (H.W.M.). In the 94 fields examined in Man. smut infection varied from 0 to 29%, average 2.0% (W.J. Cherewick). The oat smuts were less prevalent than usual about Guelph, Ont. (J.D. MacLachlan). Smut was present in 5 fields out of 15 examined in Ont., infection ranging from 4 to 15% (D.G. Hamilton, W.C. Broadfoot). Smut infection in the Montreal district, Que., was 10-tr. 1-sl. 5-sev./67 fields (T. Simard). A 10% infection of covered smut was noted in 2 fields on the same farm in Kings Co. P.E.I. (G. Ayers). Traces of loose smut only were found during a limited examination this year in P.E.I. (R.R. Hurst).

BLAST (non-parasitic) was recorded in Alta. as follows: 45-tr. 19-sl. 2-mod. 2-sev./70 fields; blast was a trace in the plots at Olds and a trace to slight at Lacombe and Lethbridge (J.D.G.). A small amount of blast occurred in all fields in Sask. (H.W.M.). There was considerable blast in Ont. in 1947 (D.G. Hamilton). Blast was recorded in the Montreal district, Que.: 38-tr. 15-sl. 7-mod./67 fields (T. Simard). A careful estimate of blast was obtained by counting the blasted grains in 10 panicles chosen at random from each plot and making the calculation: Number of blasted kernels x 100/ (sum of blasted and sound kernels). The figures for the named varieties were Beaver 6.3, Mabel 6.1, Roxton 6.9, Ajax 6.2, Banner 15.3, Beacon 4.1, Garry 3.4, and Erban 5.3 (F. Gauthier).

GREY SPECK (manganese deficiency) appeared in a block of Erban foundation oats at O.A.C., Guelph, Ont., but a corrective spray was applied (J.D. MacLachlan).

BARLEY

ERGOT (Claviceps purpurea). A trace was found in 2 fields out of 66 examined in Alta.; infection was a trace in the plots at Olds and a trace to severe at Edmonton (J.D.G.). Ergot was very rare in farm crops in Sask.; a light infection was present in the plots at Saskatoon and Indian Head (H.W.M.). Ergot infection was light to moderate at Guelph, Ont. (J.D. MacLachlan). Traces of ergot were observed in two fields and a slight infection in a third of Colsess at Charlottetown, P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe graminis) was general on all winter varieties at the Farm, Agassiz, B.C. (W. Jones). It was also quite general on Olli in the University plots, Vancouver, B.C. (I.C. MacSwan). A trace was observed in Man. in 1947 (W.J. Cherewick). In plots of Foundation and Elite seed at O.A.C., Guelph, Ont., powdery mildew was so severe on O.A.C. 21 that it masked all other diseases, severe on Montcalm, moderate on Barboff and slight on Galore (J.D. MacLachlan). Traces were observed in 2 out of 29 fields examined in the Montreal district and in Q.S.B. plots at St. Arsène and St. Flavien (T. Simard, D. Leblond). One sample was brought in from Queens Co., P.E.I. (R.R. Hurst). Examination of the nursery material (q.v.) revealed that infections were lighter than usual in B.C. and Ont.

HEAD BLIGHT (Fusarium spp., Helminthosporium sativum, etc.). In the Q.S.B. plots at L'Assomption, Que., in a crop already maturing infection was moderate on Byng, Peatland, Brandon 112 and Lennoxville 16, whereas only traces were recorded on Montcalm, O.A.C. 21, Velvet, MC8129, and MC8229. In the Montreal district, infection was 13-tr. 6-sl. 2-mod. 1-sev./29 fields (T. Simard).

STRIPE (Helminthosporium gramineum) infection was recorded as follows: 2-sl. 2-sev./66 fields in Alta. (J.D.G.); 3-tr. 1-mod./29 fields in the Montreal district, Que. (T. Simard); slight on Charlottetown 80 at Hunter River, P.E.I. (D. Robinson).

SPOT BLOTCH (Helminthosporium sativum). Infection in Alta. was 13-tr. 8-sl./66 fields; trace in some varieties at Lacombe and all varieties at Lethbridge, and slight to moderate at Edmonton (J.D.G.). Slight infections were present on Barboff and Galore at O.A.C., Guelph, Ont. (J.D. MacLachlan). Spot blotch infection was 9-tr. 2-sl. 3-sev./29 fields in the Montreal district, Que. (T. Simard).

NET BLOTCH (Helminthosporium teres). A moderate infection was found in one field at Perryvale, Alta. (J.D.G.). The hot dry summer was unfavourable for net blotch and other leaf spots in Sask.; infection was 2-tr. 1-sl. 2-mod., the latter two in south-east Sask. (H.W.M.)
A slight to moderate infection was found on the lower leaves of barley at St. Adolphe, Man. (T. Johnson). Infection was 8-tr. 2-sl. 3-sev./29 fields in the Montreal district, Que. (T. Simard). A general infection not exceeding 15% was present on barley varieties at Ste. Anne de la Pocatière (A. Payette).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Damage was 11-tr. 7-sl. 2-mod. 1-sev./66 fields in Alta. (J.D.G.). During the survey in Sask., 26 fields were sampled, mostly in the east and northern areas; damage was 2-sl. 16-mod. and 8-sev. In general, barley was much more severely lesioned than wheat in the same districts (H.W.M.). Severe damage was caused by root rot in a plot of Charlottetown 80 in a 4-year rotation (clover, timothy, Swede turnips and barley) at Charlottetown, P.E.I. The plot receives only 500 lb. 2-12-6 fertilizer per acre the year it is in turnips (D. Robinson).

STEM RUST (Puccinia graminis). A trace was found 20 Sept. in the late-sown plots at Edmonton, Alta. (J.D.G.). Infection was 2-tr. 1-sl. 2-mod./26 fields in east and south east Sask. (H.W.M.). Stem rust on barley in Man. is discussed under stem rust on wheat (q.v.). Infection was a trace to moderate about Guelph, Ont. (J.D. MacLachlan). In the Q.S.B. plots at 10 places in Que., stem rust was absent or a trace except at Ste. Martine where infection was slight to moderate (T. Simard, D. Leblond). It was moderate on nursery material (q.v.) from Fredericton, N.B.

LEAF RUST (Puccinia Hordei). A moderate infection occurred in a field near Melfort, Sask.; elsewhere traces of rust were encountered infrequently (H.W.M.). Although leaf rust was generally present on barley throughout southern Man., only traces were present (B. Peturson). Leaf rust was a trace on O.A.C. 21, light on Galore, moderate to severe on Montcalm and severe on Barboff in fields of these varieties at O.A.C., Guelph, Ont. (J.D. MacLachlan). Infection was trace to light in the Q.S.B. plots at St. Hyacinthe, Lennoxville and St. Flavien (T. Simard, D. Leblond). Leaf rust was moderate to heavy on nursery material (q.v.) from Pictou, N.S., and Charlottetown, P.E.I.

SCALD (Rhynchosporium Secalis). In Alta., infection was 16-tr. 13-sl. 2-mod. 2-sev./66 fields; infection was a trace in the plots at Olds and light at Lacombe (J.D.G.). A moderate infection occurred on the commonly grown varieties of barley (Regal, Rex, Hannchen, Warrior and Prospect) at the Station, Scott, Sask.; a light infection also occurred at Saskatoon (H.W.M.).

SPECKLED LEAF BLOTCH (Septoria Passerinii). Infection was 3-tr. 3-sl./66 fields in Alta.; it was also slight on all varieties at Lethbridge (J.D.G.). For its occurrence elsewhere in Canada Johnson's survey of nursery material (q.v.) should be consulted.

COVERED SMUT (Ustilago Hordei). Infection was 2-tr. 2-sl./66 fields in Alta. (J.D.G.). Covered smut appeared to be slightly more prevalent than in 1946 in Sask., but no heavy infections were seen; infection was a trace in 6 fields, 2% in one, and 5% in one (H.W.M.). In Man. infection by covered smut and false loose smut (U. nigra) together varied from 0 to 42% in the 135 fields examined; the average infection was 4.75% (W.J. Cherewick). The estimated yield of barley for 1947 in Man. was 44,000,000 bu. If the 135 fields surveyed for smut are representative of the crop in the province, the covered and false loose smuts caused a loss

of 2,194,000 bu. in Man., a loss to the individual farmer ranging from 0 to 4.4 bu. per acre (I.L.C.). A trace of covered smut was present in a field of Colsess barley at Charlottetown, P.E.I. (D. Robinson).

LOOSE SMUT (Ustilago nuda or U. nigra). Infection was 13-tr. 4-sl. 1-mod./66 fields in Alta.; infection was a trace in Sanalta and light in Newal at Lacombe and a trace in Newal at Olds (J.D.G.). Loose smut was more prevalent in Sask. than in 1946; infection was a trace in 8 fields, 5% in one, 10% in one. (H.W.M.). In Man., infection from loose smut (U. nuda) varied from 0 to 12% and averaged 0.7% in 135 fields examined. Both U. Tritici (wheat) and U. nuda seemed to be more prevalent this year in Man. than in 1946 (W.J. Cherewick). Loose smut was moderate about Guelph, Ont. (J.D. MacLachlan). A trace was seen in a field in Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL BLIGHT (Xanthomonas translucens). A slight infection was present in a field of beardless barley at Leduc, Alta. (A.W. Henry). A heavy infection was present on some varieties at the Station, Ste. Anne de la Pocatière, Que.; it was also observed in a few fields at Ste. Anne and St. Jean-Port Joli (A. Payette).

LEAF SPOT (non-parasitic) was moderate in Charlottetown 80 and Hanchamont at Charlottetown, P.E.I. The spots were of 2 types: (1) small brown specks and (2) large, sharply-defined black blotches. They largely disappeared as the season advanced. Dr. W.F. Hanna designated them as physiological. A moderate infection of the brown speck type only was noted on Montcalm, O.A.C. 21, Vantage and Charlottetown 80 at Urbinville (D. Robinson, B. MacLaren).

RYE

ERGOT (Claviceps purpurea). Damage was 2-tr. 1-sl./9 fields in Alta.; a trace occurred on spring rye in the plots at Olds (J.D.G.). A very light infection was observed in the University plots, Saskatoon, Sask., and in a few fields examined (H.W.M.). Two reports of severe ergot infection were received from Loon Lake and another from Paradise Hill. In one field at Loon Lake, infection was "one head in every 10 square feet" (T.C. Vanterpool).

POWDERY MILDEW (Erysiphe graminis). A slight infection was found on Storm in the University plots, Vancouver, B.C. (I.C. MacSwan).

STEM RUST (Puccinia graminis). A trace was present on Cornell in the plots, Guelph, Ont. (W.C. Broadfoot). No stem rust was observed on rye in Man. in 1947 (B. Peturson).

LEAF RUST (Puccinia secalina) was recorded as follows: slight infection on Storm in the University plots, Vancouver, B.C. (I.C. MacSwan);

infection 2-sl. 1-mod./9 fields in Alta. (J.D.G.); moderate infection in one field near Melville, Sask. (H.W.M.); a very light infection throughout southern Man. (B. Peturson).

SPECKLED LEAF BLOTCH (Septoria Secalis). Infection was a trace in one field and slight in 4 in Alta. (J.D.G.)

ROOT ROT (cause unknown) damage was a trace in 2 fields and severe in one in Alta. (J.D.G.).

SURVEY OF NURSERY MATERIAL FOR PLANT DISEASES IN 1947

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

In Table 3 are summarized the data derived from 33 rust nurseries distributed across Canada in 1947. As in previous years separate tables were prepared giving the reaction of the individual varieties of cereals to the rusts and mildews, but the complete report, mimeographed separately, must be consulted for these tables. This year, in addition, an attempt was made to utilize the nurseries for a general survey for plant diseases, particularly those affecting the leaves and heads. It should not be assumed that the data here presented provide an exact record of the intensity of any given disease at the time of plant maturity. In several instances the plants were gathered while the crop was still green.

Twelve varieties of wheat, 8 of oats, and 4 of barley were grown in the nurseries. They were as follows: wheat - Apex, McMurachy, Regent, Carleton, Little Club, Marquis, Spelmar, Thatcher, Vernal, Norka, Redman, Warden x Hybrid; oats - Bond, Erban, Trispernia, Ajax, Vanguard, White Russian, Garry, Clinton; and barley - Goldfoil, Heil's Hanna, Plush, Vantage. Varieties grown commercially in Canada are underlined.

In Man. and eastern Sask., stem rust (Puccinia graminis) of wheat was unusually severe on susceptible varieties, which generally carried 80% to 100% infection at maturity. The resistant varieties now commonly grown carried only trace infection or none at all. Durum wheats also were lightly infected. Barley in this area was more heavily rusted than usual. Oat stem rust was moderately severe in the same region. In other parts of Canada stem rust was of minor importance except for a few isolated local epidemics.

Leaf rust of wheat (Puccinia triticina) was generally severe except in Alta. and western and northern Sask. Infections of 70% to 85% were recorded on Regent and Redman in the central part of Canada, whereas only 5% to 15% infections were observed on the same varieties from several places in the coastal sections. These percentages indicate that Regent and Redman have now no appreciable resistance to leaf rust in the central part, but still maintain considerable resistance in some localities in other parts of Canada. Stripe rust (Puccinia glumarum) was noted on Redman at Creston, B.C.

Crown rust (Puccinia coronata) of oats was light in Man., but it was heavy in many localities in Eastern Canada. Leaf rust (Puccinia Hordei) of barley was present in only trace quantities in Man. and eastern Sask., but it occurred sporadically throughout Eastern Canada.

In attempts made by one of us (Johnson) to determine the distribution of the various Septoria diseases of cereals, plant material sent from the rust nurseries and from other sources was examined. Outside of Man. the localities from which specimens were received were too few to permit anything in the nature of a satisfactory survey of the prevalence or destructiveness of these diseases. As far as available data permit, their distribution is indicated below.

Septoria Avenae f. sp. triticea Johnson (Can. Jour. Res. C, 25: 259-270. 1947), which resembles S. Avenae morphologically but attacks wheat and sometimes barley, appeared to be generally distributed through the Prairie Provinces, Ont. and Que., but was probably not sufficiently severe anywhere to cause much damage.

Septoria nodorum was found only in trace quantities at a few points west of the Great Lakes and, though not generally distributed throughout Eastern Canada, was abundant at several points in Ont., Que., and N.B.

Septoria Avenae was found only in trace or light quantities at a few points in Western Canada but was rather generally present in Ont. and particularly in Que. Only two collections were obtained from the Maritime Provinces, both from N.B.

Septoria Passerinii was of common occurrence in Man. and eastern Sask. from which area a number of heavily attacked barley specimens were obtained. In Eastern Canada it was obtained only from three points, Kapuskasing and St. Catharines, Ont., and Normandin, Que.

Of the other diseases recorded in Table 3 one deserves comment. Helminthosporium victoriae, recorded in the rust nurseries, for the first time this year, was found in seven nurseries in Eastern Canada but it did not appear to be present in those from Western Canada, except at Winnipeg. In each instance, only the variety Garry was infected.

PHYSIOLOGICAL RACES OF CEREAL RUSTS IN CANADA IN 1947

T. Johnson and B. Peturson

The following report records the distribution, in Canada in 1947, of physiologic races of the following cereal rusts: Puccinia graminis var. Tritici, P. triticina, P. graminis var. Avenae and P. coronata var. Avenae. Included also is a record of infection studies carried out with aecial collections from barberry and buckthorn in Eastern Canada.

Table 3. Incidence of certain pathogenic fungi on wheat, oats, and barley grown at 33 localities in Canada in 1947.

Location 1/.	Wheat							Oats							Barley							
	P. gr. Tritici	P. triticina	E. graminis	S. nodorum	S. Avenae f. sp. triticea	Fusarium sp. (scab)	Head discoloration x	P. gr. Avenae	P. coronata Avenae	Erysiphe graminis	Septoria Avenae	H. Avenae	H. victoriae	C. graminicola	P. graminis	P. hordei	Erysiphe graminis	Septoria Passerinii	H. teres	H. sativum	Physiological spotting	Rhynchosporium secalis
1	1	3	4	0	0	0	0	1	0	0	0	1	0	0	0	0	4	-	-	-	-	-
2	0	4	0	0	2	0	4	2	0	0	1	1	0	0	0	0	4	0	0	1	1	0
3	3	4	1	-	-	0	-	1	0	0	0	1	0	0	4	0	0	0	2	0	3	0
4	0	0	1	1	0	0	1	0	0	0	0	1	0	2	0	0	0	0	1	0	0	2
5	1	1	4	0	3	0	1	0	0	0	0	1	0	0	0	0	0	0	1	1	1	3
6	1	4	1	0	3	0	0	1	0	0	0	1	0	0	0	0	0	0	2	0	2	2
7	0	2	4	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
9	1	1	0	-	-	0	-	0	0	0	-	-	-	-	0	0	0	1	0	0	1	0
10	4	4	0	0	0	0	0	2	0	0	0	1	0	0	4	1	0	0	1	0	1	0
11	3	4	0	1	3	0	0	3	1	0	0	1	0	0	2	0	0	4	1	1	2	0
12	3	4	-	0	3	1	2	-	-	-	2	1	2	-	-	-	-	2	2	-	-	-
13	4	4	0	0	3	2	2	4	2	0	1	2	?	0	2	0	0	3	1	2	3	0
14	3	4	0	1	2	2	3	3	0	0	2	1	0	0	4	1	0	0	1	2	2	0
15	1	4	0	0	2	0	1	2	0	0	2	0	0	0	1	0	0	3	0	0	1	2
16	2	4	0	0	1	0	-	3	2	0	3	-	-	-	2	2	0	0	0	1	1	0
17	3	4	3	3	3	1	2	2	1	0	0	3	4	0	1	4	2	0	0	2	1	0
18	0	4	2	1	1	1	1	0	0	0	1	1	0	0	0	0	1	1	1	0	1	0
19	1	4	0	0	2	1	2	1	2	0	0	1	0	0	1	0	0	0	0	1	2	0
20	2	4	0	1	3	0	3	1	3	0	1	1	0	0	2	1	1	0	0	0	2	0
21	2	4	0	0	2	1	2	1	4	0	1	1	?	0	1	1	0	0	0	1	2	0
22	0	4	0	0	3	1	3	1	4	0	3	1	3	0	0	1	0	0	0	4	3	0
23	0	4	0	1	1	0	2	0	4	0	0	1	0	0	2	0	0	0	1	1	2	0
24	2	4	0	0	2	3	3	3	4	0	0	3	4	0	1	2	0	0	0	4	3	0
25	2	4	2	1	2	1	4	2	4	0	2	3	0	0	0	2	3	0	0	3	3	0
26	0	4	2	0	1	0	2	2	4	0	1	1	0	0	1	0	1	0	0	2	2	0
27	1	4	0	1	1	1	3	3	4	0	2	1	4	0	1	2	0	0	0	4	3	0
28	3	4	0	3	0	1	1	2	1	0	3	1	0	0	0	0	0	4	0	1	1	0
29	2	4	1	0	0	0	1	2	-	0	2	1	0	0	1	0	0	-	-	-	-	-
30	0	4	0	4	0	0	0	4	4	0	0	2	2	2	3	0	0	0	0	4	3	0
31	0	4	0	0	0	1	0	2	4	0	0	1	0	0	2	1	0	0	0	2	1	0
32	1	4	0	0	0	0	-	2	4	0	0	1	1	-	0	4	0	0	0	2	2	0
33	2	4	0	-	-	0	-	3	-	0	0	1	4	0	0	3	0	0	0	1	1	0

xThe head discoloration here recorded occurred only on the Hope and H-44 derivatives, Apex, Regent, and Redman.

Note: 1 = trace; 2 = light; 3 = moderate; 4 = heavy.

Distribution of Physiologic Races of the Cereal Rusts

In 1947, eleven races of Puccinia graminis var. Tritici were identified in 123 isolates. The races, with the number of isolates of each in brackets, were in order of decreasing prevalence: race 56 (98), race 38 (8), race 15 (4), races 29 and 32 (3), race 17 (2), and races 10, 23, 39, 74 and 87 (1). The most noteworthy feature of the 1947 survey was the extraordinarily high percentage of isolates (80%) identified as race 56. Races, such as 17, 29, and 38, which were fairly common in past years, were relatively rare last summer. The four isolates of race 15 lack the general virulence of 15B and are not to be classed with that race. The lone isolate of race 87 obtained this year, however, seems, from preliminary tests, to have much the same infection characteristics as race 15B.

In this year's survey, 17 races of P. triticina were recognized in 201 isolates. The races were in order of decreasing prevalence: race 5a (34), race 15a (33), race 126a (28), race 58 (24), race 15 (17), race 3 (14), races 9 and 128a (12), race 76 (9), race 1a (6), race 11 (4), race 126 (3), races 1, 28, 31, 44, and 83 (1). To distinguish races or biotypes that attack Hope and H-44 derivatives heavily from those that do not, the usual differential hosts were supplemented by the Hope variety. All races or biotypes that attacked Hope heavily in seedling tests have been designated by the letter "a" to differentiate them from those that produced an "x" infection or one of a still lower grade. Numerous infection tests with adult plants of Hope and Redman showed a close relationship between the seedling reaction of Hope and the adult plant reaction (that of the uppermost leaves) of these two varieties.

The chief difference between the distribution of the races of P. triticina in 1947 and the preceding year lies in the decrease in the prevalence of race 128a (designated as race 128 in the 1946 survey) and the marked increase in that of races 126a (designated as race 113 the previous year), 5a, and 15a. As all these isolates bear an "a" designation, the major difference between the distribution in the two years were changes in the prevalence of races that attack Hope and H-44 derivatives.

1/. Location of nurseries were:-

1. Saanichton, B.C.
2. Agassiz, B.C.
3. Creston, B.C.
4. Beaverlodge, Alta.
5. Edmonton, Alta.
6. Lacombe, Alta.
7. Lethbridge, Alta.
8. Scott, Sask.
9. Melfort, Sask.
10. Indian Head, Sask.
11. Brandon, Man.
12. Winnipeg, Man.
13. Morden, Man.
14. Fort William, Ont.
15. Kapuskasing, Ont.
16. Mindemoya, Ont.
17. Guelph, Ont.
18. St. Catharines, Ont.
19. Appleton, Ont.
20. Ottawa, Ont.
21. Manotick, Ont.
22. Merrickville, Ont.
23. Kemptville, Ont.
24. Alexandria, Ont.
25. Macdonald College, Que.
26. L'Assomption, Que.
27. Lennoxville, Que.
28. Normandin, Que.
29. Ste. Anne de la Pocatière, Que.
30. Fredericton, N.B.
31. Kentville, N.S.
32. Pictou, N.S.
33. Charlottetown, P.E.I.

A study of isolates derived from wheat varieties susceptible to all races indicates a marked concentration in the central part of Canada (Ont., Man., and Sask.) of races and biotypes virulent towards Hope and H-44 derivatives. In Que., and the Maritime Provinces only one of 17 isolates from susceptible wheats was virulent in this sense; whereas in Man. 16 of 27 such isolates belonged to one or other of the virulent races. In Alta. and B.C. the concentration of the virulent races differred little from the eastern side of the continent as only two of the 15 isolates derived from known susceptible wheats were of the virulent type.

The way in which Regent, Renown and Redman select out races of the virulent type is well illustrated by a study of the 39 isolates derived from these varieties. All of these isolates attacked Hope heavily in the seedling stage. The races identified, with the number of isolates of each in brackets, were: race 1a (2), race 5a (11), race 15a (8), race 126a (11), and race 128a (7). Seventy-six isolates from Little Club, Thatcher, and other fully susceptible wheats contained the same five races but there were present, in addition, races 1, 3, 9, 11, 15, 58, 76, and 83.

The 1947 survey revealed 6 races of P. graminis var. Avenae in 115 isolates. The races, with the numbers of isolates of each in brackets were: race 1 (8), race 2 (33), race 5 (17), race 8 (28), race 10 (15) and race 11 (14). The distribution of the races differs little from that reported for 1946. In the present survey, the 115 isolates were divided almost equally between race-group 1, 2, 5, (the common races of earlier years) and the race-group 8, 10, 11, which has come into prominence in the last few years. It should not be assumed, however, that this fact indicates an equal distribution of the two groups of races in Canada at the present time. Many of the collections studied were made on oat varieties that, being resistant to the first race-group and susceptible to the second, had a strong tendency to select out races 8, 10, and 11. Calculations based on isolates from varieties susceptible to all races indicate that races 1, 2, and 5 constitute about 70% of the oat stem rust in the country.

From collections made on wild and cultivated oats in Canada in 1947, 139 isolates of P. coronata were obtained. The 11 races, with the numbers of isolates of each in brackets were: race 1 (15), race 2 (30), race 3 (39), race 4 (18), race 5 (11), race 6 (17), race 24 (4), race 34 (3), race 45 (1), and race 1947-1 (1). In this material races 1, 2, 3, 4, 5, and 6 predominated and comprised 93% of the isolates studied. As in former years, races 2 and 3 were the most prevalent races in Eastern Canada whereas races 1 and 4 were the most prevalent ones in Western Canada. However all these races were present in both the Eastern and Western areas from which collections were obtained. One new race, tentatively designated as race 1947-1, was isolated. This race resembles races 34 and 45 in that it can heavily attack the variety Bond. It cannot, however, infect the variety Victoria, from which our new crown rust resistant varieties derive their resistance or the varieties Landhafer and Santa Fe, which are now coming into use as sources of crown rust resistance.

Infection Studies with Aecia on Berberis and Rhamnus in 1947

Isolations from Aecia on Berberis

The distribution of the varieties of Puccinia graminis in the 21 aecial collections derived from barberry is much the same as in previous years. Although the collections this year were mostly from Ont. (8 collections) and N.B. (9), the few made in Que. (1) and N.S. (2) fit well into the general picture. One collection was made at Winnipeg, Man. The two predominating varieties, Secalis (from 13 collections) and Avenae (12) followed closely by the variety Agrostidis (10) are widely distributed from Ont., eastward. The variety Tritici occurred only at Dorchester and Shediac, N.B., and Winnipeg, Man., and the variety Poae was found only at three points in Ont.

The physiologic races of oat stem rust and wheat stem rust in the varieties Avenae and Tritici were identified. These races, with numbers of isolates of each in brackets, were: oat stem rust - race 2 (8), race 7 (2), race 8 (2), race 10 (1) and race 11 (1); wheat stem rust - race 15 (2) and an undescribed race (1) differing from race 21 only by its "x" reaction on Vernal. The occurrence of race 7 of oat stem rust and race 15 of wheat stem rust is worth mentioning. Oat stem rust race 7 has been very rare in past years in field collections made on oats, but it occurred twice in 14 isolates from aecial collections of the rust in 1947 and once in 6 isolates in 1946. Similarly, race 15 of wheat stem rust has been of rare occurrence on wheat but made up two of the three collections derived from aecia this year. Both of these collections correspond to the original race 15, not race 15B.

The fact that barberry collections frequently contain races of wheat stem rust or oat stem rust that are not commonly found on wheat or oats suggests that most of the rust occurring each year on these hosts comes from sources other than barberry. On the other hand the presence of uncommon races on barberry shows that it is a fertile breeding ground for such races and may at any time give rise to dangerous strains of rust.

Editor's note: The finding of wheat stem rust in aecial collections from barberry at Shediac and Dorchester, N.B., recall observations made during my cereal disease surveys in 1937 and 1938. Wheat was frequently encountered along the coast of the Northumberland Strait from Antigonish, N.S., to Newcastle, N.B. Although the varieties were susceptible and often carried relatively heavy infections of stem rust, it appeared that one reason for most of the wheat being grown near the coast was its greater freedom from rust. In the interior wheat fields were few and almost invariably heavily rusted.

If, therefore, wheat stem rust is to be found in aecial collections from the barberry it is most likely to occur from bushes located in the wheat belt along the coast. Even here there was little direct evidence of spread of stem rust to wheat. During these surveys, barberries were located at Shediac and Dorchester, N.B., and at River John, N.S. Only at River John was there evidence of some spread of rust to barley and wheat, but even here the fields were too far away to be moderately infected. Both at Shediac and River John oat fields were very close and severely rusted.

The authors' contention that most of the stem rust occurring each year on wheat comes from sources other than the barberry seems fully justified. It is not quite so clear when stem rust on oats is considered. Damaging amounts of rust were seen on several occasions, but as far as they were investigated the initial inoculum was found to be aecial infection on the barberry. Elsewhere stem rust of oats rarely exceeded a trace. In Ont., and Que., moderate infections may occasionally be found where a barberry source is unknown, but every "rust area" so far investigated has proved to be one where barberries occur, often as escapes.

Whatever role the barberry may play in breeding new races, it is effective in multiplying scarce virulent races once they appear in trace amounts on otherwise resistant oat varieties (I.L.C.).

Isolations from Aecia on Rhamnus cathartica and R. Frangula

Fifteen aecial collections of Puccinia coronata Corda were obtained in Eastern Canada in 1947. Twelve of these occurred on Rhamnus cathartica and three on R. Frangula. Aeciospores from each collection were transferred to oats and to several grass hosts in an attempt to determine the varieties of crown rust present on these two Rhamnus species.

None of the three lots of aeciospores collected on R. Frangula was capable of infecting cultivated oats. They, however, caused normal rust infection on the following grasses: Agrostis stolonifera, A. hyemalis, A. lacnantha, and A. tenuis.

All three collections from R. Frangula had similar infection capabilities and apparently belong to the same crown rust variety. This variety appears to be identical with P. coronata var. Agrostis Erikss., a variety that occurs quite commonly in Europe. Although the variety has been collected on R. Frangula at Fredericton, N.B., each year since 1939, it has not, so far as known, been collected elsewhere in America on R. Frangula.

Two varieties of crown rust, P. coronata var. Avenae Erikss. and P. coronata var. Bromi (Muehleth.) were isolated from the aecial material collected on R. cathartica. Seven collections yielded both these varieties of P. coronata, 2 yielded the variety Bromi only, one yielded the variety Avenae only, and two were transferred to oats only and yielded the variety Avenae. The rust variety here designated as Bromi, although apparently not identical with the European variety Bromi, is probably a race of that variety. This variety has not been collected before in America. It evidently is not similar to the race of crown rust isolated by Fraser and Ledingham on Bromus ciliatus in Western Canada and designated as var. Bromi by these authors in 1933. Their variety Bromi has aecia on Shepherdia canadensis and not on R. cathartica and also differs from the European variety Bromi with respect to its grass host range.

The variety Bromi here reported caused normal infection on B. secalinus and a rather weak infection on B. sterilis, but was incapable of infecting cultivated oats.

Although the variety Bromi was not isolated from the aecial collections on R. cathartica obtained in 1945 and 1946, it may well have been present as no hosts susceptible to this rust variety were included in the hosts used in those two years.

Eight isolates of race 3, one each of races 2 and 6 were obtained from the cultures of variety Avenae. Race 3, as well as being the most prevalent race on the buckthorn, was also the most prevalent race on cultivated oats in Eastern Canada in 1947.

Editors' Note: The authors are strictly correct in observing that the Aecidium on Rhamnus Frangula is known only from Fredericton, N.B. However it is worth noting that there are 3 collections of P. coronata on Agrostis stolonifera in the Division Herbarium; one from Kentville, N.S., and two from points some distance apart to the south and west of Chelsea, Que. Moreover, Rhamnus Frangula is known to occur at or near these places. Further search must reveal additional centres for the Aecidium on Rhamnus Frangula or some unsuspected race. (I.L.C.).

II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

CROWN GALL (Agrobacterium tumefaciens). A single creeping-rooted plant of Medicago falcata growing in the plots at Saskatoon, Sask., was found severely affected by crown gall (H.W. Mead, I.L. Conners).

BLACK STEM (Ascochyta imperfecta). Leaf and stem infection was slight in most stands of alfalfa examined in Alta. before the first cutting. In July, infection was estimated as 4-tr. 13-sl. 9-mod./26 fields in central Alta. It ranged from slight to severe in the variety plots at Edmonton and Lethbridge (J.D.G.). Black stem infection was moderate in the moist, cool areas of Sask; elsewhere it was slight. Dry hot weather effectively checked its development over much of central and northern Sask. The disease developed rapidly following the August rains and cooler weather, but it caused much less defoliation than in 1946. Black stem is relatively rare in the warmer south, even where the crop is under irrigation. Burning for insect control destroys much of the inoculum and reduces the severity of infection (H.W.M.).

WINTER CROWN ROT (low-temperature basidiomycete). Damage from winter crown rot in the fields examined in northern and central Alta. was estimated as follows:

District	Fields Examined	Fields Damaged				
		Tr.	Sl.	Mod.	Sev.	Total
		%	%	%	%	%
Northern Alta.	37	30	46	10	-	86
West-central Alta.	50	8	56	12	12	88
Clover Bar	83	5	38	5	-	48
All Districts	170	11	45	8	4	68

Infection was found in most of the fields examined in central and northern Alta., including the Peace River District. The damage, however, was not as severe as in 1946, except in a few fields in the Cherhill and Thorsby districts. It was estimated as slight to severe in the variety plots at Lacombe. In southern Alta. damage from winter crown rot was for the most part obscured by true winter-killing, which was prevalent and severe at Brooks, and present, although to a lesser extent, at Lethbridge (M.W. Cormack).

Winter crown rot damage was moderate in the moist wooded areas in northeast Sask., whereas it was a trace to slight in areas on the open prairie. Infection was general in the Prince Albert - White Fox area and damage moderate in 40% of the fields examined and slight in another 40%.

In the Hudson Bay Junction, Meadow Lake, and Goodsoil areas damage was severe in 4% of the fields, moderate in 56% and slight in 20%. At Saskatoon and Melfort, damage was slight (H.W.M.).

BACTERIAL WILT (Corynebacterium insidiosum) was found in one field of Grimm at Grand Forks, B.C. Infection was so severe that most of the plants were dead. According to the owner alfalfa is largely killed out in fields on his farm three years after sowing (G.E. Woolliams).

The estimated damage from bacterial wilt in alfalfa fields in northern and central Alta. in 1947 was as follows:-

District	Fields Examined	Fields Damaged				
		Tr.	Sl.	Mod.	Sev.	Total
		%	%	%	%	%
Northern Alta.	37	5	-	-	-	5
West-central Alta.	50	10	2	-	-	12
Clover Bar	83	16	20	11	-	47
All Districts	170	12	11	5	-	28

Bacterial wilt was found for the first time in fields at Falher and Hines Creek in the Peace River District and at Barrhead and Rocky Mountain House. The percentage of diseased fields in the Clover Bar district was slightly reduced this year, apparently because several of the older, most severely diseased ones had been ploughed up. There was no evidence of rapid spread of the disease in the other fields under observation in this district. A detailed survey was not made in southern Alta., this year, but observations made in several irrigation districts indicated that there was more damage than usual due to weakening of the plants through winter injury (M.W. Cormack).

A careful survey of the principal alfalfa-growing districts in Sask. revealed bacterial wilt present as follows: In the irrigated areas (1) Val Marie, infection general and severe, damage 3-mod. 12-sev./15 fields; (2) East End, infection general but less severe than at Val Marie, damage 5-mod. 5-sev./10 fields; (3) Maple Creek, damage 2-mod. 6-sev./8 fields; (4) North Battleford, one large field with a general moderate infection. In the unirrigated areas (1) Prince Albert - White Fox, a few affected plants in 12 fields; (2) Melfort, moderate infection in alfalfa plots at the Station and trace on 2 nearby farms; (3) Hudson Bay Junction, Meadow Lake, Goodsoil, no wilt found. (H.W.M.).

Bacterial wilt was found throughout Man., but there was no apparent increase in its prevalence (W.J. Cherewick).

ROOT ROT (Cylindrocarpon Ehrenbergi and Fusarium spp.). Damage was 4-sl. 2-mod./37 fields in the Peace River District, Alta. (M.W. Cormack).

WILT (Fusarium Scirpi var. acuminatum). Slight infection and damage were observed at Saskatoon, Sask., during hot weather, when wilting was evident. Badly rotted plants were not difficult to find in September. The pathogen was isolated (H.W.M.).

STAGONOSPORA LEAF SPOT (Leptosphaeria pratensis (Stagonospora Meliloti). Infection was slight in 2 fields near Edmonton, Alta. (J.D.G.). A slight to moderate infection was present in the plots at Melfort, Sask. (H.W.M.).

DOWNY MILDEW (Peronospora aestivalis). Affected specimens were received from the Station, Prince George, B.C., 15 July 1946 (W. Jones). Downy mildew was general on the lower leaves on second growth Grimm in a field at Grand Forks, B.C. (G.E. Woolliams). Infection was slight in 4 fields and moderate to severe on occasional plants in other fields in central Alta.; it ranged from a trace to severe on individual plants in a plot at Edmonton (J.D.G.).

YELLOW LEAF BLOTCH (Pseudopeziza Jonesii). Considerable defoliation was observed in a 10 acre field at Sumas 5 July 1946. Stagonospora leaf spot was also present (W. Jones). Infection was 5-sl. 3-mod. 1-sev./50 fields in west central Alta.; the disease was not as prevalent as usual early in the season in the plots at Edmonton (J.D.G.). Yellow leaf blotch is ordinarily a hot weather (July) disease in Sask., but infection was much lighter this year than in 1946. It caused moderate defoliation in an old field at Saskatoon. In the new plantings in the Goodsoil area the disease was not found. Infection was much lighter on burned than unburned areas in the Torch River area. It appears that burning in the early spring for insect control destroys much of the natural inoculum from previous crops (H.W.M.).

COMMON LEAF SPOT (Pseudopeziza Medicaginis) was much less prevalent than usual in Alta.; only a slight infection was found in the plots at Edmonton in August (J.D.G.). Slight damage was found in the dry northern areas of Sask. during the summer, but a moderate infection developed after late summer rains. Little of the disease was present in the warmer areas in southern Sask. (H.W.M.). This leaf spot caused slight defoliation in a field of Grimm at Beaumont, Que. (R.O. Lachance).

CROWN ROT (Rhizoctonia Solani) continues to be the most destructive disease of alfalfa and sweet clover in Man. In some 3-year old fields of alfalfa, less than 50% of the plants had survived (W.J. Cherewick).

RUST (Uromyces Medicaginis). A few pustules of rust were found on alfalfa at the Station, Melfort, Sask. This report is the first for Sask. (H.W. Mead, M.W. Cormack). A systemic Aecidium, not previously reported in North America, was found 3 June on cypress spurge (Euphorbia Cyparissias) at Braeside, near Arnprior, Ont., by E.G. Anderson. Uredinia were observed on June 17 in fair abundance on seedlings and occasionally on older plants of black medick (Medicago lupulina) in immediate association with affected spurge.

The rust was later found in the area on alfalfa, but early in July the affected shoots of the spurge had dried up and virtually disappeared. Greenhouse inoculations confirmed the observations in the field. It is concluded that the Aecidium on spurge is, at least in part, connected with Uromyces Medicaginis, which occurs sparingly over the United States. Canadian specimens are in the herbarium from about Ottawa and London. The affected spurge plants usually produce several affected shoots and are quite conspicuous when the aecia are mature but they are impossible to find after the collapse of the rusted shoots. The aecia mature about the time the plant flowers and the affected plants are most easily detected immediately before or just after the plant is in full bloom. Search for the rust on the spurge at other centres, where small colonies of this weed occur, was unsuccessful (I.L. Conners, D.B.O. Savile).

CROWN WART (Urophlyctis Alfalfae) was prevalent on one selected strain of the Rhizoma variety at the Farm, Agassiz, B.C. (W. Jones).

WITCHES' BROOM (virus) affected about 20% of the plants in a 1 1/2 acre field of alfalfa which was 8 years old, in the Cariboo district, B.C.; the damage was estimated to be 15%. A much lower percentage of affected plants was seen in more recently seeded stands (N.S. Wright). A few plants were affected in four of the stands examined in central and northern Alta. (J.D.G.).

BLOSSOM DROP (?fungus) was prevalent in Man. early in the blossoming period, but its further development was checked by hot dry weather in July; a good set of seed resulted (W.J. Cherewick).

CHLOROSIS (non-parasitic) was observed in several widely separated fields in Man. and attracted the attention of the growers. Careful examination failed to reveal any pathogen present. The disorder was probably caused by some soil deficiency; it was most prevalent on high lime soils (W.J. Cherewick).

WHITE TIP (physiological). Whitening of the tips of the leaves, apparently due to drought, was severe on 15% of the plants in a field at Peace River, Alta., in July (M.W. Cormack).

YELLOWS (boron deficiency). Symptoms were general throughout one section of the Salmon Arm district, B.C. From 50 to 90% of the plants showed yellows, depending on the field; the growth showed also the characteristic severe dwarfing (G.E. Woolliams).

SWEET CLOVER

ROOT (Cylindrocarpon Ehrenbergi, etc.). Severe damage occurred in the early spring in three fields near Colinton, Alta.; C. Ehrenbergi was the predominant species isolated. In September slight damage was found in young stands of several varieties at Lacombe (M.W. Cormack).

LEAF SPOT and STEM BLIGHT (Leptosphaeria pratensis (Stagonospora Meliloti). Infection was a trace in the 5 fields examined in central Alta. It was also slight on Yellow Blossom at Olds (J.D.G.).

WITCHES' BROOM (?virus) affected a few scattered plants in the Cariboo district, B.C. (N.S. Wright).

COMMON CLOVER

WINTER CROWN ROT (low-temperature basidiomycete). Damage was slight in 4 fields and moderate in 3 of alsike clover, and slight in 2 and moderate in one of red clover examined in northern and central Alta. (M.W. Cormack). Damage from winter crown rot alone or with true winter killing occurred in 5 out of 6 fields of alsike clover which were sown with a nurse crop in 1946, in the Nipawin and Torch River areas, Sask. (H.W.M.).

CERCOSPORA LEAF SPOT (C. zebrina) was moderately heavy in parts of a field of red clover at Westboro, Ont. (D.B.O. Savile).

SOOTY BLOTCH (Cymadothea Trifolii). Infection was slight in a field of alsike clover and in one of red clover near Thorsby, Alta. (M.W.C.). A heavy infection was present in a field of alsike clover in blossom in Carleton Co., Ont. but no defoliation was seen (R.J. Baylis). A slight infection was observed on alsike clover at Ste. Anne de la Pocatiere (R.O. Lachance) and traces on a sample of red clover from Kensington, P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe Polygoni). Infection was 5-sl. 6-mod. 1-sev./12 fields of red clover examined in central Alta. in late August. It was found on all varieties in the plots at Lacombe and Edmonton (J.D.G.). A slight infection was present on red clover at Ste. Anne de la Pocatiere, Que. (R.O. Lachance).

GLOEOSPORIUM LEAF SPOT (G. spadiceum). A slight infection was found in 2 fields of red clover in west-central Alta. (J.D.G.). A heavy, destructive infection was seen in a small isolated clump of red clover growing in the shade along a woodland road near Danford Lake, Que. Little or no cultivated clover occurs in the district. This collection appears to be the first record for Eastern Canada (D.B.O. Savile).

ANTHRACNOSE (Kabatiella caulivora). Infection was a trace to slight in 13 fields and moderate in 4 out of 22 of Altaswede red clover examined in central Alta. It was also slight on Siberian Red and a trace on Altaswede and other varieties at Lacombe and Olds (J.D.G.).

STAGONOSPORA LEAF SPOT (Leptosphaeria pratenis (Stagonospora Meliloti). Infection was 14-sl. 5-mod./20 fields of alsike clover in central Alta. (J.D.G.).

ROOT ROT (Plenodomus Meliloti, etc.). Extensive rotting of the lower portions of the tap roots occurred in a field of red clover near Thorsby, Alta.; P. Meliloti was isolated. Slight damage was found in a field in the Peace River district (M.W. Cormack).

COMMON LEAF SPOT (Pseudopeziza Trifolii). A 25% infection was found on red clover plants in a low-lying area of a field on the Caldwell farm, C.E.F., Ottawa, Ont. The plants were in full bloom and no defoliation had yet taken place (R.J. Baylis). A heavy infection was observed in parts of a red clover field at Westboro (D.B.O. Savile). A specimen of red clover affected by this leaf spot was received from Prince Co., P.E.I. (R.R. Hurst).

CROWN ROT (Sclerotinia Trifoliorum) infected 21% of the plants of "Ottawa" selection of red clover in the plots of the Division of Forage Plants, C.E.F., Ottawa, Ont., and caused severe damage. In the alsike clover and alfalfa ranges the disease was also common but less than 10% of the plants were affected. Isolations of the pathogen were identified by J.W. Groves (R.J. Baylis).

STAGONOSPORA LEAF SPOT (S. recedens). Infection was 3-tr. 4-sl. 1-mod./22 fields of red clover in central Alta. A light infection occurred on all varieties in the plots at Lacombe (J.D.G.).

RUST (Uromyces spp.). Rust (U. Trifolii) was common on alsike clover along the roadsides at Fanny Bay, B.C. In the same locations U. minor was common on Trifolium dubium, a weedy species very abundant on the Pacific Coast. This rust may not have been reported previously in the Survey, but it has been recorded by Arthur from B.C. and is represented in the Herbarium by specimens on T. microdon collected by Macoun, some as early as 1887. (W. Jones, I.L. Conners). Infection (U. fallens) was light but general in a field of red clover in Carleton Co., Ont. (R.J. Baylis). A trace was present on red clover from Winslow, P.E.I. (R.R. Hurst).

MOSAIC (Trifolium virus 1). A trace of mosaic was found in 3 fields of red clover in York Co., N.B. (D.J. MacLeod).

WITCHES' BROOM (virus). A few plants of Altaswede red clover were severely affected at Edmonton, Alta. (J.D.G.).

BUCKWHEAT

YELLOWS (Callistephus virus 1) was general and severe on tartarian buckwheat in York, Sunbury and Carleton Counties, N.B. A trace was found on Silver Hull at the Station, Fredericton (D.J. MacLeod).

CORN

EAR ROT (Fusarium sp.). An occasional ear was infected in a field at Bradley, P.E.I. (R.R. Hurst).

RUST (Puccinia Sorghi). A trace was observed in a field at Kensington, P.E.I. (R.R. Hurst).

SMUT (Ustilago Maydis). Specimens were received from Charlottetown and Royalty, P.E.I. (R.R. Hurst).

FLAX

Prof. T.C. Vanterpool, University of Saskatchewan, Saskatoon, Sask. has summarized his observations in an account entitled: "Flax Diseases in Saskatchewan in 1947".

Flax diseases were of little consequence in the drier parts of Sask., but a hot dry spell, July 7-15, with the daily maximum temperature above 90°F. caused a die-back of the upper third, or, in extreme cases, a scorching of the whole plants. Yields were adversely affected depending on the severeity of the injury. Yields were high in the eastern half of the province where moisture conditions were favourable and were apparently little affected by the various diseases which developed late in the season.

SEEDLING BLIGHT (Rhizoctonia Solani, etc.) caused a slight thinning of the stands in Sask. In the early isolations, Pythium spp. (de Baryanum-ultinum type) predominated, followed by Fusarium spp., whereas Rhizoctonia Solani was present in small amounts in some samples only. By July 7, R. Solani was the most common fungus, Fusarium spp. next and Pythium spp. only occasionally isolated. Different sequences in the prevalence of these fungi have been recorded before (T.C. Vanterpool, Proc. World's Grain Exhib. & Conf. 2: 300-302, 1933) depending on the temperature and moisture. See also the results obtained by L.F. Roth and A.J. Riker, (Jour. Agr. Res. 67(7): 273-293, 1943) in their studies of damping off in red pine seedlings. The weather remained continuously dry, but after a long cool spring it turned suddenly very warm.

RUST (Melampsora Lini) was again very light in Sask. On a survey in late August, rust infection was a trace to slight in crop district 1 and in adjacent areas of districts 2 and 3. Damage was negligible. A moderate infection was present on a sample of late-sown Royal received in September.

STEM BREAK and BROWNING (Polyspora Lini). Traces were found on the open prairie only in the southeast where moisture conditions were favourable. Further north, especially in the Elfros-Mozart district, the browning phase was developing rapidly after August rains. It probably did not reduce yields, but appreciable seed infection would likely result.

On June 18, a field near Asquith sown with 1943 seed showed severe cotyledonary lesioning caused by P. Lini (confirmed by plating). On account

of the hot, dry weather during most of the season, no trace of the disease could be found in this field on August 25. Similar observations have been recorded previously.

DIE-BACK and SCORCH (heat and drought) was severe in the dry central and western parts of Sask. and caused heavy losses, following a heat wave July 7-15.

A type of injury not previously encountered was found in 2 fields near Elbow and one at Dundurn, where scorch was unusually severe. It was later found in less severe form around Saskatoon. The affected plants showed a trace to severe scorch and they always occurred in scorched areas. In addition the individual plants were surrounded at 3/4 to 1 in. below soil level with a grey-black sclerotium-like ring having a metallic lustre, up to 1/16 in. thick and 3/16 to 1/4 in. broad. The soil was dry and hard and an air space usually was present around the base of each plant indicating subjection of the plants to strong winds. In some areas 75% or more of the plants were affected. The sclerotium-like masses proved to be compacted soil. The portion of the roots under these masses was usually unblemished and only rarely were present small reddish-brown lesions. This type of injury was first observed a few days after a heavy wind and rainstorm, which ended a long hot dry spell.

PASMO (Septoria linicola). Pasmo was first found on Aug. 29-30 on flax in crop district 1 and in parts of districts 2 and 3, in southeastern Sask. Again, the disease appeared too late in most fields to do much damage. Even in districts such as Hirsch, Hitchcock, Estevan, and Alameda, where the disease was most prevalent, shrivelling of the seed was slight in the fields examined. Moisture conditions were good in the southeast and the highest yields in the province were obtained there. Pasmo, however, was more generally distributed throughout the area than in 1946. It was also found at Saskatoon on late-sown flax on Sept. 5.

Mature pycnidia of a species of Phoma were found on a few plants in a field near Weyburn. The upper half of the affected plants was conspicuously blackened. A Phoma has not previously been observed in the field although Phoma spp. have been isolated from flax seeds several times in the last few years. Most isolates are only moderately pathogenic, but one of them identified as P. exigua proved to be a virulent pathogen. In preliminary trials the Weyburn isolate was only slightly pathogenic.

BUNCHY TOP (cause unknown) was a new trouble observed at several, widely scattered localities in Sask. The upper branches were reduced in length and bunched together at the top. The leaves remained green, but the bolls usually failed to develop. The trouble was most common near the edges of fields and in individual plants or groups, which were late in maturing. Insect sweepings were not conclusive.

BOLL SHEDDING. Specimens received from Moose Jaw and Colville showed that the bolls had separated neatly from the ends of the pedicels. Usually a piece of the pedicel remains attached when a boll falls off. Plating trials gave no clue to the cause.

SELENOPHOMA BRANCH SPOT (S. linicola), which was quite prevalent in 1946, caused very light infections this year although found in widely scattered areas. Specimens of Coniothyrium olvaceum, Colletotrichum Lini and the true WILT organism, Fusarium oxysporum f. Lini, were not collected. HEAT CANKER on seedlings was not found probably on account of uniformily cool early season. LATE ROOT ROT was not differentiated from heat and drought injury.

"Flax Diseases in Manitoba in 1947" is the subject of a report by W.E. Sackston, Dominion Laboratory of Plant Pathology, Winnipeg, Man.

Flax acreage in Man. in 1947 was 180% of that sown in 1946 and the production of linseed was similarly increased. The heavy demand for seed immediately prior to seeding time resulted in the use of much seed that was inadequately cleaned, of poor quality, and not treated before seeding.

Crop development was delayed during cool weather and above-normal rainfall in June. July and August temperatures were above normal whereas precipitation was normal in July and higher than usual in August. The intense mid-summer heat hastened the maturity of the crop appreciably. Most crops ripened at about the normal time except some late-sown fields.

Two main surveys were made to determine the diseases present in flax: an early survey covering more than 100 fields, July 14-19, and a late one covering over 140 fields in Man. and 32 fields in southeastern Sask., Aug. 27-Sept. 5.

PASMO (Septoria linicola) was recorded in early July on plants experimentally inoculated in June. The first natural infection was found on Aug. 14 in the variety plots, at the University, Winnipeg. Plants of Victory flax were severely diseased and numerous mature pycnidia of S. linicola were present on the pasmo lesions. Although stem lesions were found in farm fields somewhat earlier (Aug. 9) in 1946, heavy infections with the pathogen in fruit were later than in 1947. High temperatures in July and August and traces of precipitation on many days in July may have been responsible for the early development of pasmo in 1947, its wide distribution and severity. It was present in every field of flax seen in Man. in the late survey and was much more severe than in any previous year. Infection was a trace in 20 fields, light (5-10% of stem area affected) in 34, moderate (15-30%) in 18 and heavy (40-100%) in 69 fields.

A type of pasmo injury not previously observed on a large scale was noticed in experimental plots and farm fields in 1947. Pedicels weakened by pasmo lesions broke off during periods of heavy rains and strong winds. Stripping of bolls from this cause accounted for the complete loss of seed from heavily infected plots of Redwing at Morden, for a 50% loss in a field of Royal near Morden, a 10% loss in Royal near Deloraine and various amounts elsewhere.

SEEDLING BLIGHT (Rhizoctonia Solani, etc.). Although seedling blight is present in Man. in most seasons, it usually reduces stands very little. However, in 1947 the disease caused severe losses. Reports of destruction of flax stands at Clearwater late in June were investigated. It was found that 95% of the seedlings on 300 acres of flax had been killed

shortly after emergence and 75% were killed in another 300 acres. The loss was placed at 25% in more than 1,000 additional acres of flax in the district and similar losses were reported from large acreages elsewhere. Rhizoctonia Solani was isolated from the dead seedlings.

Blighted seedlings are usually very difficult to find when rain follows their death. For this reason it was not always possible to determine the cause of the gaps seend in flax fields in July. The general appearance of such fields, however, was very similar to those where seedling blight was found. Damage, as the result of thinning in the 110 fields examined was estimated to be nil in 10 fields, trace to 10% in 58, 11-25% in 19, 26-50% in 15, 51-75% in 7 and 95% in one field. Weeds replaced the dead flax plants in most of the fields.

STEM BREAK and BROWNING (Polyspora Lini). Although the disease has been reported previously in Man., the stem break phase was only found for the first time on 15 July 1947. Stem break occurred with heat canker in 4 fields in southwest Man. Unlike in the latter disease the break in the stem occurred at the level of the cotyledons, about an inch above the soil line.

WILT and ROOT ROT (Fusarium oxysporum f. Lini and Rhizoctonia Solani). Wilt was a trace in 16 fields and up to 15% in 4 out of 110 fields examined on the early survey. Isolations yielded Alternaria sp. (tenuis type) from most specimens; F. oxysporum and F. Scirpi var. acuminatum from roots and crowns and occasionally from the lower part of the stem; and R. Solani from roots and crowns only.

Wilt was found in 3 of the 32 fields examined in Sask. Traces of wilt were seen near Bienfait, 5% near Heward, and 10% near Carlyle. F. oxysporum f. Lini was isolated from diseased plants collected in each of these fields.

RUST (Melampsora Lini). Very little rust was seen on flax in Man. in 1947. Traces were present in some fields by mid-July. Infection increased slightly as the season advanced. By 31 Aug. rust was in the telial stage, with few telia per plant in most cases. No rust was seen in half the fields and in only 7 of the 140 examined were 75-100% of the plants affected. Rust infection was heavy in one field and moderate in two others examined by W.J. Cherewick at Winnipeg Beach in July.

Rust was also observed in Sask. but was of little importance except in two fields where telial infection was severe.

Rust on wild Linum Lewisii was extremely heavy in southwest Man., killing the plants in some locations in mid-July.

ANTHRACNOSE (Colletotrichum Lini). Dead seedlings from the variety plots at Winnipeg, for which the seed came from Ottawa, yielded C. Lini and other organisms when plated. C. Lini was also isolated from leaf spots on plants grown from Ottawa seed in the plots at Brandon and Morden. Little disease developed except on the susceptible variety Bombay when 150 varieties and selections of flax were inoculated with C. Lini in the field at Winnipeg. Treatment, with Ceresan, of seed known to be infected greatly reduced the number of seedlings killed by the organism, but it failed to give complete control in a field experiment at Winnipeg.

HEAT CANKER (non-parasitic) was unusually prevalent and severe in Man. in 1947. The intense heat during July affected flax throughout the province and on all soil types, but the worst injury occurred on the lighter soils in the western part of the province. In the fields examined in July, heat canker was absent in 48; it affected a trace to 5% of the plants in 47, 6-10% in 7, 11-20% in 2 and 50% in one field. In most of the fields where damage was heavy, the rows were sown from east to west in light or sandy soil. In several instances adjacent fields were seen with thin stands and considerable heat canker in one and thicker stands with little or no heat canker in the other. In some fields heavy weed growth protected the thin stand of flax and heat canker was light.

BOLL BLIGHT (cause unknown) was less severe than in 1946, although it was conspicuous in mid-August. From 10 to 60% of the bolls were blighted on individual plants, but the percentage of affected plants varied greatly from field to field. In the late survey boll blight was absent in 20 fields, a trace in 27, 5% in 17, 10-15% in 50, and 20-30% in 28 fields. In about 10 fields in the last group pasmo lesions were numerous on the bolls and may have caused the blighting.

All the fields seen in Sask. had some boll blight. There were traces in 13 fields, 5% in 5, 10-15% in 11, and 20-45% in 5.

BOLL DISCOLORATION (cause unknown). Black or brown discolorations were seen on bolls and occasionally on flax seeds. Isolations from discoloured tissues yielded mainly Alternaria sp. of the tenuis type.

MINOR OBSERVATIONS. Wind damage was considerable in scattered localities in Man. as a result of strong winds and drifting soil early in the growing season. Heavy rains early in the season flooded the low parts of fields in some districts. Standing water drowned out the flax completely or greatly retarded the subsequent growth. Hail damage, reputedly severe in some districts, was seen in trace amounts in one field. Drought injury due to the hot dry weather that followed a cool wet June caused plants to be stunted in some areas and evidently reduced yields appreciably. Alkali injury was also observed in several fields, the flax being stunted in patches. Chlorosis was conspicuous in several of the flax plots at the Flax Pilot Plant at Portage la Prairie on July 19. It apparently was due to some feature of the soil, from which the plants later recovered. Die-back of the upper third or half of flax plants was observed in 3 of 16 fields examined in mid-August. Only a few plants were affected in each field. Later it was difficult to distinguish the trouble from pasmo. Severe injury caused by spraying with Sinox was seen in plots of flax at the Flax Pilot Plant, Portage la Prairie. Rains prevented spraying at the date planned and induced rapid succulent growth. The Sinox was applied later on plants 10-12 in. high on a very hot day.

Other Observations

ANTHRACNOSE (Colletotrichum Lini). A trace of anthracnose was seen on Stormont Cirrus about Ste. Anne de la Pocatiere, Que.; repeated seed treatment appears to have controlled the disease (R.O. Lachance).

WILT (Fusarium oxysporum f. Lini) reduced the stands in some plots of Cirrus at the Station, Ste. Anne de la Pocatiere, Que. (R.O. Lachance).

RUST (Melampsora Lini). Infection was slight in 8 of the 12 fields examined in Alta. It was a trace in the plots at Lethbridge and Olds and a trace to slight at Lacombe and Edmonton (J.D.G.). Rust was recorded for the first time in Kamouraska Co., Que. in 1947. Fields of Cirrus, almost without exception, in several parishes showed at least a trace of rust. In a few fields, infection was slight to moderate (A. Payette).

BROWNING (Polyspora Lini) was reported from the Peace River district, Alta. (A.W. Henry).

DIE-BACK (cause undetermined) slightly affected Stormont Cirrus in a field at Ste. Anne de la Pocatiere, Que.; the disease was more prevalent in the drier sections of the field (R.O. Lachance).

HEAT CANKER caused slight damage in one field at Blackie, Alta. (J.D.G.).

SPRING FROST RESISTANCE. This spring afforded an opportunity to record the frost resistance of the leading varieties in the plots at Saskatoon, Sask. Counts were made in two-foot lengths at the opposite ends of two adjoining rows in two plots. Each count was thus based on an 8-foot length. The percentage of seedlings killed varied from 8.7% for Redwing to 48.6% for Victory. In decreasing order of resistance the varieties were Redwing, Prince, Royal, Viking, Dakota, Rocket, and Victory (T.C. Vanterpool).

MANGEL

LEAF SPOT (Cercospora beticola). Infection was slight on a few seed plants at Agassiz, B.C. (W. Jones) and in a field at Waterville, N.S. (J.F. Hockey).

LEAF SPOT (Phoma Betae). A slight infection was observed in a field of Frontenac in Kings Co., P.E.I. (R.R. Hurst).

CROWN and DRY ROT (boron deficiency) was found in some fields of roots being grown for stecklings at Grand Forks, B.C.; severe injury was found in a sample of roots received earlier for diagnosis (G.E. Woolliams).

CULTIVATED MUSTARD

WHITE RUST (Cystopus candidus) caused a trace of damage in commercial fields of black mustard in the Lethbridge area, Alta. (J.D. Gilpatrick). All plants of black mustard (Brassica nigra) were severely affected at the Botanical Garden, Montreal, Que. (J.E. Jacques).

SOYBEAN

The principal observations on soybean diseases are given in a special report, "Soybean Diseases in Southwestern Ontario in 1947" by L.W. Koch and A.A. Hildebrand.

The following observations are based, as in previous years, on periodic examinations of test and experimental plots at Chatham, Ridgetown and Harrow as well as on surveys of commercial stands in Essex, Kent and Middlesex Counties.

DOWNY MILDEW (Peronospora manshurica) was first noted about 26 June and from then on continued to be active throughout the summer on susceptible varieties such as Capital, A.K. Harrow, and Richland. In the light of the meteorological data for the season, this activity of a downy mildew is especially interesting. On 13 June there was a fairly heavy rainfall (0.70 in.), but from then until 14 Aug., when 1.93 in. of rain fell, the weather was extremely dry. Within the 62-day period indicated, a total of only 1.65 in. of rain fell on 11 different days and no shower exceeded 0.33 in. Within this period, the maximum temperature ranged from 80° to 90°F. on 37 days and from 90° to 97°F. on 18 days. Despite these hot dry conditions the disease persisted throughout the season on the varieties mentioned. It would appear that, physiologically, P. manshurica resembles very closely Pseudoperonospora cubensis, the organism causing downy mildew of cucurbits, which according to Plakidas (U.S.D.A. Plant Dis. Reptr. 31(11): 422-425. 1947) flourishes under environmental conditions corresponding to those described above. As in previous seasons, systemically infected plants were in many instances foci for current season infection.

BROWN STEM ROT (Cephalosporium sp.). On 25 Sept., while examining a stand of Lincoln soybeans in the test at the Ont. Experimental Station, Ridgetown, attention was attracted to plants, many of which had lodged and most of which showed a browning of the lower part of the stem. When stems of affected plants were cut open, they showed symptoms identical with those described by Wm. B. Allington (Phytopath. 36(5): 394. 1946) for brown stem rot. Isolations from the interior of diseased stems yielded almost invariably a fungus which when cultured later on certain media, employing the technique described by Vernon (Ann. Bot. 45: 733. 1931), was identified tentatively as a species of Cephalosporium. In certain of its morphological characters this Cephalosporium is indistinguishable from

that recently described by J.T. Presley and W.B. Allington (Phytopath. 37(9): 681-682. 1947) as the cause of brown stem rot of soybean.

This new disease has proved to be a very destructive one in the important soybean-producing states of Illinois, Indiana and Iowa.

BUD BLIGHT (virus of tobacco ring-spot group) occurred sporadically except for a stand of Capital, in which the number of infected plants (about 12%) was the highest ever observed. This stand was located near Chatham.

In current-season experiments at Harrow, 1824 seeds, obtained in the autumn of 1946 from bud-blight-infected plants, were planted in outdoor plots. Throughout the season not an infected plant was detected among the almost 1500 plants that comprised the stand. These results indicate strongly that bud blight is not a seed-borne disease and confirm those obtained in previous experiments.

Other diseases which need only to be mentioned include: BACTERIAL BLIGHT (Pseudomonas glycinea); MOSAIC (Soja virus 1); BROWN SPOT (Septoria glycines); PHYLLOSTICTA LEAF SPOT (P. sojaecola); POD and STEM BLIGHT (Diaporthe Phaseolorum var. Sojae); FUSARIUM BLIGHT (F. oxysporum f. tracheiphilum); and SUN SCALD (non-parasitic).

Other Observations

DOWNY MILDEW (Peronospora manshurica). Infection was severe on Capital; moderate on Richland, Goldsoy and O.A.C. 211; and light on Mandarin, Kabott, Flambeau, Harman, Pagoda, and Earlyana in the plots, O.A.C., Guelph, Ont. (I. Roberts).

BACTERIAL BLIGHT (Pseudomonas glycinea). Infection was severe on Pagoda; moderate on Kabott and Goldsoy; light on Earlyana, O.A.C. 211, Flambeau and Harman; and nil on Mandarin, Richland and Capital in the plots, O.A.C., Guelph, Ont. (I. Roberts). Bacterial blight appeared in the nursery plots of the Division of Forage Plants, C.E.F., Ottawa, in early July. Records were taken 18 July, at which time most varieties were coming into flower. Infection was estimated to be: Trace (less than 5% of the plants affected) on Capital, Mandarin, Kabott, and Pagoda x Mandarin; light (5-15%) on O.A.C. 211; heavy (16-20%) on Pagoda x O.A.C. 211, A.K. Harrow x Pagoda and O.A.C. 211 x Pagoda; and very heavy (over 20%) on Nutter, Pagoda, and Pagoda x A.K. Harrow. Slight fall of the blight-infected leaves occurred in July, but after this month there was no further spread of the disease (R.J. Baylis).

MOSAIC (virus). A slight infection was present through the soybean plots at O.A.C., Guelph, Ont.; no differences in varietal susceptibility were observed (I.Roberts).

SUN SCALD caused considerable injury in the plots of the Division of Forage Plants, C.E.F., Ottawa, Ont., as a result of the prolonged period of dry weather in July and August; defoliation was heavy in the nursery plots, which were located on shallow soil (R.J. Baylis).

SUGAR BEET

LEAF SPOT (Cercospora beticola) was more severe in the Blackwell area, Ont., than for several seasons (A.A. Hildebrand). Infection was slight to moderate on mangels and sugar beets at Guelph, Ont. (J.D. MacLachlan).

ROOT KNOT (Heterodera marioni). Traces of root knot were present on nearly every root of sugar beet in a small planting (1/14 acre) in the Montreal district, Que. The affected beets were growing alongside carrots (q.v.) and parsnips also affected by root knot. (R. Desmarteau).

ROOT ROT (Phoma Betae). Pycnidia of P. Betae were found fruiting on the stem and root of a few affected plants received from the B.C. Sugar Refineries. The pathogen was isolated. It was reported that the disease was causing appreciable damage to seed crops of sugar beet in the Fraser Valley, B.C. The gradual decay of the root caused the seed to ripen prematurely and thus lowered the quality of the seed crop. The same condition has been observed in seed crops of mangels and garden beets (W. Jones).

SUNFLOWER

DOWNY MILDEW (Plasmopara Halstedii) infected 7% of the plants in a field in a 6-year rotation at Ste. Anne de la Pocatiere, Que.; the affected plants were stunted. When sunflower seed was sown in the greenhouse in soil from field plots on which a heavily infected crop was grown 11, 12, 13, and 14 years ago, but on which sunflowers had not been planted since, some of the seedlings became affected by downy mildew (C. Perrault).

RUST (Puccinia Helianthi). Although no survey was made to determine sunflower diseases in 1947, rust was extremely heavy on some plants in several fields visited 13 Sept. near Morden, Man. (W.E. Sacksto n).

DAMPING-OFF (Pythium sp.). A few seedlings were affected in plots in the greenhouse in December. (C. Perrault).

WILT (Sclerotinia sclerotiorum). In the fields examined near Morden, Man., damage was estimated at 5%, but losses were reported amounting to 25% in one or two cases (W.E. Sacksto n). Wilt destroyed about 2% of the plants in a field at Ste. Anne de la Pocatiere, Que. (C. Perrault).

LEAF SPOT (Septoria Helianthi). Numerous pycnidia were present on many leaves in fields near Morden, Man. (W.E. Sacksto n).

DROWNING. Damage from standing water was conspicuous in low parts of fields in the Winkler-Altona district, Man., as a result of heavy rains in August (W.E. Sacksto n).

CULTIVATED GRASSES

AGROPYRON - Wheat Grass

Ergot (Claviceps purpurea). Affected specimens of A. Smithii were collected at Cartwright, Man. in 1946 (H.A. Senn, W.L. Gordon).

Root Gall Nematode (Ditylenchus radicicola). A light infection was found on A. Smithii plants collected from virgin soil at Radisson, Sask. The nematode is therefore probably indigenous to Sask. Infection was also secured experimentally on A. cristatum. A fuller report is given under wheat (T.C. Vanterpool).

Take All (Ophiobolus graminis). About 2% of the wheat-grass hybrid (Vernal emmer x A. elongatum) were found affected in a plot, C.E.F., Ottawa, Ont. (R.J. Baylis).

Smut (Ustilago macrospora). A colony of infected plants of A. trachycaulum var. glaucum was found at Bic, Que. This host is much less severely affected than A. repens (H.A. Senn, D.B.O. Savile).

Brittle Dwarf (?aphid injury) was more prevalent in the plots of A. cristatum sown in 1947 than those sown in 1946 at the Forage Crops Laboratory, Saskatoon, Sask. It was noted last year that brittle dwarf was prevalent on the plots of the current season (P.D.S. 26:6). If brittle dwarf were due to a virus, one would expect the disease to be not less, but more severe in 1947 than in the fall of 1946. The western wheat aphid was present on affected plants (T.C. Vanterpool).

ARRHENATHERUM ELATIUS - Tall Oat Grass

Brown Stripe (Scoletotrichum graminis) was general in a plot at the Station, Saanichton, B.C. in 1946 (W. Jones).

Smut (Ustilago perennans) affected 10% of the plants in a plot at Saanichton, B.C., in 1946 (W. Jones).

BROMUS - Brome Grass

Ergot (Claviceps purpurea). Infection was slight in two fields of B. inermis near Lacombe, Alta. (S.G. Fushtey).

Leaf Blotch (Helminthosporium Bromi). Infection was severe in several roadside stands of B. inermis near Edmonton and slight in the plots at Lacombe, Alta. (J.D.G.).

Stripe Rust (Puccinia glumarum) was common on the leaves and inflorescence of B. carinatus along the roads at White Rock, B.C., in 1946 (W. Jones).

Leaf Rust (Puccinia Clematidis) was also common on the same host at the same place (W. Jones).

Leaf Spot (Rhynchosporium Secalis). A slight infection was found on B. inermis on the University farm, Winnipeg, Man. (G.J. Green).

Brown Stripe (Scoletotrichum graminis) was common along the roadside at Brentwood, B.C., in 1946 (W. Jones).

Leaf Spot (Selenophoma bromigena). Infection was slight on B. inermis in one field and in the plots at Olds, Alta. (J.D.G.). The disease was common and infection light in Sask. Among the numbered strains and varieties of B. inermis at Saskatoon, some showed considerable resistance (H.W.M.).

CYNOSURUS CRISTATUS - Crested Dogtail

Brown Stripe (Scoletotrichum graminis) affected a few plants in a lawn at North Saanich, B.C., in 1946 (W. Jones).

DACTYLIS GLOMERATA - Orchard Grass

Rathay's Disease (Corynebacterium rathayi) was again observed in the Station orchard, Ste. Anne de la Pocatiere, Que., where it has spread in the orchard from the northeastern part over the whole area. Infection, however, was moderate, being not as heavy as last year. The warm dry weather brought about a rapid drying of the plants or parts infected (A. Payette).

Purple Leaf Spot (Mastigosporium rubricosum) was common and caused slight damage at North Saanich, B.C., in April, 1946 (W. Jones).

Brown Stripe (Scoletotrichum graminis). Infection common and damage slight at North Saanich, B.C., in May, 1946 (W. Jones). The disease was general and infection heavy on clones of orchard grass in the pasture plots at the Agricultural School, Kemptville, Ont. (R.J. Baylis).

ELYMUS

Stripe Rust (Puccinia glumarum). A slight infection on E. glaucus at North Saanich, B.C., in May 1946 (W. Jones).

FESTUCA - Fescue

Ergot (Claviceps purpurea) was present on specimens of F. elatior received from Bedford, Que. (I.L. Conners).

Crown Rust (Puccinia coronata). Nursery plots at C.E.F., Ottawa, Ont., began to show infection by rust in late August and early September. On 30 Sept. infection was severe (over 50% of leaf surface) on lines of Festuca elatior including variety Ensign, and on several lines of foreign origin of F. pratensis, a trace only on a few clones of F. elatior var. arundinacea and nil on F. gigantea (R.J. Baylis).

Snow Mould (low-temperature basidiomycete). The damage was slight in 2 and moderate in one of the 3 fields of F. rubra examined near Beaverlodge, Alta. (M.W. Cormack).

Bacterial Leaf Spot (Corynebacterium agropyri (O'Gara) Murray et al.). Infection was slight in 2 fields of F. rubra near Innisfail, Alta., and a trace in the plots at Olds (J.D.G.).

HORDEUM

Smut (Ustilago bullata (U. Lorentziana) was reported by E.C. Stacey to be very prevalent on H. jubatum at Fort Simpson, N.W.T., and at other places in the north (J.D.G.).

PHLEUM PRATENSE - Timothy

Snow Mould (low-temperature basidiomycete). Moderate damage was found in 2 fields in west-central Alta. (J.D.G.).

Leaf Spot (Heterosporium Phlei). A slight infection was observed in the Cariboo district, B.C., in Sept. 1946 (W. Jones). Infection was slight in 5 fields in west-central Alta. and in the plots at Olds and Edmonton (J.D.G.).

Stem Rust (Puccinia graminis var. Phlei-pratensis). A heavy infection was observed at Milton, P.E.I., 2 Sept. (R.R. Hurst).

Brown Stripe (Scoletotrichum graminis). A slight infection was observed in the Cariboo district, B.C., in 1946 (W. Jones).

POA - Blue Grass

Powdery Mildew (Erysiphe graminis). Infection was moderate in the plots at Lethbridge and slight at Olds and Edmonton, Alta. (J.D.G.).

LAWNS and GOLF COURSES

Snow Mould (low-temperature basidiomycete). Damage was found in many lawns at Edmonton and other points in central Alta., but it was not nearly as severe as in 1946 (M.W. Cormack). Snow Mould was moderately prevalent at Saskatoon and in the University campus, killing the grass in spots. The fungus was also isolated from white clover and dandelion, but it affects these latter plants but little (T.C. Vanterpool).

III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

RUST (Puccinia Asparagi). Infection was moderate on the smaller branches and light on the main stems of most plants examined in a 2-acre field of Martha Washington at Grand Forks, B.C., on 8 Oct.; growth of the plants was not noticeably retarded (G.E. Woolliams).

BEAN

GREY MOULD (Botrytis cinerea). Infection was general on a seed crop of Masterpiece at the Farm, Agassiz, B.C.; it caused discoloration and decay of the seed particularly of pods at the soil level (W. Jones).

ANTHRACNOSE (Colletotrichum Lindemuthianum). A survey for bean diseases was carried out this season, as in 1946, in Essex, Kent, Huron, Elgin and Middlesex Counties, where the more important bean-growing areas in southwestern Ont. are located. Although only a fraction of the 8,000 plantings of dry or field beans was examined, it is believed the observations give a good picture of the disease situation in these counties. In marked contrast to last year (P.D.S. 26:32), anthracnose was of rare occurrence in 1947 and only occasionally caused loss as, e.g., in a field of Michelite near St. Thomas, where pod infection was severe and eventually a high percentage of the seed bore visible lesions (A.A. Hildebrand, L.W. Koch and J.T. Slykhuis).

A slight infection was present on several varieties in the Laboratory plots, St. Catharines, Ont. (J.K. Richardson). The disease caused slight damage in a field at St. Martin, Que. (E. Lavallee). Anthracnose affected all the pods of a few rows of Blue Seeded Pencil Pod in a garden at Kentville, N.S.; no reports of losses were received from growers (K.A. Harrison). Very little anthracnose was present in P.E.I. in 1947; only two cases were brought to the Laboratory (R.R. Hurst).

HALO BLIGHT (Pseudomonas phaseolicola (Burkh.) Dowson). Diseased specimens were received from Grand Forks, B.C. D.C. Cook, Plant Products Division, stated in his covering letter: that the infection was slight 3 weeks earlier, but in the interval the grower had cultivated the crop while the plants were still wet after a rain and "now the infection is nearly 100%" (G.E. Woolliams). Damage was severe - on Long Green, Masterpiece and Red Pod and a trace to moderate on the other varieties at Beaverlodge, Alta. (J.D.G.). Halo blight was less severe than usual about Saskatoon, Sask., possibly on account of the dry season; only 1 - 2 severe cases were observed (R.J. Ledingham). The disease was common on snap beans at Winnipeg, Man. (W.A.F. Hagborg). Halo blight slightly affected several plantings in the St. Catharines district, Ont. (J.K. Richardson). A slight infection was recorded on 2 varieties at Ste. Anne de la Pocatiere, Que. (R.O. Lachance).

CHARCOAL ROT (Macrophomina Phaseoli) was observed affecting many plants in a stand of Corvette in the Laboratory plots, Harrow, Ont., in mid-September (A.A. Hildebrand et al.).

ROOT ROT (?Pythium spp.) was prevalent in early September in areas, in southwestern Ont., that had been flooded following heavy rains; Pythium was isolated from diseased specimens (A.A. Hildebrand et al.).

WILT (Sclerotinia sclerotiorum) was found affecting 1% of the Masterpiece plants at Agassiz, B.C.; sclerotia were present on the pods at soil level (W. Jones, I.C. MacSwan). Wilt was found in fields of Blue Lake at several places in the North Okanagan Valley; up to 50% of the plants were affected (G.E. Woolliams).

RUST (Uromyces appendiculatus). A severe infection was present in a 4-acre field of Kentucky Wonder pole beans at Agassiz, B.C. (W. Jones, I.C. MacSwan). Whereas rust was only of sporadic occurrence in previous years, the disease was widespread in southwestern Ont. in 1947 and severe damage was apparent in a number of severely infected fields of Michelite and Blue Pod (A.A. Hildebrand et al.). A light infection was seen in one planting and specimens were received from four others in Queens Co., P.E.I. (R.R. Hurst).

COMMON BLIGHT (Xanthomonas phaseoli). Diseased specimens were received from Hedley, B.C. (G.E. Woolliams). Some severely diseased plantings were seen about Saskatoon, Sask., but damage was probably less than usual on account of the dry season (R.J. Ledingham); diseased specimens were sent in from Marsden (T.C. Vanterpool). Common blight was found in several plantings at Winnipeg, Man. (W.A.F. Hagborg). Infection was heavy in a field at Lanoraie, Que. The disease also affected a patch 30 feet square in a 6-acre field at Ste. Theodosie (F. Godbout, E. Lavallee). Common blight was of no importance in P.E.I. this year (R.R. Hurst).

BACTERIAL BLIGHT (Common and Halo Blight), though widespread in its occurrence in southwestern Ont. in 1947, was far less destructive than last year. This year (a) infection was mostly confined to the foliage and (b) the stem-girdle or joint-rot phase of the disease was rare. In a field of Michelite near Chatham, pod infection was severe and a high percentage of the harvested seed showed greyish or faintly yellowish discolorations in varying degrees. The field was close to an area where both stem girdle and pod infection had been very severe last year (A.A. Hildebrand et al.).

CURLY TOP (Beta virus 1) affected about 5% of the plants in a field near Grand Forks, B.C. (G.E. Woolliams).

MOSAIC (virus). A trace of mosaic was seen in Stringless Refugee beans, in the University plots, Vancouver, B.C. (I.C. MacSwan). Mosaic was moderate on Strider and a trace on other varieties in the plots at Lethbridge, Alta. (J.D.G.). Only a trace of mosaic was observed in bean plantings in southwestern Ont. in the 1947 survey. However, following a prolonged period of dry weather, certain varieties of Dutch snap beans in

the plots at Harrow and Ridgetown developed symptoms resembling very closely those of common bean mosaic (A.A. Hildebrand et al.). Mosaic was present but it was of little economic importance in the many plantings examined in the St. Catharines district, Ont. (J.K. Richardson). A trace of mosaic (Phaseolus virus 1) was found on Kentucky Wonder (pole), Giant Stringless Green Pod and White Marrowfat in a garden at Fredericton, N.B. (D.J. MacLeod). Mosaic was observed in Yellow Eye (trace) and Ace (4% of plants) at Kentville, N.S. (K.A.Harrison). A heavy infection of mosaic occurred in one garden at Charlottetown, P.E.I. (R.R. Hurst).

YELLOW MOSAIC (Phaseolus virus 2). A well-defined yellow mosaic affected 4% of the plants of Flageolet in a garden at Fredericton, N.B. (D.J. MacLeod).

PRE-EMERGENCE KILLING. In my garden at Saskatoon, Sask., early-sown beans germinated so poorly, because of the extremely cold spring, that I dug up and reseeded the plot with seed from the original lot, which had been treated with spergon before the first seeding. Germination of the second seeding was 100% (F.C. Vanterpool).

SUN SCALD continues season after season to be the most noticeable and the most widespread of the various troubles on beans in southwestern Ont. It apparently does not cause any serious injury to the seed or reduction in yield (A.A. Hildebrand et al.).

AN UNDESCRIBED DISEASE OF BEANS. During June and July field beans of the varieties Michelite and Corvette in the Laboratory plots, Harrow, Ont., exhibited symptoms that appeared to be different from those of any disease described in beans. The first symptom noticed was the flaccid condition of a leaf or tendril on certain plants. Wilted leaves were not misshapen but were usually a darker green than the unaffected foliage. On some affected plants a leaf, otherwise normal, showed a more or less distinct yellow mottle. Even with an abundance of moisture in the soil, wilted leaves or tendrils soon dried up and died. Some of the plants showing wilted leaves were stunted and failed to set nearly as many pods as neighbouring healthy plants. Subsequently, the trouble was found in many commercial stands of the district and appeared to be more prevalent in Michelite than in other varieties.

After microscopic examination and attempts to isolate a pathogen had failed to reveal the presence of an organism in the affected tissues, the possibility that the disease was of virus origin was investigated. In a series of inoculation experiments in which the leaves of healthy bean seedlings were rubbed with juice obtained by macerating wilted leaves from affected plants, the yellow-mottle, but not the wilt, symptoms appeared in a high percentage of the inoculated seedlings. These results suggest that the trouble is, at least in part, of virus origin (A.A. Hildebrand et al.).

BEET

SCAB (Actinomyces scabies). A trace of scab was present on garden beets at Ste. Anne de la Pocatiere, Que. (R.O. Lachance) and Charlottetown, P.E.I. (R.R. Hurst).

LEAF SPOT (Cercospora beticola). Infection was general and damage slight in seed crops at Milner and Cobble Hill, B.C., in 1946 (W. Jones). The disease was present on all the plants and caused slight damage in 4 fields at St. Martin, Que. (E. Lavallee). A light infection was seen in one planting at Charlottetown, P.E.I. (R.R. Hurst).

DOWNY MILDEW (Peronospora Schachtii) was general in 2 gardens at Sidney, B.C. From field evidence, it appears that the disease is distributed with seed - most probably in diseased leaf fragments with the seed. Up to the present the disease has never been observed on sugar beets (W. Jones). A slight infection was observed at Point Grey, B.C. (I.C. MacSwan). Downy mildew was quite general and severe on Detroit Dark Red 16, but there was only a trace of infection observed on D.D.R. 6 at Grand Forks, B.C. (G.E. Woolliams).

LEAF SPOT and ROOT ROT (Phoma Betae). Considerable infection by P. Betae appeared to be present in roots forwarded to the Laboratory for diagnosis of downy mildew from Grand Forks, B.C. in Feb. 1946. The organism was isolated from blackened areas on the roots (W. Jones). A slight infection was general on the leaves, particularly the lower ones, at Agassiz and Milner, B.C. (I.C. MacSwan).

LEAF SPOT (Ramularia beticola) was general on the leaves on 18 March at the Station, Saanichton, B.C. (W. Jones). A slight infection was recorded on Flat Egyptian at Agassiz and Milner, B.C. (I.C. MacSwan).

RUST (Uromyces Betae). A slight infection occurred in a garden at the Station, Saanichton, B.C. (W. Jones).

BROWN HEART (boron deficiency) affected 10% of the stecklings in a field of Flat Egyptian at Keating, B.C., in 1946. The disease is quite common, but it can be reduced by application of boron (W. Jones). Brown heart affected 20% of the roots in a field of D.D.R. 16 at Grand Forks, B.C. (G.E. Woolliams).

BROCCOLI

BLACK LEAF SPOT (Alternaria oleracea) caused slight damage to the lower leaves of seed plants of Italian Green Sprouting at the Farm, Agassiz, B.C., in 1946 (W. Jones).

RING SPOT (Mycosphaerella brassicicola) was general on the foliage of over-wintered plants at North Saanich, B.C., in May 1946 (W. Jones).

CLUB ROOT (Plasmodiophora Brassicae). A slight infection was seen at Victoria, B.C. (W. Jones).

STERILITY (virus) was severe on 6 plants in a garden at Fredericton, N.B. The virus was transmitted by cleft grafting to Swede turnips, wild radish and broccoli. The virus is similar to the one causing sterility in Swede turnips (D.J. MacLeod).

CABBAGE

BLACK LEAF SPOT (Alternaria oleracea). A slight infection was present on seed plants at the University, Vancouver, B.C. (W. Jones) and on pods and leaves at Agassiz (I.C. MacSwan).

DOWNY MILDEW (Peronospora Brassicae). A slight infection was seen on Golden Acre at the Station, Saanichton, B.C., in 1946 (W. Jones).

CLUB ROOT (Plasmodiophora Brassicae). A severe infection occurred in a garden at Campbell River, B.C. (W. Jones). Club root was found in nearly every one of the 40 fields visited in the Montreal district, Que. Additional fields are being contaminated each year (E. Lavallee). Seedlings in a number of flats were a total loss at Kentville, N.S. (K.A. Harrison). A light infection was present in a planting of Danish Ballhead at Charlottetown, P.E.I.; it was also observed in 3 other local gardens (R.R. Hurst).

WIRE STEM (Rhizoctonia Solani). Although wire stem is less prevalent on cabbage than on cauliflower, the disease caused considerable trouble to growers in the Montreal district, Que. (E. Lavallee).

WILT (Sclerotinia sclerotiorum) affected a few plants in a garden on the Lower Mainland, B.C., in 1946 (W. Jones).

BLACK ROT (Xanthomonas campestris) was present in plots of cabbage and turnip grown side by side at the University, Winnipeg, Man.; the causal organism was isolated from discoloured tissues of the turnip root (W.A.F. Hagborg). Black rot affected 60% of the plants in a 10-acre field at St. Laurent, Que., with an estimated loss of 10% of the crop; the seed was home-grown (E. Lavallee).

FASCIATION (?Corynebacterium fasciens (Tilford) Dowson) affected 15% of the seed plants of Green Acre in a plot at the Station, Saanichton, B.C., in 1946 (W. Jones).

CARAWAY

YELLOWS (Callistephus virus 1) affected 10% of the plants in a field being grown for seed at Grand Forks, B.C. (G.E. Woolliams).

CARROT

LEAF BLIGHT (Alternaria Dauci). Infection was general and damage to the foliage was considerable at Agassiz, B.C., in 1946 (W. Jones). The disease was again observed at Agassiz in 1947 (I.C. MacSwan).

BLACK ROT (Alternaria radicina) was found on the occasional steckling of Chantenay and Nantes at Grand Forks, B.C., on 5 June. A very little infection was present on plants from treated seed examined 8 Oct. and it was confined to the petioles of the outer leaves. On the other hand when untreated seed was sown foliar infections occurred on 50% of the plants and some root rot was present developing largely where growth cracks had occurred (G.E. Woolliams).

LEAF BLIGHT (Cercospora Carotae) was observed occasionally about Guelph, Ont. (J.D. MacLachlan).

SOFT ROT (Erwinia carotovora). Damage was severe on all varieties in one test at the Station, Lethbridge, Alta. (J.D.G.).

ROOT KNOT (Heterodera marioni). All 10 fields examined averaging an acre each were infested at St. Janvier, Terrebonne Co., Que. Infection varied from a trace to moderate. The disease developed later than last year and consequently losses were slight. At Dorval, Jacques Cartier Co., 90% of the carrots were infected in 1/2 acre field; loss was 50-60% (R. Desmarteau). At St. Martin, Laval Co., a 3-acre field was found heavily infested; value of crop reduced 50%. A similar case was found at St. Vincent de Paul (E. Lavallee).

SCLEROTINIA ROT (S. sclerotiorum) was reported to have been prevalent on carrot roots from the Interior of B.C. after they were removed from storage and shipped to the Vancouver market, especially in shipments made after Christmas. In July infection was a trace in a field of stecklings, at Vernon, whereas the disease had caused a 50% loss in a seed crop at Armstrong (G.E. Woolliams).

BACTERIAL BLIGHT (Xanthomonas carotae). Infection varied from a trace to 75% of the seed plants in fields at Grand Forks, B.C. In the heavily-infected fields many of the umbels were partly or completely destroyed. Aphids were prevalent in the severely diseased fields and may have served in the spread of the disease. Later infection was a trace in a field intended for stecklings at Armstrong (G.E. Woolliams).

DWARF (virus). In a commercial field of Chantenay in York Co., N.B., 22% of the plants showed a distortion and dwarfing of the leaves. The petioles or petiolules were frequently twisted and bent so that the lower surface of the leaf or leaflets were uppermost. The lower and middles leaves showed an irregular chlorotic mottling which was later superseded by a chlorosis of the margins and finally a reddening of the marginal areas. The leaves so affected died prematurely. The petioles were generally quite brittle and frequently showed necrotic streaking. The roots were reduced in size and showed nodular growths. The disease

resembles yellows (q.v.) and was frequently found associated with it. Plants affected by both viruses were severely dwarfed and distorted. Dwarf was transmitted to healthy carrots by a species of aphid as yet not specifically identified, found on the infected carrots in the field (D.J. MacLeod).

YELLOWS (Callistephus virus 1). From a trace to 1% of the seed plants were found affected in fields at Grand Forks, B.C., on 5 June; these plants were from diseased roots that passed undetected and were not culled out at harvest time, 1946. Only a trace of yellows was present in the stecklings this year. The low infection in the crop is a marked improvement over former years and is due in part to the rigorous roguing of affected roots by growers at harvest in the past few years (G.E. Woolliams). Some yellows was observed at Edmonton, Alta. Yellows was also found by D.J. MacLeod in a tansy mustard at Calgary, Alta. (T.R. Davidson). Only traces of yellows were present at Indian Head in July. Slight damage occurred at Saskatoon, Sask., where late-season observations were made (R.J. Ledingham). About 25 carrot fields were examined in the Montreal district, Que., and yellows was found in nearly every one especially at the borders of the fields. Infection was generally light. In about 10 fields, which were oil-treated for weed control, the disease was practically absent (E. Lavallee). Yellows was common in carrots in York, Sunbury, Queens and Carleton Counties, N.B. Infection ranged from a trace to 12% in the 11 fields examined (D.J. MacLeod). Yellows infection varied from one to 10% (av. 4%) in the fields examined in Kings and Annapolis Counties, N.S. (J.F. Hockey). Infection varied from a trace to 50% of the plants in gardens in Queens Co., P.E.I. (R.R. Hurst).

CAULIFLOWER

BLACK LEAF SPOT (Alternaria oleracea). Infection was slight on the lower leaves of a 3/4 acre seed crop of Perfection Snowball at White Rock, B.C., in 1946 (W. Jones). A trace was present on cauliflower at Cloverdale, B.C. (I.C. MacSwan).

CURD ROT (Erwinia carotovora). A slight infection was seen at Elk Lake, B.C. (W. Jones).

DOWNY MILDEW (Peronospora Brassicae) caused considerable damage at Royal Oak, B.C., due to systemic infection of the seed plants (W. Jones).

CLUB ROOT (Plasmodiophora Brassicae) was severe on a few seed plants at Lulu Island and Elk Lake, Vancouver Island, B.C. (W. Jones). Severe infections of club root were found on both cabbage and cauliflower in the Chinese market gardens on muck soil in the Fraser River Delta. Infection was also slight to severe in home gardens and farms throughout the Delta region (I.C. MacSwan). In one 6-acre field at St. Bruno, Que., 80% of the plants were severely affected (R. Desmarteau). One or two plants were affected in a garden at Kentville, N.S. A very heavy infection occurred in this garden in 1940, but no crop of crucifers had been planted in the interval (K.A. Harrison). A trace of club root was observed in one garden in Queens Co., P.E.I. (R.R. Hurst).

WIRE STEM (Rhizoctonia Solani) was again prevalent, causing severe damage in plant beds, in the Montreal district, Que. Because this disease occurs quite regularly each spring, growers of cauliflower, cabbage and early turnips grow seedlings greatly in excess of their planting requirements; even so, the acreage has frequently to be reduced due to the lack of transplants. Formaldehyde treatment is effective but not when manure is used in making the hot beds, which is frequently the case (E. Lavallee, F. Godbout).

WILT (Sclerotinia sclerotiorum) affected 10% of the plants in a seed crop at Elk Lake, B.C. (W. Jones). Diseased specimens were received from a planting near Windsor, Ont. (C.D. McKeen).

BLACK ROT (Xanthomonas campestris). Two one-acre plantings in Lincoln Co., Ont., showed severe leaf infection, apparently spread during cultivation. Damage was largely confined to the leaves but a few plants were destroyed prior to heading (J.K. Richardson). Black rot caused heavy losses in some fields in the Montreal district, Que. Two fields, one at St. Laurent and another at St. Paul L'Hermite, grown from seed from the same source were heavily infected and nearly a total loss. Rows of plants from seed of another source in each of these fields were much less affected. One 3-acre field (16,000 plants) also at St. Laurent was a total loss, estimated at $2,000-$3,000 by the grower. Other fields from the same seed source were stated to be severely infected. A 10-20% infection was found in a field at St. Martin and in another at St. Vincent de Paul (E. Lavallee, R. Desmarteau).

BROWN HEART (boron deficiency). A trace was found on cauliflower on the local market, Charlottetown, P.E.I. (R.R. Hurst).

WHIPTAIL (physiological). On account of whiptail 10% of the plants failed to head in a 2-acre planting at Waterville, N.S.; the loss would have been greater but many plants were discarded at the time the field was set (K.A. Harrison).

CELERY

EARLY BLIGHT (Cercospora Apii). A heavy infection was observed in a 2-acre planting at Leamington, Ont.; damage was extensive (C.D. McKeen). Early blight appeared to be causing more damage than late blight in several plantings observed in Lincoln Co. and in some instances the damage was quite severe (J.K. Richardson). Infection was severe in one planting at St. Martin, Laval Co., Que. (E. Lavallee).

LATE BLIGHT (Septoria Apii-graveolentis) was common in truck gardens at Marpole, B.C., in 1946 (W. Jones). A light infection was found mostly on the lower leaves in a seed crop at Kelowna (G.E. Woolliams). Infection was heavy and the crop was a total loss in a field of about an acre planted by a new grower with diseased plants at St. Martin, Que.; no spraying was done. A loss of about 75% of the crop occurred in two other fields planted by inexperienced growers in the same district. Most celery growers in this

district control blight fairly well using the following programme: applying Bordeaux mixture 7 1/2 - 15 - 100 or copper-lime dust. (a) In beds: one application every week to 10 days starting when the plants are about 2" high. (b) In fields: one application every 10-15 days according to the growth and rainfall (E. Lavallée).

POTASH DEFICIENCY. Complaint was received that celery plants were severely stunted in numerous patches in a large field in Lincoln Co., Ont. The condition, due to low potash, was corrected by several applications of 0-12-10 fertilizer. A month later the plants had almost regained their normal size and vigour (J.K. Richardson).

CHIVES

RUST (Puccinia Porri). An excellent collection of this rust was made by Dr. H.T. Güssow on 15 June in his own garden, Victoria, B.C. Although this species was previously recorded in B.C. (P.D.S. 23:49), its identity had remained in doubt, only uredinia being present in the earlier collections. Dr. Güssow notes: "This rust kills the chive leaves every year at this time, but new growth comes from the bulbs and is sound for about a year". The rust has occurred sporadically in the eastern United States for some time, but it was after 1920 before it was known on the Pacific Coast. Freeman Weiss (U.S.D.A. Pl. Dis. Reptr. 31(1):33-37. 1947) reports it on garlic from Calif., on chives from Conn., N.Y., and Wash., and on onion from Conn., Nebr., and Calif. Aecia of this supposedly euautoecious rust have not been observed in North America (I.L. Conners).

CUCUMBER

GREY MOULD (Botrytis cinerea) caused moderate damage to a greenhouse crop at Mayne Island, B.C. (W. Jones). Grey mould attacked the nodes of cucumber stems in several greenhouses in Essex Co., Ont. Where the disease was not checked, the plants wilted and died. In one large greenhouse 30% of the crop was destroyed (C.D. McKeen).

SCAB (Cladosporium cucumerinum) caused slight damage to Perry's Special in greenhouses in Essex Co., Ont. (C.D. McKeen). Scab was present at the end of the season in many fields about St. Martin, Laval Co., Que. (E. Lavallee). Weather conditions were unfavourable for scab in N.B. throughout the growing season and little or no loss occurred this year (J.L. Howatt). Scab destroyed all the fruit in a garden plot of White Spine at Kentville, N.S., but no complaints were received from growers of field crops. Scab destroyed a crop in a greenhouse at Hantsport just as the plants were coming into bearing (K.A. Harrison). A trace was observed in a garden in Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL WILT (Erwinia tracheiphila) caused the death of a few plants in a greenhouse at Cottam, Ont., in June (C.D. McKeen). The disease

destroyed a few plants in a 2-acre planting of Chicago Pickling heavily infested with cucumber beetle and tarnished plant bug at Millville, N.S. (K.A. Harrison).

POWDERY MILDEW (Erysiphe Cichoracearum) caused considerable damage in many greenhouses in Essex Co., Ont. Mildew also appeared late in the season on most outdoor plantings and rapidly destroyed the foliage and vines (C.D. McKeen).

WILT (Fusarium sp.) infection was moderate to severe in one plot in trials at Point Grey, B.C.; affected plants, usually one plant in 3 or 4 plants per hill, wilted and died (I.C. MacSwan). Wilt was affecting many plants in a greenhouse at Sidney on May 8. Isolations yielded a Fusarium, which was identified as F. oxysporum by W.L. Gordon. Its pathogenicity has not been tested (W. Jones). Wilt (?cause) was a serious disease in many commercial plantings at Winnipeg, Man., and vicinity. Losses were heavy from the end of July onwards. There was no evidence that Erwinia tracheiphila was involved (W.L. Gordon, W.A.F. Hagborg). Fusarium wilt was found in 2 greenhouses in the Leamington area, Ont.; all affected plants died just after harvesting began (C.D. McKeen).

WILT (Mycosphaerella citrullina). Several plants were attacked and died in a greenhouse at Ruthven, Ont.; the disease often appears as the crop approaches maturity (C.D. McKeen).

ANGULAR LEAF SPOT (Pseudomonas lachrymans). Damage was severe in a 15-acre field near Coaldale, Alta., and moderate in a greenhouse at Edmonton (J.D.G.). A heavy infection was found on the variety Minou at the Farm, Brandon, Man., in 1946. The causal organism was isolated, identified and its pathogenicity tested. The disease was also found at St. Adolphe in 1947 (W.L. Gordon, W.A.F. Hagborg). It affected several plants in a greenhouse at Leamington, Ont. (C.D. McKeen). The disease was severe in a plot at the Station, Fredericton, N.B., and caused moderate damage in scattered plantings in the cucumber area around Sheffield and Grand Lake (J.L. Howatt).

DAMPING OFF (Pythium sp.) was severe in most cucumber seed beds in Essex Co., Ont., in April, loss being 50% of the seedlings in some cases. The weather was cool and cloudy (C.D. McKeen).

STEM ROT (Sclerotinia sclerotiorium). Several plants were killed by stem rot in one greenhouse at Ruthven, Ont. (C.D. McKeen).

MOSAIC (virus). All field plantings of cucumbers and muskmelons in Essex Co., Ont., showed some infection, the highest being 4%. Mosaic also affected greenhouse cucumbers but it was much less common than in 1946 (C.D. McKeen). Several plantings were slightly infected in Lincoln Co. (J.K. Richardson).

EGG PLANT

VERTICILLIUM WILT (V. ?Dahliae). Several plants were affected in a seed plot at Summerland, B.C. (G.E. Woolliams). The disease was present in every planting in Essex Co., Ont., infecting 2-4% of the plants (C.D. McKeen). Not a planting was observed free from infection in Lincoln Co., Ont., and in some many plants were severely stunted and failed to produce fruit (J.K. Richardson).

HOPS

DOWNY MILDEW (Pseudoperonospora Humuli) continues to be a serious disease of hops in the Fournier district, Ont. In yards which were dusted but not sprayed up to half the crop was lost due to the disease. Downy mildew was effectively controlled with copper sprays (L.T. Richardson).

POWDERY MILDEW (Sphaerotheca Humuli) is general in the Fournier district, Ont., but it is not a serious pest as it readily responds to either dusts or sprays (L.T. Richardson).

NETTLEHEAD (virus). Typical nettlehead symptoms were seen on 4 plants in a planting at the Station, Fredericton, N.B. The affected vines were very weak and failed to climb the poles provided for their support. Only a few distorted cones containing no seed were formed. The disease was transmitted to healthy hop plants by cleft grafting in the greenhouse (D.J. MacLeod).

HORSERADISH

WHITE RUST (Cystopus candidus). Affected specimens were received from Chatham, Ont., from a grower who claimed that the disease was causing severe injury in his commercial planting (J.E. Howitt). White rust heavily infected horseradish plants in the Botanical Garden, Montreal, Que. (J.E. Jacques).

LETTUCE

GREY MOULD (Botrytis cinerea) severely affected a few plants at the Station, Saanichton, B.C., in 1946 (W. Jones). A moderate infection was found in lettuce at Point Grey (I.C. MacSwan).

DOWNY MILDEW (Bremia Lactucae) was quite general on the lower leaves of lettuce at Agassiz and Point Grey, B.C. (I.C. MacSwan).

DROP (Sclerotinia sclerotiorum) was reported as follows: 10% of the seed plants of New York 12 killed at the Farm, Agassiz, B.C., in 1946

(W. Jones); found on lettuce grown for seed at Armstrong (G.E. Woolliams); 10% of the plants killed in the plots at Edmonton, Alta.; disease severe on all varieties of head lettuce at Lacombe (J.D.G.).

POTASH DEFICIENCY. In the London district, Ont., there were areas in a planting of head lettuce where the plants were somewhat stunted, leaves were chlorotic with yellow mottling and necrosis of both the margins and areas within the leaf. Soil from affected areas in the field revealed potash deficiency (J.K. Richardson).

TIP BURN (physiological). A planting of 15,000 heads of Iceberg lettuce at Grafton, N.S., was nearly a total loss on account of tip burn. One cut was made on 10 July following a heavy rain on the 8th. The weather was very hot on the 11th and 12th with fog at night. By the 14th the whole field was affected (K.A. Harrison).

MELON

LEAF SPOT (Alternaria cucumerina) was found in a few fields of muskmelon in the Harrow district, Ont., but it caused slight damage (C.D. McKeen). A single hill of variety 11-38 showed considerable spotting in a variety test at Aldershot (R.G. Atkinson).

SCAB (Cladosporium cucumerinum) was found in one muskmelon field at Leamington, Ont., where it caused slight damage to the stems and leaves (C.D. McKeen).

BACTERIAL BLIGHT (Erwinia tracheiphila) was observed in many muskmelon fields in Essex Co., Ont., but the damage was usually slight; 0.3% of the plants were affected and died in a plot at the Station, Harrow (C.D. McKeen).

POWDERY MILDEW (Erysiphe Cichoracearum) appeared in epidemic proportions in most muskmelon fields in the Leamington district, Ont., causing extensive killing and defoliation; the loss in crop varied from 25 to 50% (C.D. McKeen).

FUSARIUM WILT (F. bulbigenum var. niveum) was present to some extent in many muskmelon fields in Essex Co., Ont. Wilt was particularly severe in 4 fields, where the number of wilted or dead plants at the time of first picking was 86.5%, 75%, 69% and 25% respectively (C.D. McKeen). In varietal trials for wilt resistance conducted at Aldershot, in co-operation with Ont. Agricultural College, infection was quite severe in the more susceptible varieties and resulted in the death of a few hills. However, some varieties in the test showed a high degree of resistance (R.G. Atkinson, J.J. Miller).

DAMPING-OFF (Pythium sp.) caused considerable loss in most seedbeds in Essex Co., Ont., in May. Rainy and cloudy weather retarded plant growth and the seedlings were under attack for a longer period than usual (C.D. McKeen).

MOSAIC (virus). Several melon plantings in the Aldershot district, Ont., showed 1-5% of the plants affected by mosaic (J.K. Richardson). Mosaic severely affected the leaves and fruits of Iroquois and Perfecto melons in the Botanical Garden, Montreal, Que. (J.E. Jacques).

ONION

PURPLE BLOTCH (Alternaria Porri) caused moderate leaf and stalk injury in a 2-acre field at Harrow, Ont. (C.D. McKeen).

NECK ROT (Botrytis Allii). Two cases of neck rot were encountered: slight infection in Yellow Danvers from Port Moody in Jan. 1946, and moderate infection in Portugal at Sidney, B.C. in Jan. 1947. From the second specimen the organism was isolated and identified (W. Jones). Neck rot was affecting less than 1% of the bulbs of all varieties planted for seed production in the Grand Forks area in June. About 10% of the onions from one field of Yellow Globe Danvers that had not been thoroughly cured were affected at Grand Forks on 8 Oct.; the loss may be severe if these onions are kept in storage to the end of the season (G.E. Woolliams). A moderate infection was seen in one lot of stored onions at Saskatoon, Sask., this fall (R.J. Ledingham). A slight infection was observed in September at Ste. Anne de Pocatiere, Que. (R.O. Lachance).

DOWNY MILDEW (Peronospora destructor) was general and rather severe in a seed crop at Duncan, B.C., in 1946 and in garden crops at Campbell River and Sidney in 1947 (W. Jones). Downy mildew was present on the seed crop only in some fields in the Kelowna, Vernon and Armstrong districts on July 4; none of the fields were seriously affected. A slight infection was recorded on both the seed and bulb crops in the Grand Forks district on 25 July (G.E. Woolliams). Downy mildew was reported from many parts of Ont. again this year and in some cases it caused apparently severe losses (J.E. Howitt). A slight infection was found at L'Assomption, Que. (L.T. Richardson).

STORAGE ROT (cause unknown) caused moderate damage to onions in storage at New Westminster, B.C. Among the fungi present was Papulaspora sp. (I.C. MacSwan, I.L. Conners).

PINK ROOT (Phoma terrestris Hanson). Affected specimens were received from Tilbury, Ont. (C.D. McKeen). This disease has not been previously reported in Canada; it was originally described by H.N. Hansen (Phytopath. 19(8): 691-704. 1929).

SMUT (Urocystis Cepulae) was found in 2 nearby fields at Kelowna, B.C. In one field, where the bulbs were being grown for seed production, only one diseased plant was found. Seed produced earlier in the field was used to sow the nearby field, which was in a commercial crop. In the latter, affected onions were found in patches throughout the field. Loss would be slight this year; as far as possible all infected plants were removed by the grower, and when the field was thinned in accordance with standard practice, there was still a good stand over the whole field. According to

the grower, the disease was first noticed about 2 years ago. Imported onion sets were planted in this field in 1944 and it seems possible that it was in this way the disease was introduced. This is the first record of onion smut in the Okanagan Valley (G.E. Woolliams). Damage was moderate to heavy in one field at St. Laurent, 3 at Cote St. Michel and one at St. Leonard de Port Maurice, Que. (E. Lavallee).

ASTER YELLOWS (Callistephus virus 1) was observed in a field of seed onions adjacent to a 1/4 acre field of Warba potatoes, where 80% of plants were affected by purple top (q.v.) at Portage la Prairie, Man. (D.J. Petty). Two plants apparently affected with aster yellows were found in a small planting of seed onions at Bradford, Ont. (H.N. Racicot).

YELLOW DWARF (virus) was first found in the Grand Forks district, B.C., in the section devoted to the production of seed of the variety Ebenezer. In 1947, the disease has now been found on onion seed crops in all parts of the district and on all the varieties (Yellow Globe Danvers, Ebenezer, Early Yellow Globe, Red Withersfield, Mountain Danvers) being grown, a trace to 15% of the plants being affected on 15 June. Infection is most serious in the zone devoted to Ebenezer and the adjacent Early Yellow Globe zone. Yellow dwarf was found again at Vernon, B.C., where about 10% of the plants of Yellow Globe Danvers in seed crops and 1% in bulb crops were affected (G.E. Woolliams).

PARSNIP

ROOT KNOT (Heterodera marioni). All parsnip plants were severely affected in a 1/2-acre field at Dorval, Que.; the field was a total loss (Roger Desmarteau).

PEA

LEAF and POD SPOT (Ascochyta Pisi). Infection was severe on pea specimens received from Prince Rupert, B.C. Early varieties were stated to be only slightly affected in the same home garden (I.C. MacSwan).

A survey was made for disease in pea fields when at the pod stage in 4 districts in Alta. Rainfall was light at Lethbridge during the latter part of June and throughout July. In the other districts it was much heavier during July, particularly at Beaverlodge.

District	Fields		Fields Affected by					
	Examined	Diseased	Pseudomonas pisi		Ascochyta Pisi		Septoria Pisi	Peronospora Pisi
			(1)	(2)	(1)	(2)	(1)	(1)
Lethbridge	26	21	12	0	0	0	6	6
Edmonton	8	8	3	2	4	1	0	0
Athabaska	4	4	4	0	3	0	0	0
Beaverlodge	6	6	0	0	4	2	0	0
All Alberta	44	39	19	2	11	3	6	6

(1) Infection trace to slight. (2) Infection moderate to severe.

Of the 44 fields inspected 37 were grown for seed; no apparent difference was noted in the amount of disease in these fields compared with those grown for other purposes. The absence of leaf and pod spot at Lethbridge was probably due to the low rainfall. The disease was present and sometimes severe in fields in the other districts. Infection was trace to severe in gardens in the Edmonton district and in varietal test plots at the University it was a trace to moderate in 18 of the 59 seed lots representing 27 varieties in the test. At the Beaverlodge Station infection was severe on Alaska and Wisconsin Early Sweet and slight on Giant Stride (J.D. Gilpatrick).

Some pod spot developed as a result of rains in August in a planting near Saskatoon, Sask. (T.C. Vanterpool).

Leaf and pod spot was present only in trace amounts in variety plots at Wellington, Ont., 10 July. Some fields in Ont., however, became severely infected before the seed crop was ripe as some of the seed samples of the 1947 crop being presently examined are heavily infected.

Pea seed samples have been examined each year for several years at the Laboratory, Ottawa, Ont., to determine their suitability for seed. A total of 778 samples chiefly of Foundation, Elite and Registered seed were examined from the 1946 crop. Of these samples 397 (51%) were suitable for seed, 289 (37%) were suitable if treated, and 92 (12%) were unsuitable. Most of the samples considered unsuitable contained more than 3% of the seeds affected by Ascochyta spp. A tabulation of the results obtained from tests made on the 1939-1946 crops revealed that the three species were present in the ratio of 16 A. Pisi (leaf and pod spot), 5 A. pinodes (Mycosphaerella blight) to 2 A. pinodella (Ascochyta root rot) (W.C. Broadfoot).

Leaf and pod spot was unimportant in P.E.I. in 1947; a light infection was seen in one planting in Queens Co., (R.R. Hurst).

GREY MOULD (Botrytis cinerea) was common on pods of plants among weeds in a seed crop of Giant Stride on Lulu Island, B.C., in 1946 (W. Jones).

POWDERY MILDEW (Erysiphe Polygoni). Infection was moderate on a late-sown crop of Alderman at Beaumont, Que. (R.O. Lachance); severe on a

garden patch of Fenland Wonder, part of which had been left to mature seed at Kentville, N.S. (K.A. Harrison); and light on a planting in Queens Co., P.E.I. (R.R. Hurst).

ROOT ROT (Fusarium sp.) caused severe damage in a garden at New Westminster, B.C.; the pathogen was isolated (W. Jones). Infection was very heavy on a variety in plots of a cultural experiment at Smithfield, Ont. on 3 July; a Fusarium was isolated (H.N. Racicot, W.C. Broadfoot). Infection was severe in a plot of Thomas Laxton, which was a total loss, at Ste. Anne de la Pocatiere, Que. The disease was also present in field peas, but it was less prevalent than in previous years (R.O. Lachance). Root rot caused moderate to severe damage in many plantings in York Co., N.B. Isolations were not made this year, but Fusarium spp. and Rhizoctonia Solani have been isolated from diseased roots in previous years (J.L. Howatt). About half the plants were affected and died early in a planting of Fenland Wonder at Kentville, N.S. (K.A. Harrison). In a test plot at the Kentville Station the variety Radium showed appreciable injury (30% infection) (J.F. Hockey).

MYCOSPHAERELLA BLIGHT (M. pinodes) was not encountered during the survey for pea diseases in Alta. in 1947, nor has the organism been isolated to date at Edmonton. However, the fungus has been isolated a few times at Ottawa from Alta. samples (J.D. Gilpatrick, W.C. Broadfoot). Considerable blight was seen on some varieties in the trials at the Horticultural Station, Smithfield, Ont. (W.C. Broadfoot).

DOWNY MILDEW (Peronospora Pisi) was general and caused slight damage at Sidney, B.C. (W. Jones). Traces occurred at the Lethbridge Station and district, Alta. (J.D. Gilpatrick). A trace, the lesions mostly old, was found in a variety test at Wellington, Ont., 10 July (I.L. Conners).

BACTERIAL BLIGHT (Pseudomonas pisi) was moderate in a well-isolated field that had never grown peas before; this field was one of two moderately to severely affected in the Edmonton district, Alta. (see table above). Hail damage seemed to increase its prevalence. Infection was a trace to severe in Edmonton gardens and a trace to slight on the odd variety at the Lethbridge, Olds and Beaverlodge Stations (J.D. Gilpatrick).

ROOT ROT (Rhizoctonia Solani) destroyed a few plants at Edmonton, Alta. (J.D. Gilpatrick).

LEAF SPOT (Septoria flagellifera). A moderate infection occurred on Chancellor at Indian Head, Sask., in late August (H.W.M.).

LEAF SPOT (Septoria Pisi) was severe in several gardens at Edmonton and one at Calgary, Alta. Infection was a trace to severe on 44 of the 59 lots tested in the plots at Edmonton (J.D. Gilpatrick). The disease was prevalent and injurious to the leaves of Lincoln and Onward at Birds Hill, Man. A trace of S. flagellifera was also present (W.L. Gordon). Infection was severe in a planting of Alaska at Beaumont, Que. (R.O. Lachance).

RUST (Uromyces Fabae). A slight to moderate infection was observed in a commercial planting of Lincoln at North Kildonan, Man.; this rust is seldom found on peas in Man. (W.L. Gordon). A trace of rust was observed on a planting at Charlottetown, P.E.I. (R.R. Hurst). The rust was inadvertently reported in P.D.S. 26: 42, as U. Pisi (I.L.C.).

MOSAIC (virus) affected 5% of the plants in a plot of Alderman at the University, Vancouver, B.C. (I.C. MacSwan). A trace of mosaic (Pisum virus 1) was found in 3 fields in York Co. and in a small garden at Fredericton, N.B. (D.J. MacLeod).

PEPPER

FRUIT SPOT (Diaporthe Phaseolorum var. Sojae). A few fruits of Pennwonder sweet pepper were affected in a plot at the Station, Harrow, Ont. (C.D. McKeen).

SOFT ROT (Erwinia carotovora). In late August and in September, 4 to 5 fruits per plant, both green and ripe, were attacked and rotting in many plantings in Essex Co., Ont. Corn borer larvae were found in diseased fruits and probably provided an avenue of entrance for the organism (C.D. McKeen).

ANTHRACNOSE (Gloeosporium piperatum Ell. & Ev.) was found on a few fruits of sweet peppers in a plot at the Station, Harrow, Ont. (C.D. McKeen). This disease appears not to have been previously reported to the Survey (I.L.C.).

DAMPING OFF (Rhizoctonia Solani and Pythium ultimum) was found affecting seedlings of all pepper varieties in nearly every greenhouse in Essex Co., Ont.; losses varied from a few up to 80% of the seedlings in some flats (C.D. McKeen).

BACTERIAL SPOT (Xanthomonas vesicatoria) caused considerable leaf spotting and much defoliation in one planting of sweet and hot peppers in Essex Co., Ont. Spots also occurred on the fruits and pedicels (C.D. McKeen).

INFECTIOUS CHLOROSIS (virus). A single plant was seen in a seed plot of Paprika peppers at Summerland, B.C. (G.E. Woolliams).

MOSAIC (virus) affected 2% of the plants of California Wonder sweet pepper in a planting in Essex Co., Ont. (C.D. McKeen). Mosaic was present to some extent in most plantings of sweet and hot peppers in Lincoln Co., but losses were insignificant (J.K. Richardson).

BLOSSOM-END ROT (non-parasitic) affected 2-5% of the fruits in every planting in Essex Co., Ont. Alternaria fruited abundantly in the affected areas (C.D. McKeen).

SUNSCALD (non-parasitic). A number of fruits with tan-coloured soft areas on the exposed side was found in every planting in Essex Co., Ont. (C.D. McKeen).

POTATO

The Plant Protection Division, Science Service, has supplied the data, included in Tables 4 - 7, on the Seed Potato Certification work. All fields of potatoes entered for certification are planted with Foundation or Foundation A seed.

Table 4. Seed Potato Certification.
Number of Fields and Acres Inspected, 1947

Province	Number of Fields		Fields Passed	Number of Acres		Acres Passed
	Entered	Passed	%	Entered	Passed	%
P.E.I.	8,540	7,257	84.9	33,496	29,223	87.2
N.S.	579	554	95.5	1,256	1,206	96.0
N.B.	2,500	2,355	94.0	16,383	15,515	94.0
Que.	904	678	75.0	2,321	1,667	71.8
Ont.	892	718	80.3	2,922	2,365	80.9
Man.	162	129	79.6	648	573	88.4
Sask.	106	91	85.8	147	105	71.6
Alta.	197	175	89.2	614	550	89.6
B.C.	736	649	88.2	2,598	2,270	87.4
Total	14,616	12,606	86.2	60,385	53,474	88.5

Previous Yearly Totals

1946	14,198	11,628	81.9	68,666	55,256	82.8
1945	11,267	9,501	84.3	50,648	40,866	80.7
1944	8,500	7,567	89.0	31,633	28,616	90.4
1943	9,562	5,520	57.7	34,947	19,148	54.8

Acres Entered		Acres Passed	
1946	66,665	1946	55,256
1947	60,385	1947	53,474
Decrease of 6,280 or 9.4%		Decrease of 1,782 or 3.2%	

Table 5. Seed Potato Certification: Acreage Passed by Varieties, 1947.

Variety	P.E.I.	N.S.	N.B.	Que.	Ont.	Man. Alta.	B.C.	Total
Katahdin	2,617	574	9,984	4	1,498	56	33	14,766
Green Mountain	9,195	132	3,061	1,693	119	25	116	14,241
Irish Cobbler	11,900	171	665	67	245	297	12	13,357
Sebago	5,315	102	231		67			5,715
Netted Gem	1		1			583	1,422	2,007
Bliss Triumph		185	1,439			64	4	1,692
White Rose	3		1			6	420	430
Chippewa	36				365	9	19	429
Warba	2	16	5		13	59	90	185
Sequoia	132	7					1	140
White Bliss			117					117
Houma	18							18
Pontiac	3		11					14
Cahus						8		8
Teton					4			4
Menominee						1		1
Others	1	19		3	54	120	153	350
TOTAL	29,223	1,206	15,515	1,667	2,365	1,228	2,270	53,474

Table 6. Seed Potato Certification: Fields Rejected on Field Inspection, 1947.

Province	Leaf Roll	Mosaic	Ring Rot in field	Ring Rot on farm	Black Leg	Adjacent Diseased Fields	Foreign Varieties	Misc.	Total
P.E.I.	189	358			193	63	175	305	1,283
N.S.	8	1			3	3	5	5	25
N.B.	47	9	27	2	13	6	29	12	145
Que.	11	13	110	20	16	22	9	25	226
Ont.	42	5	60	12	7	5	3	40	174
Man.			12	9	1	1		10	33
Sask.	1		8					6	15
Alta.		1	3	5	8	1		4	22
B.C.	4	11			7	8		57	87
TOTAL	302	398	220	48	248	109	221	464	2,010
Rejections as a percentage of fields:									
Entered	2.1	2.7	1.5	0.3	1.7	0.7	1.5	3.3	13.8%
Rejected	15.0	19.8	10.9	2.4	12.3	5.4	11.0	23.2	100%

Table 7. Seed Potato Certification: Average Percentage of Disease found in Fields, 1947.

Average Percentage of disease found in	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
	%	%	%	%	%	%	%	%	%
Fields entered: (first inspection)									
Black Leg	.20	.05	.08	.12	.16	.09	.03	.29	.07
Leaf Roll	.37	.19	.40	.09	.16	.03	.15	.08	.08
Mosaic	.27	.06	.02	.09	.03	.01	.10	.02	.10
Fields passed (final inspection)									
Black Leg	.04	.04	.06	.07	.02	.05	.03	.05	.06
Leaf Roll	.13	.14	.30	.07	.04	.02	.05	.03	.09
Mosaic	.06	.05	.01	.04	.02	-	.02	.01	.08

The potato seed crop grown in 1947 was slightly smaller than in the previous year. The percentage of crop passing certification was unusually high. The number of rejections for leaf roll was low, particularly in N.B. Rejections were high in N.B. in 1945 and 1946, and in both N.B. and P.E.I. in 1942 and 1943, but they were about 1.0% of the fields entered in both provinces in 1944. The increasing use of DDT may so reduce the population of aphid vectors that marked fluctuations in the amount of leaf roll in seed potato fields may no longer occur, but several seasons must elapse without any appreciable change in the varieties grown before the low incidence of leaf roll may be attributed to the wide use of DDT. Mosaic caused more rejections in 1947 especially in P.E.I. than the previous year. Ring rot is still an important disease in the seed crop in some provinces; it was the cause of rejection of 14.4% of the crop entered for certification in Que., 13.0% in Man., 8.1% in Ont., 7.5% in Sask., 4.1% in Alta. (with none in 1945 and 1946) and 1.2% in N.B. Complete information is not available on the amount of disease in table stock, but it is known that only traces occurred in P.E.I., N.S. and B.C. (none this year), 6.6% of the fields in Alta., 11% in Ont., and considerable in Que. In general the situation is less critical with the exception of Man., Sask. and possibly Que.

COMMON SCAB (Actinomyces scabies) was found in B.C. on many crops of smooth-skinned varieties (Early Epicure, Irish Cobbler, Green Mountain, Katahdin, Warba, White Rose) and on a few crops of Netted Gem. Infection varied greatly in prevalence and severity even in different parts of the same field. The worst crop was one under irrigation in the Cariboo district; 60% of tubers were below certified seed grade (H.S. MacLeod). Scab was observed everywhere in Alta. and was more severe than usual in central and northern sections on smooth skinned varieties; only one lot of Netted Gem showed scab on bin inspection (J.W. Marritt). Moderate to severe infections were present on susceptible varieties in some districts in Sask. (A. Charlebois). Scab was unusually prevalent in the Saskatoon area in 1947; the season was very

dry (R.J. Ledingham). Scab was negigible in Man., but in a few fields in the Kenora and Thunder Bay districts in Northwestern Ont., scab was slight on 3 - 6% of the tubers and moderate on 4% (D.J. Petty). Scab was present in most plantings of Irish Cobbler in Essex Co. and was more prevalent than last year (C.D. McKeen). Scab was slight throughout Southwestern Ont.; it appeared to be less severe in 1946 and 1947 than in previous years (F.J. Hudson). In counties along Lake Ontario, including York and Frontenac, common scab was sufficiently prevalent this year to necessitate grading out the scabbier tubers or in some cases marketing the entire crop as table stock. In Durham Co. potatoes suffer from a type of scurfy scab, which in its milder forms closely resembles the normal netting or russetting of Netted Gem. In some counties, including Dufferin and Wellington, the scab lesions are deep or pitted and are frequently associated with severe scab-gnat injury; when so injured the crop is ineligible for seed and very unattractive as table stock. It is estimated that 25 - 50% of the tubers of the susceptible varieties such as Irish Cobbler, Chippewa, and Katahdin are unfit for seed each year on account of scab. It varies, of course, with individual growers and grower practices. On farms where scab is severe we would like to be able to suggest to the grower that he grow one of the fairly excellent varieties highly resistant to common scab that have proved their worth in New York and other states. Unfortunately, with the exception of Menominee, a rather rough growing variety, the other varieties, Ontario, Seneca and Cayuga (F.M. Blodgett and F.L. Stevenson Am. Pot. Jour. 23 (9): 315-329. 1946) are not at present licensed in Canada and, therefore, ineligible for certification. There is a definite need for such varieties and these American varieties would fill a place until Canadian ones were available (W.L.S. Kemp). In Inspection District 3, scab is apparently becoming more serious on certain farms especially on the heavier types of soil. Scab-resistant varieties seem to be the best answer. On one farm a block of Ontario was planted in the centre of a field of Katahdin; and abundance of scab developed on the Katahdin but there was practically none on the Ontario variety.

It has been observed that when growers use heavy applications of commercial fertilizers scab may develop on farms where it has never been present to any extent before. A study is contemplated of the kind of filler used in fertilizers (H.W. Whiteside). Fertilizer fillers appear to be of two kinds: neutral sand or limestone, now usually dolomitic limestone. The latter could hardly be added to the potato crop with safety (I.L.C.). Slight scab was found in a few crops in eastern Ont. (O.W. Lachaine).

Scab infection was general but slight along the lower St. Lawrence and in Eastern Townships, Que., but it was less prevalent than usual. Scab appeared in a few lots in the Chicoutimi region, but the affected tubers were easily removed (B. Baribeau). Scab was more prevalent than usual in N.S.; it was present in 45% of the crops inspected and about 10% of the tubers were affected. Three crops with about 80, 75 and 50% of the tubers affected were sold as table stock (R.C. Layton). Scab was unusually heavy in many crops in P.E.I. in 1947 and was much more prevalent than for several years. A slight infection occurred in the resistant Sebago (S.G. Peppin).

EARLY BLIGHT (Alternaria Solani) was found in 87 (11.8%) of the fields inspected in B.C., but it was severe in only one (H.S. MacLeod). Infection was slight in 46 fields and moderate in 10 of 197 inspected in Alta.; the disease was more widespread than usual (J.W. Marritt). Infection was slight to moderate in commercial plantings about Edmonton (J.D.G.). A slight infection was general in Sask. (R.J. Ledingham). Early blight was present in eastern Sask. and infections were moderate between Yorkton and Norquay (A. Charlebois). Traces of early blight were present in most fields in Man. and northwestern Ont., and in several fields of the early varieties on light soil infection was moderate to severe (D.J. Petty). Only a trace was found on Irish Cobbler in the Harrow district, Ont. (C.D. McKeen). A slight infection was noted in a few fields in southwestern Ont. (F.J. Hudson). Early blight was extremely scarce in Inspection District 2; the use of DDT early in the season is suggested as a contributing factor (W.L.S. Kemp). The disease was much more prevalent in 1947 than usual in District 3, although it was most severe on early varieties, many fields of the late varieties were also affected (H.W. Whiteside).

Early blight was general throughout Que., except in the northern sections, on account of the drought. In some fields it appeared in early July and caused much damage to the foliage; the yield was reduced 8 - 10% where the fields were not sprayed. A slight amount of tuber rot was reported in a lot of Green Mountain near Quebec city (B. Baribeau). Early blight was noticed in fields of Irish Cobbler and Bliss Triumph in N.B., but it caused no serious damage (C.H. Godwin). Early blight was less prevalent than last year in N.S., but it became fairly general. Infection was heavy in Colchester and Antigonish Counties and some fields were completely destroyed in the latter county. It was severe in Kings Co., in a few fields of Irish Cobbler. To date no Alternaria rot has been noted (R.C. Layton). Early blight was obviously more prevalent in P.E.I. than the previous year; the damage was moderate in the North River plots (L.C. Calbeck, S.G. Peppin). An occasional tuber of Irish Cobbler was affected in a lot examined 17 Feb. 1947 (R.R. Hurst). One crop showing upwards of 1% tuber rot was seen this fall (S.G. Peppin).

DRY ROT (Armillaria mellea) affected a few tubers in a planting at North Saanich, B.C. (W. Jones).

STEM ROT (Botrytis cinerea) was affecting 15% of the plants in plantings of Sebago and Green Mountain at Hunter River, P.E.I. (G. Ayers).

BACTERIAL RING ROT (Corynebacterium sepedonicum). In the production of certified seed, fewer rejections were made across Canada in 1947 than in any year since apparently healthy fields were rejected if ring rot was found anywhere on the farm. The figures for each province are given in Table 6. Bacterial ring rot was not observed in B.C. (H.S. MacLeod). An inspection was made of all commercial crops in the Courtenay district, B.C., where the last outbreak occurred; no new cases were found. Even though no ring rot was found on the 4 farms affected in 1946, the potatoes are being marketed in non-potato producing areas. A number of carloads were inspected from the Okanagan Valley, Columbia Valley and the Coast, but no ring rot was found. A specimen suspected of being affected by ring rot was received from a householder at Pouce Coupe, in the B.C. section of the Peace River District (W.R. Foster).

Some slight progress was achieved in the control of bacterial ring rot in Alta. in 1947. Although only 1127 fields were inspected the survey was as complete as in previous years because substantially fewer farmers grew potatoes for market in 1947. Ring rot was found on 76 farms compared with 103 in 1946, but the percentage of infected farms remained almost unchanged.

The tabulation below shows what progress has been made in the control of ring rot:

Year	Number of Fields		Change in Number Diseased over previous year	Percentage Diseased
	Inspected	Diseased		
1940	261	73	+ 33	28.0%
1941	430	102	+ 29	24.7
1942	406	151	+ 49	37.3
1943	965	235	+ 84	24.1
1944	1010	241	+ 6	24.8
1945	1198	137	-104	11.4
1946	1637	103	- 34	6.3
1947	1127	76	- 27	6.6

Regulations for the control of ring rot were passed in 1942 and were put into effect that fall. Considerable improvement in the situation resulted. Very few prosecutions were made in 1943, but in the winter 1943-44 substantial penalties were requested for violators of the regulations. In 1945 the percentage of farms on which ring rot was found dropped from 24.8% to 11.4%. A substantial reduction was secured the following year by the same means. During the past year more reliance was again placed on educational efforts and only one prosecution was made. However, the percentage of farms on which the disease was observed increased slightly to 6.6%. It would appear that educational means, however thorough, are insufficient and more rigid enforcement of the regulations will be necessary to reduce the disease further (J.L. Eaglesham).

The 8 rejections (Table 6) in Alta. were the first since 1943 (J.W. Marritt). About a dozen specimens were received at the Laboratory from scattered points in Sask.; last year 8 samples were received. Ring rot affected 15 - 20% of the plants in a field of Bliss Triumph and trace in other varieties at North Battleford (R.J. Ledingham). Numerous plants were affected in table stock fields near Saskatoon and in the Cravan--Lumsden area (A. Charlebois).

Ring rot was found in 13 of the 21 samples of diseased tubers submitted for examination from Man.; 2 of the infected samples were from table stock (W.A.F. Hagborg). No ring rot was found in northern Ont. (D.J. Petty).

In Ont. 72 fields (Table 6) entered for certification were rejected on account of ring rot. In Inspection District 3, the disease occurred in the Cochrane District, Dufferin and southern Simcoe Counties. All varieties were equally affected. Except for some seed of Warba,

infection of the seed was apparently due to the use of machinery or other equipment which had become contaminated when used in handling table stock on the same farm. All infected crops are being disposed of as table stock and an organized clean-up is being carried out in these districts. A similar programme was carried out in 1946 in the Sudbury District and in a small area in northern Simcoe. The programme included disposal of all potatoes in an isolated township in the Sudbury district and a thorough disinfection of all premises and machinery. A carload of Foundation A Chippewa seed from a ring-rot free area was planted. Four inspections were made: 2 in the growing season, one at digging time and a final bin inspection. No ring rot was found at any time. The programme in northern Simcoe was also successful (H. . Whiteside). In District 2, besides 26 cases of ring rot in fields entered for certification, the disease was found in a crop of Monominee grown by the largest grower of table stock in Ont., who had 152 acres in potatoes this year. The presence of infected table stock in seed producing areas is a distinct menace to the latter crop. A campaign similar to those carried out in District 3 in 1946 is needed in Wellington Co. (W.L.S. Kemp).

Since 1943, an annual survey has been made of table stock potatoes on farms in the chief potato growing areas in Ont. by the Provincial Department of Agriculture as part of its programme for the control of bacterial ring rot. Some of the results obtained are summarized below:

Year of Survey	Number of Farms		Percentage
	Inspected	Diseased	Diseased
1943	902	157	17%
1944	3,000	463	15%
1945	3,300	281	9%
1946	3,200	678	21%
1947	3,100	351	11%

In 1947, ring rot was found in potatoes on 351 (11%) farms. Of these 265 (8.5%) had it for the first time in the 5-year period; of the remaining 86, 77 (2.5%) were repeats from the previous 2 years and 9 (0.3%) were considered reinfections. The value of the survey is borne out by the fact that fewer farms are now infected and the rate of infection is lower. Moreover the annual survey is the best means of providing information on the prevalence and distribution of the disease from year to year. For additional details see L.T. Richardson and R.E. Goodin. Five years of bacterial ring rot. Proceedings Ont. Crop Improvement Assoc. 1948 (L.T. Richardson). Not only was bacterial ring rot the major cause of rejection of fields entered for certification in Que., but the disease is still quite prevalent in table stock fields. The loss in 1947 was estimated at 10-12% of the crop (B. Baribeau). The potato crop in Que. for 1947 was estimated to be 9,517,000 cwt. by the Dominion Bureau of Statistics. The loss in yield was therefore 1,057,000 to 1,298,000 cwt. At $1.88 per cwt., the farm value in 1946, the loss from ring rot was $1,987,000 to $2,440,000 (I.L.C.).

Ring rot was less severe than in recent years both in the seed crop and table stock in N.B. (C.H. Godwin). Despite increased sources of infection and a favourable season, little ring rot was found affecting plants in the field or tubers in storage in N.B. It is suggested that the low incidence of ring rot is due to the action of a bacteriophage. Hundreds of isolations from externally intact, diseased tubers failed to grow and many that did underwent lysis (J.L. Howatt). In 1946 a preliminary survey was conducted for bacterial ring rot in table stock fields in 9 counties in N.S. This year it was decided to make a complete survey of the potato producing area in Kings and Colchester Counties. Inspectors were to call at every house in these districts, however small the acreage, and to visit every farm where ring rot was found last year. A total of 1,405 fields (1,295 acres) was inspected and ring rot was found in 8 fields (13.25 acres) in Kings Co. and, since the survey was completed, a ring rot infected sample was received from Pictou Co. Ring rot was not found again on the farms where it occurred last year. Infection in these 8 fields appeared to have arisen in most instances from the use of contaminated bags or containers from the dehydration plant, Kentville. No case of ring rot could be traced to its presence in certified seed (R.C. Layton). As a result of a province wide survey only 4 cases of ring rot have been found in P.E.I. in 1947 compared with 28 last year (S.G. Peppin).

POTATO ROT NEMATODE (Ditylenchus destructor). The potato rot nematode was first reported in Canada in 1945, after its discovery at York and Uigg, P.E.I. (P.D.S. 25 (1945);66). An area of possible infestation was defined and placed under quarantine, in which it was not permitted to grow potatoes. Research work was undertaken to determine the best means of eradicating the parasite. No case of this nematode was found in 1946.

In 1947, another infestation was found around Bideford, P.E.I., where some of the crops on 7 farms, grown in 8 fields with an area of 40 acres, were found infected. An investigation made in that district leads one to believe that that infestation has no connection with those at York and Uigg, but that it is of long standing. Bideford is the site of an early pioneer settlement, and of an important ship building industry in years gone by. At that time, ships plied back and forth between there and Europe, and it is possible that the infestation dates back to those days. Bideford has never been a seed potato growing section, and little interchange of seed with other districts of the province has taken place (R.R. Hurst, G.W. Ayers, H.N. Racicot).

BLACK LEG (Erwinia phytophthora) was found in 149 (20%) of the fields inspected in B.C., and caused the rejection of 7 fields; the disease was present in more fields but the rejections were fewer than in 1946 (H.S. MacLeod). Black leg was found in 55 fields mostly in the irrigated districts of southern Alta.; 8 fields were rejected (J.W. Marritt). Damage by black leg was slight to severe in commercial plantings at Edmonton; 8% of the plants were affected in one garden (J.D.G.). Infection was high for several rows in the centre of a field of Earley Ohio, in Sask., planted with Foundation A seed which showed no black leg in 1946. Some 17% of the plants were affected in these diseased rows with lesser amounts in the adjacent rows. The balance of the field averaged less than 0.5% and 3 other fields planted with the same seed showed no infection. A high

infection was also seen in plots of Irish Cobbler planted in tuber units. Where present in other fields infection was slight (A. Charlebois). About a fifth of the fields inspected in Man. showed a trace to 1% infection; one field was rejected. Infection was still lighter in northwestern Ont. (D.J. Petty). Black leg was severe in some fields at Springfield, Man. (W.A.F. Hagborg).

Black leg was found in 6 fields entered for certification in southwestern Ont.; in all affected plants found the disease appeared to have been carried by the seed corn maggot (F.J. Hudson). Seven fields were rejected for black leg in Inspection District 2. Most of these fields were in Wellington Co. where considerable corn is grown (W.L.S. Kemp). Black leg was not prevalent in District 3 and caused little loss. Seed treatment is generally practiced. No rejections occurred in 1947 (H.W. Whiteside). It was present in 9 fields in eastern Ont., but none were rejected (O.W. Lachaine). Black leg was largely confined to the Chicoutimi and Lake St. John districts, Que. Of the 16 fields rejected, 11 were in these districts (B. Baribeau). Some 5% of plants were affected by black leg in a small poorly drained field at Ruisseau Vert on the north shore of the lower St. Lawrence, where it appeared to be associated with ring rot (C. Perrault). Black leg was again quite severe in Sebago in N.B. The disease was more prevalent than usual in the other varieties but its presence may be attributed to the delay in planting on account of wet weather. A large amount of cut seed remained unplanted until the weather became more favourable (C.H. Godwin). Black leg was less prevalent in N.S. than in 1946. Infection was usually slight and except for a few fields of Katahdin it was virtually confined to Sebago. The 3 rejected fields were in Sebago (R.C. Layton). The disease was far more prevalent in P.E.I. in 1947 than the previous year. The percentage of fields rejected rose from 0.9% to 2.4%. Sebago is very susceptible to black leg (S.G. Peppin).

BACTERIAL SOFT ROT (Erwinia carotovora) was present in a few bins in District 3, Ont., but it was not as serious as in 1946 (H.W. Whiteside). Quite a number of affected tubers were received during the ring rot survey in Ont. All tubers showed injuries that occurred at harvest (J.K. Richardson). About 2% of the tubers were affected in a field in Temiscouata Co., Que. (B. Baribeau).

WILT (Fusarium oxysporum) was found in 137 (18.6%) fields inspected in B.C. It was present in about the same percentage of fields as last year, but it affected a higher percentage of plants in 1947; 8 fields, mostly in White Rose, were rejected. It is believed that most of the infection was from the soil (H.S. MacLeod). Wilt was not prevalent in Man. and northwestern Ont. in 1947, infection reaching 1.5% in one field (D.J. Petty). A low percentage of wilt was noted in a few fields in southwestern Ont. (F.J. Hudson). A few plants were affected at the Station, Harrow; isolations yielded the organism (C.D. McKeen). An odd wilted plant was found in a large number of fields but only one field was rejected in Inspection District 2 (W.L.S. Kemp). Wilt was more prevalent in District 3 in 1947 than last year. Two fields were rejected (H.W. Whiteside). Vascular necrosis believed to be due to Fusarium or Verticillium was found in 18 samples received through the ring rot survey. Most of these samples came from District 3 (L.T. Richardson). Wilt was very little in evidence in the growing crop in N.B. in 1947;

this freedom contrasted with its common occurrence last year (C.H. Godwin). Wilt affected 2% of the plants of Green Mountain in a field at Union Road, P.E.I.; the causal fungus resembled F. Sambucinum F. 6, but it has not been positively identified. This type of wilt has also been found on Sebago at Charlottetown and Hunter River (D. Robinson).

WILT (Fusarium and Verticillium) was found in 14 (7%) of the fields inspected, most of which were located in the irrigated districts of southern Alta. (J.W. Marritt).

DRY ROT (Fusarium spp.). Many tuber samples received during the winter of 1947 from Kings, Hants, and Pictou Counties, N.S., were affected by dry rot (J.F. Hockey). The disease was again quite prevalent in the Sebago variety in P.E.I. (S.G. Peppin).

RHIZOCTONIA (Pellicularia filamentosa (Rhizoctonia Solani) was observed in 635 (86%) of the fields inspected in P.C. Infection on the plants was 473-sl. 132-mod. 30-sev. Infection where present on the tubers was slight to moderate (H.S. MacLeod). Damage was moderate in 43 fields and slight in most of the other 164 fields inspected in Alta. Tubers were relatively free from infection on bin inspection (J.W. Marritt). Some of the early planted fields were severely infested, but in general damage was usually slight in Sask.; due to late development of the tubers they were free from sclerotia (A. Charlebois). Only a slight infection was seen in most areas in Man. and northwestern Ont. (D.J. Petty). Only a slight infection developed in the tubers in the few fields where the disease was present in southwestern Ont. (F.J. Hudson). Rhizoctonia was present in many fields of Irish Cobbler in the Harrow district but infection was for the most part slight (C.D. McKeen). Rhizoctonia was fairly abundant in central Ont. and was most noticeable on white skinned varieties such as Chippewa and Sebago (W.L.S. Kemp). Rhizoctonia was more prevalent than usual on the tubers in the southern part of District 3 because digging was delayed considerably (H.W. Whiteside). Although rhizoctonia was not noticeable in the field in N.S. this year, an average of about 5% of tubers showed sclerotia at bin inspection (R.C. Layton). Rhizoctonia was more prevalent on the tubers in P.E.I. in 1947 than for several years (S.G. Peppin).

PINK ROT (Phytophthora erythroseptica) was found affecting tubers of Irish Cobbler from Cochrane and those of Chippewa from Pourquois Junction, Ont.; the pathogen was isolated (L.T. Richardson). The disease appeared on Green Mountain in the same area, at Ste. Anne de la Pocatiere, Que., where it was first observed in 1945. Again it was more prevalent (infection moderate) in the depressions in the field. There were also traces in the variety test plots, where drainage is better. The disease spread to the Laboratory plots and was severe in a small badly drained area (A. Payette).

LATE BLIGHT (Phytophthora infestans) was first reported in B.C. on 5 June from the Ladner district, in the lower Fraser Valley. The disease was observed in 205 (27.8%) of the fields inspected, infection being 124-sl. 38-mod. 45-sev. It was most severe in fields in the Courtenay district where the growers did not spray sufficiently early or

often (H.S. MacLeod, N.S. Wright). A slight and patchy infection was noted at Norquay and in 2 fields of Netted Gem at Calder, Sask. These places are in eastern Sask., where the season was wet (A. Charlebois, R.J. Ledingham). Late blight was first observed in Man. in the University plots, Fort Garry, on 22 Aug. by O.A. Olsen. The disease occurred in a large number of fields, but infection was light and occurred usually a few days before killing frost. Infection was severe in only a few fields and even in them tuber infection was slight. The weather was dry during August and September (J.E. Machacek). Traces were found in some fields in Man. and northwestern Ont. in the last week of August. Damage to the tubers was negligible. Only one field near Port Arthur showed moderate foliage infection (D.J. Petty).

Late blight was relatively severe throughout Ont. this year and caused considerable loss in unsprayed fields (J.E. Howitt). Late blight was first reported in Ont. from Eganville, Renfrew Co., on 28 July, from Goodwood, Ontario Co., on 5 Aug., Bradford Marsh, Simcoe Co., on 11 Aug. and in other parts of Ont. at still later dates. Its appearance and spread in Ontario seemed to be the natural extension of the epidemic area centred in Pa. and N.Y. which was clearly defined by 10 Aug. Both potatoes and tomatoes were affected. Its development in Ont. north of Lake Ontario indicates that weather conditions were suitable for late blight spread in that area in late July and early August, but the disease may have been more severe because of increased windborne inoculum arriving from the south (I.L. Conners).

Late blight was quite general in Lincoln Co., particularly in late fields where spraying was neglected in September and early October (J.K. Richardson). Due to heavy rains in mid-September there was considerable tuber rot in many fields in southwestern Ont. (F.J. Hudson). Late blight first appeared in District 2 about 15 Aug. It caused the tops to die prematurely. Lack of moisture coupled with late planting and early death of the vines resulted in an immature crop with yields reduced 20-25%. Little tuber rot resulted, most of the affected tubers being also sunburned. The loss from tuber rot did not exceed 10%. It appears that for the satisfactory control of late blight the growers should increase the number of applications. Moreover Bordeaux and Burgundy mixtures are evidently superior to many of the newer and more expensive preparations (W.L.S. Kemp). Late blight was more prevalent in District 3 in 1947 than in 1946. However, where crops were adequately sprayed or dusted with a recommended copper compound the disease was negligible. Failure to achieve control occurred more frequently in fields that were dusted, but the growers had not kept the plants adequately protected (H.W. Whiteside). Due to heavy rains in early September, late blight killed the foliage in many fields and caused some tuber infection in eastern Ont. In a few fields the loss was severe (O.W. Lachaine, L.T. Richardson).

Late blight spread in early August in many fields in the Montreal District, Que. Hot, dry weather held the disease in check until early September. Then it appeared rapidly and many fields were completely defoliated (E. Lavallee). Late blight was first found on the Gaspe coast on 31 July and it had been reported by 11 Aug. from nearly all potato-growing districts in Que. No epidemic developed on account of the dry weather in August, but owing to heavy dews in late August and early September many fields became moderately infected about mid-September. Tuber infection was severe (50%) in 2 parishes in Terrebonne Co.; elsewhere the loss was a trace (B. Baribeau).

Late blight was destructive in unsprayed fields in N.B. along the Bay of Fundy. It was reaching epidemic proportions in Carleton and Victoria

Counties even in sprayed fields, but weather conditions became unfavourable for late blight before much damage was done (J.L. Howatt). All fields of potatoes developed late blight in N.B. Weather was ideal for its development during September. About 1% of the crop was lost due to late blight rot (C.H. Godwin). Late blight was first observed at Wedgeport, Yarmouth Co., N.S., on 16 July and at Scotts Bay, Kings Co., next day. The disease was general throughout the province but epidemics developed only in coastal areas where fog and cloudy weather prevailed for a period and resulted in some damage. Little or no loss occurred in the main potato-growing areas, where the potatoes were regularly sprayed (J.F. Hockey, R.C. Layton). Late blight was first observed on 22 July, a month earlier than in 1946, in Queens Co., P.E.I. This infection, which originated in a cull pile, spread and moderately affected 15 fields. Late blight was far less prevalent than in previous years due to the hot dry weather although it became quite severe in a few fields of Katahdin. Late blight rot was generally light, affecting up to 6% of the tubers in some lots of the late varieties. Its development was due to a slight late-season infection of the foliage and lifting the tubers while the tops were still partially green (L.C. Callbeck, S.G. Peppin).

LEAK (Pythium ultimum). Several reports were received in October of loss of tubers in storage or in transit from the Okanagan Valley, B.C. (G.E. Woolliams). The disease was observed in one lot of Green Mountain upon bin inspection at St. Roch des Aulnaies; 5% of the tubers were affected (B. Baribeau, A. Payette).

STALK ROT (Sclerotinia sclerotiorum) was destructive to 3 plants in a garden in Queens Co., P.E.I. (R.R. Hurst).

SILVER SCURF (Spondylocladium atrovirens) was observed in a few lots at bin inspection in Terrebonne, Labelle and Megantic Counties, Que., but the infection was slight (B. Baribeau). The disease was observed a few times during the fall shipping season in N.B. (C.H. Godwin). Very slight amounts of silver scurf were observed in N.S. (R.C. Layton). An occasional tuber was seen in a bin of Irish Cobbler in P.E.I. on 27 March (R.R. Hurst).

POWDERY SCAB (Spongospora subterranea) was found on White Rose grown on peat soil in the Cloverdale district, B.C., but it was much less severe than it was in the same district last year (P.D.S. 26;51) (H.S. MacLeod). The disease was found in a few lots only on bin inspection in the eastern districts of Que.; 8% of the tubers of Green Mountain were affected in one bin (B. Baribeau). Powdery scab was present in two lots in eastern N.B. (C.H. Godwin). A small area adjacent to some old buildings at the Potato Breeding Station, Alma, yielded severely scabbed tubers among seedlings resistant to common scab (J.L. Howatt).

WILT (Verticillium spp.) was reported in 31 fields and caused the rejection of one (7% infection) out of 579 inspected in N.S. Specimens from all affected fields were sent to the Kentville Laboratory for determination (R.C. Layton). This wilt was much more prevalent in P.E.I. this year than last; it caused the rejection of 1.8% of the fields entered (S.G. Peppin).

LATE LEAF ROLL (virus). During late August before aphids arrived in one of the propogating plots of the Laboratory in York Co., N.B., the varieties Katahdin, Irish Cobbler, Sebago, and Bliss Triumph showed a severe rolling of the leaves and reddening of the stems, petioles, and leaflets in the upper and middle sections of the tops. The percentage of plants affected was: Katahdin 65%, Irish Cobbler and Sebago 35% and Bliss Triumph 18%. The rolling symptoms resembled the current season's symptoms of leaf roll (Solanum virus 14) and they persisted until the vines died down. Affected plants matured earlier than those which did not show the condition. Scions from affected plants of each variety were cleft-grafted to tomato. In 21-30 days the tomato developed a moderate rolling of leaves, stiffening of the petioles and leaflets and a reddening of the veins. The affected plants were dwarfed and tended to mature early, the symtoms persisting until the tomato matured. Scions from the infected tomatoes were cleft-grafted to tomato and potato (Katahdin) in which plants the rolling symptoms were again produced. Symptoms produced by this virus in tomato are more pronounced than those caused by Solanum virus 14 and less pronounced than those produced by the bunch top virus. These findings seem to indicate the existence of another virus causing a type of leaf roll in potato. The disease is apparently not aphid transmitted because it made its appearance before these insects were present in the plot and all efforts thus far to transmit the disease from tomato to tomato and potato by means of Myzus persicae have been unsuccessful. This late developing leaf roll was also observed in commercial fields of Katahdin, Irish Cobbler and Bliss Triumph. A similar type of leaf roll was found in Green Mountain, the only difference being that the stems, petioles, and leaves showed a yellow instead of a red coloration. No symptoms were found in the tubers from plants showing the late leaf roll (D.J. MacLeod).

LEAF ROLL (virus) was found in 238 (32.3%) of the fields inspected in B.C., but in 229 not over 1% of the plants were affected; 4 fields were rejected (H.S. MacLeod). Leaf roll was present in 73 (38.5%) of the fields inspected in Alta., but no field contained more than 0.6% (J.W. Marritt). Infection was slight to moderate in commercial plantings at Edmonton (J.D.G.). Leaf roll caused the rejection of one field in Sask. It was more common in Irish Cobbler than in other varieties; 12% of the plants were affected in one field of this variety at Lumsden (A. Charlebois). Leaf roll was severe in some gardens in Sask. (R.J. Ledingham). Traces of leaf roll were seen in Man. and northwestern Ont. (D.J. Petty). One field of Sebago was rejected on account of leaf roll in southwestern Ont. (F.J. Hudson). This disease is one of the most important in Crop District 2, possibly on account of the popularity of Chippewa and Sebago; 18 fields were rejected (W.L.S. Kemp). Although leaf roll is present in nearly every variety in Crop District 3 it is most prevalent in Irish Cobbler, Warba, Chippewa and Sebago; 18 fields were rejected. Fields planted with seed brought south from the Cochrane district was considerably freer from leaf roll than seed in use previously (H.W. Whiteside). Three of the 52 fields inspected in eastern Ont. were rejected on account of leaf roll (O.W. Lachaine). Little leaf roll was present in Que. this year; in 1947 only 1.2% of the fields inspected were rejected for leaf roll (B. Baribeau). Only 47 fields were rejected for leaf roll in 1947 in N.B. in contrast with 489 in 1946. In the fields rejected only 1 field showed 9% infection whereas all others showed less than 5% (C.H. Godwin). Leaf roll was also light in N.S. in 1947 (R.C. Layton). It was likewise less prevalent in P.E.I. (S.G. Peppin).

LEAF ROLLING MOSAIC (Solanum virus 11). A trace was found in a field of table stock of Green Mountain in York Co., N.B. (D.J. MacLeod).

LEAF STREAK (Solanum virus 1, N strain). A trace was found in Katahdin, Chippewa, Sequoia and Earlaine in fields in York Co., N.B. (D.J. MacLeod).

MILD MOSAIC (Solanum virus 1, S strain). A trace was observed in 3 commercial fields of Katahdin in York County, N.B. (D.J. MacLeod).

MILD MOSAIC (Solanum virus 3) ranged from a trace to 8% in table stock fields of Green Mountain in York, Sunbury, Carleton, Victoria, and Westmorland Counties, N.B. (D.J. MacLeod).

MILD MOSAIC (Solanum virus 11) ranged from a trace to 3% in table stock fields of Irish Cobbler in Sunbury and Carleton Counties, N.B. This virus causes leaf rolling mosaic (q.v.) in Green Mountain (D.J. MacLeod).

MOSAIC (virus) was recorded as follows: In 280 (38%) of the fields inspected in B.C. and caused rejection of only 11 (H.S. MacLeod); small percentages found in 11 of 197 fields inspected in Alta. (J.W. Marritt); small amounts present in many fields in Sask. (A. Charlebois); only traces in Man. and northwestern Ont. (D.J. Petty); usually only small amounts of mosaic in Ont., but some fields of Green Mountain with a very mild mosaic were rejected in District 3 (H.W. Whiteside); less prevalent this year in Que., only 13 fields out of 904 being rejected for mosaic (B. Baribeau); more fields of Katahdin affected in N.B. than formerly, the cool weather during July probably favouring symptom expression (C.H. Godwin); only one field rejected in N.S. (R.C. Layton); more prevalent in P.E.I. than in 1946, 4.2% of the fields inspected being rejected for mosaic (S.G. Peppin).

RUGOSE MOSAIC (Solanum viruses 1 and 2). A trace was found in table stock fields of Green Mountain, Irish Cobbler, Earlaine, Katahdin, Chippewa, and Houma in York, Sunbury, Carleton, and Victoria Counties, N.B. (D.J. MacLeod).

PURPLE DWARF or HAYWIRE (virus). Not over 0.5% of the plants were affected in any of the 31 fields in which the disease was found in Alta. (J.W. Marritt). A trace of haywire was found in White Rose and five seedlings grown under field conditions in N.B. When scions from these potatoes were cleft-grafted to Lycopersicon esculentum, Datura Stramonium, Nicotiana Tabacum and N. rustica, symptoms were produced in these hosts similar to those caused by the bunch-top virus. It would appear that haywire and bunch-top have a virus in common or are caused by closely related viruses. Material of Canus and Early Epicure affected by haywire from Alta. were also found with a virus similar to the bunch-top virus present in Eastern Canada (D.J. MacLeod).

PURPLE or BUNCH TOP (virus) was seen in only 2 fields in southern Alta. in 1947; the disease was, therefore, much less prevalent than in previous years (J.W. Marritt). Purple top affected 80% of the plants in one field, 4-7% in 3 and under 3% in several other fields in Man.; infection did not exceed 3% in northwestern Ont. (D.J. Petty). Purple top was less common than last year in southwestern Ont., only an occasional plant being affected (F.J. Hudson). Only a few hills were affected in 3-4 widely scattered areas in District 2 (W.L.S. Kemp). Small amounts of purple top occurred in almost every field of Katahdin, Chippewa and Sebago in District 3 (H.W. Whiteside). A few plants were seen in one field in eastern Ont. (O.W. Lachaine). Purple top was less prevalent than in the previous year in N.B., particularly in Sebago and Katahdin (C.H. Godwin). Traces were present in N.S. in only 14 fields, mostly of Sebago and Katahdin (R.C. Layton). Purple top affected a trace to 5% of the plants in table stock fields in P.E.I. (R.R. Hurst).

Bunch top was general in potato fields in York, Sunbury, Carleton, Victoria and Westmorland Counties, N.B. Infection ranged from a trace to 3% and was present in Green Mountain, Irish Cobbler, Bliss Triumph, Katahdin, Netted Gem, Sebago, Houma, Chippewa, and 7 new seedlings. The bunch-top virus was transmitted by grafting to Nicotiana Tabacum, N. rustica, N. glutinosa, Datura Stramonium, Lycopersicon esculentum and potato (Green Mountain, Katahdin, and Sebago). The virus was found in combination with Solanum virus 14 (leaf roll) in Katahdin, Irish Cobbler, Green Mountain and Netted Gem. In the last three named varieties, the combined viruses gave rise to a net necrosis and spindling sprout in the tubers. The leaf-roll virus alone did not produce typical net necrosis and spindling sprout in these varieties of potato. The bunch-top virus alone gave rise to spindling sprout but failed to produce net necrosis. These findings seem to indicate that the net necrosis symptom is due to the combined effects of the two viruses and that spindling sprout is a symptom of the bunch-top virus (D.J. MacLeod).

SPINDLE TUBER (virus). Found in 2 fields in southern Alta. (J.W. Marritt); in one seed stock showing up to 10% spindle tuber used in planting 2 fields in Man. and 3 in the Rainy River district in Ont. (D.J. Petty); a trace in fields in central and eastern Ont. (W.L.S. Kemp); less prevalent in District 3 in 1947, and mostly in Sebago (H.W. Whiteside); not reported in the field in Que., but a few off-shape tubers seen on bin inspection (B. Baribeau); tubers found in very small numbers in all varieties in N.B. (C.H. Godwin); a few off-shape tubers on bin inspection in N.S. (R.C. Layton); much less prevalent in Sebago than in 1946 in P.E.I.; tuber unit indexing and careful inspection late in the season should keep it well in check (S.G. Peppin); traces only in 15 table stock fields of Sebago and Irish Cobbler in Queens and Prince Counties (R.R. Hurst).

WITCHES' BROOM (virus). In one 14-acre field of White Rose in the Cariboo district, B.C., 15% of the tuber units were affected with witches' broom. The seed used was grown in the Cariboo district and contained less than 1% of affected plants before the field was rogued in 1946. As the disease affected entire units spread must have occurred last year in the seed plot (N.S. Wright). Witches' broom was more prevalent and more severe in fields entered for certification in B.C. in 1947 than in previous years. It was found in 213 (29%) of the fields inspected and caused the rejection of 7 fields in 1947 compared with its occurrence in 11.6% in 1946 and 8% in

1945 and no fields rejected in either year (H.S. MacLeod). Witches' broom was found in 16 (8.1%) of the fields inspected in Alta. (J.W. Marritt).

Witches' broom was found in commercial potato fields in York and Carleton Counties, N.B., in the following varieties: Green Mountain (1 plant), Irish Cobbler (2), White Rose (1), Bliss Triumph (2). Two scions from each infected plant were cleft-grafted to tomato (Bonny Best). The virus was transmitted in each case giving rise to the typical symptoms of witches' broom in tomato, which is a good host for the characteristic and distinct expression of the disease symptoms (D.J. MacLeod).

YELLOW DWARF (virus) was observed in several fields in District 3, Ont., but only a few plants were affected in each (H.W. Whiteside).

BLACK HEART (non-parasitic) severely affected several barrels of Katahdin stored close to a furnace at Storrs Point, N.S. Tubers sproutly excessively, wilted and turned black. Three cases were brought in for ring rot examination in the spring. In a crop from a 11-acre field harvested when the weather was wet and piled deeply into bins at Hillarton, the centres of the piles were affected (K.A. Harrison). Two affected tubers were brought in for examination from Queens Co., P.E.I. (R.R. Hurst).

FERTILIZER INJURY. In a field in Champlain Co., Que., 5% of the sets were destroyed through injury from fertilizer (B. Baribeau).

FROST INJURY. Samples of Netted Gem brought to the Laboratory, Saskatoon, Sask., in March 1947, were found affected by field frost, a diagnosis confirmed by G.B. Sanford. The potatoes were probably stored after harvest under conditions favourable for cork formation. Bacterial break-down did not progress far before the frosted tissues dried up leaving externally visible depressions and small cavities in the flesh (R.J. Ledingham). Potato vines remained green in most sections of Sask., until severe local frosts caused considerable damage to the tubers in late September (A. Charlebois). Severe frost in September caused at least 10% loss in District 2 in Ont. Rain had removed the soil over the plants allowing the tubers at or near the surface, particularly in fields of Katahdin, to be injured by frost (W.L.S. Kemp). A heavy frost on 24 Sept. in Que., blackened the tops and injured the tubers near the surface. The loss was 4-8% of the crop (B. Baribeau). Only a few very late fields suffered frost damage in N.S. (R.C. Layton). Field frost caused 10% damage in a field in Prince Co., P.E.I. (G.W. Ayers).

FUMIGATION INJURY (chloropicrin) caused severe injury to several bags of seed potatoes in a warehouse at London, Ont. Sunken areas appeared about the lenticels and the eyes were killed (H.N. Racicot).

GIANT HILL was reported in 106 (14.4%) of the fields examined in 1947 in B.C. (H.S. MacLeod); in 6 fields (3.0%) in Alta. (J.W. Marritt); and in a few fields in District 2, Ont. (W.L.S. Kemp); not prevalent in Que. in 1947 (B. Baribeau); present in a few fields of Green Mountain in N.B. (C.H. Godwin); trace in 2 fields of Green Mountain in N.S. (R.C. Layton).

HOLLOW HEART (non-parasitic) affected 2% of the tubers in a lot of Katahdin table stock in L'Assomption Co., Que. (B. Baribeau). Hollow heart was more prevalent than usual in N.B. due to favourable growing conditions in September (C.H. Godwin).

LIGHTNING INJURY was observed in 2 fields in Kamouraska Co., Que.; the affected areas did not exceed 30 sq. ft. (B. Baribeau). Lightning caused severe damage to a field of Green Mountain at Hunter River, P.E.I. (R.R. Hurst).

NET NECROSIS does not appear to be as prevalent or severe in B.C. this year as in 1946; only 3 of the crops so far inspected were rejected for net necrosis (H.S. MacLeod). This condition is not as severe as it was in previous years in N.B.; only a trace was reported in Green Mountain during bin inspection in the fall (C.H. Godwin).

RHUBARB

LEAF SPOT (Ascochyta Rhei). Infection was severe in one garden at Edmonton, Alta. (M.W. Cormack).

LEAF SPOT (Ramularia Rhei) was found on a specimen received from Shipman, Sask. (P.M. Simmonds, D.B.O. Savile).

CROWN ROT (cause unknown) was prevalent in Sask. in 1947; damage was severe in some plantings (R.J. Ledingham).

SALSIFY

WHITE RUST (Cystopus cubicus) was present, although not severe, on nearly every plant at the Botanical Garden, Montreal, Que. (J.E. Jacques).

SPINACH

MOSAIC (virus). An occasional plant was affected in a garden in Queens Co., P.E.I. (R.R. Hurst).

SQUASH

YELLOWS (virus) affected 2% of the plants in a commercial field in Sunbury Co., N.B. (D.J. MacLeod).

SWEET CORN

BACTERIAL EAR and KERNEL ROT, caused by an undetermined bacterium, was severe at Edmonton, Alta. (A.W. Henry, L.E. Tyner).

EAR ROT (Diplodia Zeae) was found affecting a few ears in a garden plot at Beaumont, Que. (R.O. Lachance).

SMUT (Ustilago Maydis) was reported as follows: affected specimens received from Speers and Saskatoon, Sask. (T.C. Vanterpool); less infection than usual in fields examined this year in Ont. (J.K. Richardson); affected specimens received from Overbrook (H.N. Racicot); traces at the Botanical Garden, Montreal, (J.E. Jacques), and St. Pascal, Que. (R.O. Lachance); diseased specimens from Cambridge, N.S. (K.A. Harrison).

SWISS CHARD

LEAF SPOT (Ramularia beticola). Slight infection was present in 2 gardens located at Gordon Head and Victoria, B.C., in 1946 (W. Jones).

TOBACCO

Dr. L.W. Koch has prepared the summary of tobacco diseases in Ont. and Que. given below.

Diseases in the Seedbed

BLUE MOULD (Peronospora tabacina) was the most destructive disease of tobacco seedlings in Ont. in 1947. The earliest cases reported both in Essex and Norfolk Counties strongly indicated overwintering of the causal organism. Also, in each of these cases the presence of weeds within the area of the initial outbreak always at the edge of a bed indicated imperfect steaming. Blue mould occurred this year more than a week earlier than in any year since its appearance in Ont. During June the disease reached epidemic proportions in Essex Co., and during the latter half of the month it also became widespread in the new tobacco belt. Damage in the latter area was mild because more than 90% of the growers in this district sprayed their seedlings with Fermate. A few used bismuth subsalicylate.

Attempts by growers to control blue mould in glass-covered seedbeds by periodically raising the temperature above 100°F. for 4 hours per treatment again failed to check effectively the disease. In Essex Co. some growers who delayed spraying until after the disease appeared in their seedbeds lost all their plants. Blue mould has not yet appeared in the tobacco-growing districts of Que.

YELLOW PATCH (excessive nutrients) caused less damage than usual in Ont. Certain severe cases were reported or observed in Essex Co. but in the majority of seedbeds in both the old and new tobacco belts yellow patch was mild and the beds soon recovered.

DAMPING-OFF (Pythium sp., Rhizoctonia sp., etc.) was responsible for considerable re-seeding in Kent and Essex Counties, Ont., particularly in outside, cotton-covered beds. In the affected beds the fungi attacked the seedlings either before or soon after they emerged. In glass-covered seedbeds which were regularly sprayed with Permate damping-off was of no importance.

MUSHROOMS caused mild to severe damage in many seedbeds in Kent Co., Ont. Materials, particularly the manure, used in seedbed construction appeared to have an important bearing on this trouble. In Essex Co. and other tobacco-growing areas these fungi are of no consequence.

2,4-D (Dichlorophenoxyacetic acid) INJURY. At least a dozen cases of 2,4-D injury were identified in the dark tobacco area around Blenheim, Ont. Affected plants had drooping, narrow leaves, more or less strap-shaped, with very prominent veins, wavy or deeply-toothed leaf margins and with a blistered surface in some cases. Usually the malformation was confined to certain sets of leaves. Symptoms resembled those of a virus infection except for the fact that when examined at intervals subsequent to damage, youngest leaves were found to be normal in appearance. Mild leaf symptoms were always followed by recovery, but sometimes root symptoms were observed long afterwards in the field. Affected roots bore clusters of closely-spaced, thickened, short rootlets.

Investigation indicated that the damage resulted from the use of contaminated knapsack sprayers in blue mould control. The sprayers had been used previously, in some cases the previous year, for spraying weeds and still contained sufficient traces of the herbicide to damage the tobacco.

BLACK ROOT ROT (Thielaviopsis basicola) was observed in a few seedbeds in Que.

SORE SHIN (Rhizoctonia Solani). A few cases were reported in Que.

Diseases in the Field

BLUE MOULD (Peronospora tabacina) caused considerable damage in the field during June and July both in the old and new tobacco belts of Ont. The disease spread even to the uppermost leaves in some fields and resulted in necrotic spots up to one inch in diameter. Infection proved most severe in fields or parts of fields with poor air drainage.

BROWN ROOT ROT (cause undetermined) was injurious in the old tobacco belt of Ont. mainly to Harrow Velvet and Halley's Special when these varieties followed corn in the rotation. In the Laboratory plots the disease was most severe where nutrient levels were below optimum. Brown root rot was reported from a field of burley tobacco at Cazaville, Que.

BLACK ROOT ROT (Thielaviopsis basicola) caused some damage in the dark tobacco area around Blenheim and in the poorly-drained fields in the flue-cured belt of Norfolk Co., Ont. Overall damage was less extensive than in the previous year, probably because of the excessive heat and drought in July and August.

Black root rot was severe on cigar varieties throughout the southern section of the tobacco area in Que. Apparently conditions were favourable in this area during the early part of the growing season when moisture was excessive and low temperatures prevailed.

MOSAIC (virus) was of minor importance in Ont. in 1947. During the latter part of the season cucumber mosaic caused mild damage in certain burley crops in Essex and Kent Counties. Some mild cases of mosaic were present in Que.

RING SPOT (virus) occurred in mild form in some fields of burley tobacco around Blenheim, Ont.

FRENCHING (cause undetermined) was observed in both the old and new tobacco belts of Ont. The disease was present only in poorly-drained areas, sometimes affected plants occurring in groups composed of up to 50 plants. More often, however, the plants were scattered, usually occurring singly.

SORE SHIN (Rhizoctonia Solani) caused moderate damage in certain fields of flue tobacco in Essex Co., Ont. As usual, damage was not apparent until plants which were bent or broken over as a result of high winds were closely examined.

LEAF SPOT (physiological) was destructive late in the growing season in many fields of flue-cured tobacco in Norfolk County, Ont. This disease also caused considerable damage to flue tobacco in Quebec.

Other Observations

MOSAIC (virus) again was noticed in Que., in fields where crop rotation was not practiced, but it was much more prevalent than in 1946, infection varying from 5 to 50%. Frequent rains during the planting season and in June and July necessitated more and later cultivation and bracing than usual; this extra handling may have spread the virus (F. Godbout). In a planting at the Laboratory, Fredericton, N.B., 1% of the plants showed severe symptoms of mosaic (Nicotiana virus 1) (D.J. MacLeod).

TOMATO

EARLY BLIGHT (Alternaria Solani) was recorded as follows: heavy infection mostly on the lower leaves late in the season at Point Grey and Agassiz, B.C. (I.C. MacSwan); infection light to moderate in all varieties at the Station, Lacombe, and slight on Early Chatham and Lethbridge 3700 at Beaverlodge, Alta. (J.D.G.); infection severe in many fields of early tomatoes in the Leamington district, Ont.; in several fields considerable defoliation (caused by both A. Solani and Septoria Lycopersici) before much of the crop was harvested; the collar blight phase caused a rot of 2% of the late tomato seedlings in plant beds at Cottam (C.D. McKeen); general again this year in Lincoln Co., but caused appreciable loss in only a few fields (J.K. Richardson). Early blight was present in plantings in Victoria, Carleton, York and Sunbury Counties, N.B., where it caused slight to moderate damage to the foliage. In general the disease was more prevalent than usual and it was not satisfactorily controlled by the common copper dusts (J.L. Howatt). All the plants of several standard varieties were affected by leaf spot and 15% showed stem or petiole lesions in a planting at Hantsport, N.S.; the plants had just been set out. A light general infection was noticed late in the season at Kentville (K.A. Harrison).

NAIL-HEAD SPOT (Alternaria tomato). A slight infection occurred in a small garden at Ottawa, Ont., late in the season (L.T. Richardson).

GREY MOULD (Botrytis cinerea) was causing a stem rot of plants received from Edson, Alta. (J.D.G.). The fungus was fruiting abundantly on the fruit-bearing pedicels, causing slight damage in a field of early tomatoes at Kingsville, Ont. (C.D. McKeen).

LEAF MOULD (Cladosporium fulvum). Infection was moderate in a greenhouse at Edmonton, Alta. (J.D.G.). Variety V121 was heavily attacked by leaf mould in most greenhouses in the Leamington district, Ont., in October 1947. Due to extensive killing of the foliage the late fruits would not be marketable. V473 was still free from mould on 30 Oct. C. fulvum was also found fruiting on the foliage of Bounty in two fields at Kingsville in July (C.D. McKeen). Leaf mould was so severe in a full crop in a range of 3 large greenhouses at St. Catharines that over half the leaves had fallen by mid-November when cropping was well underway; in addition some of the fruits were also infected (J.K. Richardson). D.L. Bailey (Phytopathology 38:2. 1948), in discussing physiologic specialization of C. fulvum, offers evidence "that the evolution in virulence encountered in C. fulvum has been a function of the increasing resistance of the host varieties to which it has been exposed".

ANTHRACNOSE (Colletotrichum phomoides). A few ripe fruits were infected in a plot of late tomatoes at the Station, Harrow, Ont. (C.D. McKeen). Anthracnose developed on a few fruits placed in storage near Ottawa, Ont. (L.T. Richardson).

BACTERIAL CANKER (Corynebacterium michiganense) affected the plants in a small home planting at Summerland, B.C., in July. It was also noticed in the field on tomato fruits bearing scabby spots; the pathogen was isolated (G.E. Woolliams). The disease again caused damage in the University plots, Fort Garry, Man. (W.A.F. Hagborg).

LATE BLIGHT (Phytophthora infestans) affected a few plants and fruit at the Farm, Agassiz, B.C. (W. Jones). Late blight was again very prevalent in the tomato growing areas of Ont., in 1947. It did not appear, however, until quite late in the season, about the time of the first picking. It spread very rapidly and in many instances caused severe loss. It was observed that the disease was worse in fields with poor air drainage or with a heavy crop of weeds. Very heavy applications of nitrogenous fertilizers also appeared to increase susceptibility of the plants to late blight (J.E. Howitt). Late blight was first reported on tomatoes in Durham and Prince Edward Counties on 7 Aug. and in Northumberland Co. on 11 Aug. Latterly it spread southwest and northeast becoming widespread during the first two weeks of September. The disease became particularly destructive in the important tomato-growing areas along Lake Ontario (T.L. Conners).

Late blight was widespread in Lincoln Co.; scarcely a planting escaped infection and upwards of half the crop was ruined. In one greenhouse in October considerable fruit rot developed while the crop was still green (J.K. Richardson). In an acre field of late tomatoes near Harrow, defoliation was severe and 50% of the crop rotted at one end of the field. In a 7-acre field only 50 yards away late blight was absent. Diseased fruit were received from a greenhouse at Leamington on 28 Oct. (C.D. McKeen). On 6 Sept. late blight appeared on the leaves of plants in the check plots of a spraying experiment at St. Martin, Laval Co., Que. A week later it had spread to the other plots and appeared on the fruits. By 21 Sept., 20-30% of the fruit were rotted. A nearby potato field was heavily blighted (E. Lavallee). Late blight caused little damage to tomato vines or fruits in N.B. because the disease was late in developing. Stored green fruit, however, showed considerable rot even when from sprayed plantings (J.L. Howatt). Late blight was not seen on the foliage, but 50% of the green fruit placed in storage from a small garden at Kentville, N.S., rotted (K.A. Harrison). A trace of late blight was seen on one planting in Queens Co., P.E.I. (R.R. Hurst).

FRUIT ROT (Phytophthora sp.) was found affecting fruit received from Westview, B.C. It was stated that nearly every plant, including the cherry tomato, was affected (G.E. Woolliams).

STEM and FRUIT ROT (Phytophthora parasitica). Following an epidemic in 1946 canker reappeared in the fall crop in the greenhouse at Belle River, Ont. In one house 20% of the transplants were lost and in the others an occasional plant died until the plants were 3-4 ft. high (C.D. McKeen). About 5% of the full-grown plants carrying a ripening crop were wilting in a greenhouse at Colborne on July 16. P. parasitica was isolated from the stems and also from seedlings grown in soil brought back to the Laboratory. Some 75% of the seedlings damped off (J.K. Richardson).

BACTERIAL SPECK (Pseudomonas tomato). In one 4-acre field of early tomatoes at Harrow, Ont., 60% of the fruits were affected by bacterial speck (C.D. McKeen, W.A.F. Hagborg).

STEM ROT (Sclerotinia sclerotiorum) was found affecting a plant received from a greenhouse at Banff, Alta. (L.E. Tyner). Stem rot was found affecting a few plants in every tomato field in Essex Co., Ont.

Rate of infection varied from a trace to 7%. The cankers usually reached 6-8 in. above the ground and sclerotia were formed in abundance inside the stem (C.D. McKeen).

LEAF SPOT (Septoria Lycopersici) appeared early in the season and caused considerable defoliation in early tomato fields in Essex Co., Ont. (C.D. McKeen). Leaf spot was present in most fields of canning tomatoes in Lincoln Co., but in only two fields did it cause severe defoliation and reduction of crop (J.K. Richardson). Leaf spot caused some defoliation in many tomato fields about St. Martin, Laval Co., Que., in late August and early September (E. Lavallee). Leaf spot caused slight to severe defoliation in two plots at the Station, Fredericton, N.B. (J.L. Howatt).

VERTICILLIUM WILT (V. albo-atrum) was found in both field and greenhouse crops of tomatoes in several parts of the Okanagan Valley from Vernon to Osoyoos as well as at Lillooet. Infection ranged from a trace to 75% of the plants (G.E. Woolliams).

BACTERIAL BLIGHT (Xanthomonas vesicatoria). A heavy infection was seen on one plant in a garden at Charlottetown, P.E.I. This record is the first for P.E.I. (R.R. Hurst).

BUNCHY TOP (Lycopersicum virus 6). Two affected plants of Table Talk were found in a garden at Fredericton, N.B. The characteristic symptoms of bunchy top are a severe dwarfing, distortion, and necrosis of the stems and leaves. The fruits are extremely small and contain few or no seeds. The virus was transmitted by grafting to Nicotiana Tabacum, Nicandra physaloides, Nicotiana glutinosa, and Capsicum annuum. In N. Tabacum and Nicandra physaloides a slight dwarfing and distortion of the leaves occur. In Nicotiana glutinosa and C. annuum the virus was carried without visible symptoms (D.J. MacLeod).

LEAF STREAK (Solanum virus 1). Three plants in a garden at Fredericton, N.B., showed a severe leaf streak due to the N strain of Solanum virus 1 (D.J. MacLeod).

MOSAIC (virus). A small number of V121 plants was found affected in nearly every greenhouse in Essex Co., Ont. Some 80% of the transplants, which had been grown in a cold frame near a greenhouse at Kingsville, were also affected. About 10% of the Bounty plants were infected in a field of early tomatoes at Harrow (C.D. McKeen). In Lincoln Co., scarcely a planting was free from mosaic, infection varying from insignificant amounts to severe cases where the loss was considerable (J.K. Richardson).

PURPLE-TOP (virus) was found in 8 plants of Bonny Best, 6 of Globonnie and 2 of Bonton at the Station, Fredericton, N.B. The virus was transmitted by grafting to tomato (Bonny Best) and potato (Katahdin and Green Mountain). In the tomato a disease similar to that described in P.D.S. 23:77 was produced. In the potatoes the typical symptoms of bunch top were produced, indicating that bunch-top (purple top, yellow top) in potato and purple-top in tomato are caused by the same virus (D.J. MacLeod).

STREAK (virus). Over 75% of several thousand staked plants were severely affected in a planting of Harkness in Lincoln Co., Ont., and very few fruit were formed (J.K. Richardson). A trace of severe streak (Lycopersicum virus 1) was found in a garden in Fredericton, N.B. (D.J. MacLeod).

BLOSSOM-END ROT (non-parasitic) was common in Sask. particularly in plantings where moisture was very low (R.J. Ledingham). Blossom-end rot was so severe in many fields of early tomatoes in the Leamington district that the crop was almost a total loss. In the Harrow area the trouble was also very prevalent among the first maturing fruits of the late canning crop (C.D. McKeen). A few fruits were affected at the Botanical Garden, Montreal, Que., but losses were considerable in many home gardens in town (J.E. Jacques). A slight amount of blossom-end rot occurred in the plots, Ste. Anne de la Pocatiere (R.O. Lachance). Three cases of blossom end rot were submitted by local market gardeners at Fredericton, N.B. (J.L. Howatt). Fifteen cases of the trouble were received from local gardeners in Queens Co., P.E.I. (R.R. Hurst).

HORMONE INJURY. From 50 plants in a garden in the Montreal district, Que., only a dozen small fruits were produced due to the use, in excess, of a hormone sprayed on the plants to increase the set of fruit (H.N. Racicot).

SKIN CRACKING (non-parasitic) was present on green fruits toward the end of September in most greenhouses in Essex Co., Ont., all affected fruits were unsalable due to the widening of the cracks as the fruit ripened (C.D. McKeen).

SPRAY INJURY. Leaves of plants sprayed with Dithane at the recommended concentration at Fredericton, N.B., were mottled and showed a fern-like distortion. This condition has also been reported in Florida (J.L. Howatt).

SUN SCALD (non-parasitic). Affected fruits were received through the Scott Station from Adanac, Sask. (W.A.F. Hagborg); one of 6 fruits was affected in a sample from Grand Matis, Que. (H.N. Racicot).

TURNIP

POWDERY MILDEW (*Erysiphe Polygoni*) slightly infected Bangholm Swede turnips in the University plots, Vancouver, B.C. (I.C. MacSwan).

DOWNY MILDEW (*Peronospora Brassicae*). A light infection was reported with a specimen from a farmer in Queens Co., P.E.I. (R.R. Hurst).

BLACK LEG (*Phoma lingam*) was present in Ont., this year, but it was not as prevalent as in 1946 (J.D. MacLachlan). Traces were noted in a field of Laurentian Swede turnips in Queens Co., P.E.I.; the disease only becomes severe later in storage (R.R. Hurst).

CLUB ROOT (Plasmodiophora Brassicae). In 4 fields amounting to 10 acres, at Riviere des Prairies, Que., every turnip was affected and the crop was nearly a complete loss. Powdered cyanamid applied to plots 10 x 100 ft., at rates varying from 550 to 875 lb. per acre failed to prevent the development of the disease (R. Desmarteau).

BLACK ROT (Xanthomonas campestris) infected over half the plants in a 10-acre field of Laurentian at Uxbridge, Ont., and a high percentage of the roots will be unmarketable. Most of the infection was from the soil; it was learned that the grower was accustomed in recent years to feed his unmarketable turnips to livestock and to apply the manure to the land on which the next crop was to be grown (J.K. Richardson). An affected root was brought in by a local grower from Queens Co., P.E.I.; this case was the only one encountered (R.R. Hurst).

BACTERIAL BLIGHT (unidentified organism). An, as yet, unidentified bacterial blight first appeared early in September in the Walkerton district, Ont. It was most prevalent there, but later was found in several other nearby turnip areas. Symptoms resembled those of black rot, but no vascular blackening was evident. It appeared that infection was through the foliage and that aphids might be the carrier. The most striking symptoms on the foliage resulted from petiole infection; the petioles and leaf blades became chlorotic, wilted and died. In most cases all leaves on a plant except the small crown leaves were affected and the root stopped growing. In plants where the leaves were severely affected an orange or brown discoloration was evident about the vascular bundles in the neck and downwards into the cambial region of the root. Secondary soft-rot invaders attack the diseased crowns.

The disease also gave trouble after harvest. A few carloads were condemned upon arrival at their destination in the United States. Apparently mildly affected roots were included in the shipments and the disease developed rapidly under the wax.

An organism was readily isolated from the interior of the petioles and from the cambial region of the root. Its cultural characteristics indicated a close resemblance to Xanthomonas campestris. Further studies are being made by the Department of Bacteriology, Ont. Agr. College, Guelph (J.D. MacLachlan).

STERILITY (virus) was a trace in a seed plot of Swede turnips at the Station, Fredericton, N.B., and affected 1.5, 2.5 and 4% of the plants in 3 other seed plots in York and Sunbury Counties. Further investigation of the disease confirms its virus origin. The virus was transmitted by cleft grafting to Swede turnip, cabbage, turnip, wild radish, and broccoli. The typical sterility effect was produced in all these hosts (D.J. MacLeod).

WITCHES' BROOM (virus). Three affected plants were found in a seed plot at the Station, Fredericton, N.B., and two more in a commercial seed plot in York Co. (D.J. MacLeod).

BROWN HEART (boron deficiency) was not as severe as usual in Ont. (J.D. MacLachlan). It caused severe damage in a mussel-mudded field of Laurentian Swede turnips in Queens Co., P.E.I. In general, the disease was more prevalent than usual probably because the season was abnormally dry and hot (R.R. Hurst).

VEGETABLE MARROW

LEAF SPOT (Ascochyta Cucumeris Fautr. & Roum.). A slight infection was found at Agassiz, B.C., in 1946 (W. Jones). Examination of a specimen submitted by Jones revealed a fungus that agrees well with the description of A. Cucumeris given by W.B. Grove (Br. Stem & Leaf Fungi 1:300). The fungus was previously reported from B.C., as A. sp. (P.D.S. 23:79) (D.B.O. Savile).

MOSAIC (virus) affected 10% of the plants in a planting at the Station, L'Assomption, Que.; many of the fruits on the affected plants were aborted (L.T. Richardson).

IV. DISEASES OF FRUIT CROPS

A. POME FRUITS

APPLE

FIRE BLIGHT (Erwinia amylovora) was general at Edmonton, Alta., but was less severe than in 1946 (J.D.G.). At Saskatoon, Sask., it showed up here and there on susceptible trees; early in the season it was more severe than in 1946, but it was checked by hot, dry weather in July (T.C. Vanterpool). Fireblight caused severe damage in a commercial nursery near Prince Albert; the owner thought the disease to be endemic on wild hosts, especially the saskatoon; preliminary examination showed only Dimerosporium Collinsii on the latter plant (R.J. Ledingham). Although they seldom show extensive injury, various native species of Amelanchier, Aronia, Crataegus, etc., in Eastern Canada are attacked especially by the blossom blight phase of the disease; they unquestionably play some part as both reservoirs and distributors of the pathogen (D.B.O.S.). Very little fire blight developed in orchards of south-western Que., in 1947 (F. Godbout, L. Cinq-Mars). Blight was conspicuous on isolated apple trees along the highway from Lévis to Ste. Anne de la Pocatière, where cankered limbs are left from year to year (C. Perrault).

STORAGE ROT (Gloeosporium album). In the apple storage tests at Kentville, N.S., of the rotted apples examined in April, 1946, 96% of Northern Spy, 66% of Cortland and 35% of Wagner yielded this organism. In 1947 losses were negligible (K.A. Harrison).

RUST (Gymnosporangium spp.). G. Juniperi-virginianæ caused up to 5% fruit infection of early and mid-season varieties in Essex Co., Ont. (L.W. Koch). Rust occurred on McIntosh windfalls in the Laboratory orchard, St. Catharines, but only a trace was found on harvested fruit; an infected cedar is located west of the orchard (G.C. Chamberlain). A trace to 1% infection of G. clavipes occurred on Delicious, Gravenstein and Cortland in the spray plots at Kentville, N.S. Junipers grow within 100 ft. of the Delicious and 200 yd. of the Gravenstein trees. Crataegus and Amelanchier along the fence-row were severely rusted (J.F. Hockey).

TWIG BLIGHT (Nectria cinnabarina associated). Twigs were killed in a small nursery at Ste. Anne de la Pocatière, Que.; winter injury appeared to have been a factor (R.O. Lachance).

PERENNIAL CANKER (Neofabraea perennans). The wooly aphis parasite, Aphelinus mali, was released in the Okanagan Valley, B.C., in 1929; and distribution was made from the original release points for several years by the staff of the Vernon Entomological Laboratory. At this time the canker phase of N. perennans started to decline and has recently been of minor importance, although the pathogen is still widespread. In 1947 the wooly aphis population built up very rapidly,

following the use of DDT to control codling moth. It seems probable that the DDT has reduced the parasite population. The effect of the wooly aphis increase on the incidence of perennial canker remains to be seen (A.B. Baird, H.R. McLarty).

ROT (Penicillium expansum) affected a few fruits of King at harvest at Saanichton, B.C. (W. Jones).

BLACK ROT (Physalospora obtusa) caused slight damage to the fruit of Winter Banana at North Saanich, B.C. (W. Jones). Leaf spotting was seen in twelve orchards in southwestern Que. (L. Cinq-Mars).

POWDERY MILDEW (Podosphaera leucotricha). Almost 100% of the seedlings in the nursery at the Station, Summerland, B.C., were severely affected (G.E. Woolliams). Infection was 10-15% in 2-year-old Cortland, Lobo and Fameuse in cellar storage in Lincoln Co., Ont., in late March. Damage was confined to the apical 2-6 in. and was most severe on Cortland; McIntosh was slightly affected. The disease appeared to have developed somewhat in storage (G.C. Chamberlain). Mildew caused moderate damage at Greenwich, N.S., to young trees imported from Ontario in the spring (J.F. Hockey).

SCAB (Venturia inaequalis) caused moderate damage at Vancouver, B.C. (I.C. MacSwan). It was seen in varying amounts on several varieties in the Fraser Valley (R.E. Fitzpatrick). Some scab occurred on McIntosh in the Grand Forks district, but caused little damage (G.E. Woolliams). In all but the best-sprayed orchards in the Kootenays scab reduced the marketable crop of all variaties, particularly McIntosh, unsprayed fruit of which were 90-100% infected (M.F. Welsh).

In well-sprayed orchards in Ont., scab was of minor importance. In several orchards in Norfolk and Middlesex Co., considerable infection resulted from poorly timed or inadequate sprays. In an orchard of mixed varieties at Carlisle, where both fungicide and schedule were unsuitable, heavy defoliation occurred in mid summer and all fruit was badly scarred; the outbreak was aggravated by the orchard being surrounded by brush and tall poplars. In the Laboratory orchard, St. Catharines, unsprayed trees were heavily infected and were losing their leaves by 8 July; in sprayed plots infection on harvested fruit ranged from 1.8 to 25.4%. Scab was reported to be epidemic in the Brighton and Trenton district (G.C. Chamberlain). Severely scabbed fruits were received from Fort William, where the disease was stated to have been most noticeable on Osman and Robin crabs and Haralson apples. A specimen of McIntosh was received from Northfield Station, with the statement that the apples were rotting on the trees. Moderately affected Delicious specimens were received from Lachine, Que. (H.N. Racicot). In southwestern Que., scab caused great losses. Perithecia developed slowly but were very numerous. Heavy and frequent rains during the pink, blossom and calyx stages interfered with spraying and resulted in abundant primary infection. Continued wet weather in June and July favoured spread. A hot, dry August checked the disease but further development occurred in the fall. A light carry-over, thorough and timely spraying whenever possible, and, to some extent, spraying or dusting during bloom enabled a few growers

to secure clean crops (F. Gadbout, L. Cinq-Mars). In eastern Que., scab was easily controlled in carefully tended orchards and infection was light (R.O. Lachance).

In the St. John R. Valley, N.B., mature ascospores were found 22 May, the first ascospore discharge was recorded 28 May and heavy discharges occurred during bloom. Primary infections were seen 15 June. Despite heavy rain in May, June and early July commercial growers were able to apply their sprays and many obtained excellent scab control. In poorly tended orchards infection ranged up to 100% on McIntosh and Cortland. Rank growth aggravated the situation. Dry, hot weather in August, September and October curbed the disease and allowed ready control with mild fungicides (S.F. Clarkson, J.L. Howatt). In the Annapolis Valley, N.S., the first ascospores matured 15 April and the first spore discharge was recorded 1 May. The heaviest discharges occurred 21-27 May when trees were in the pink or full bloom stages. Primary infection was found 22 May. Over twice as many ascospores were released per unit leaf area as in the past few years. Effectiveness of scab control in commercial orchards was variable. There was much late infection at harvest on winter varieties (J.F. Hockey). Scab caused slight damage even to McIntosh in adequately sprayed commercial orchards in P.E.I., but it was heavy on wild trees (R.R. Hurst).

MOSAIC (virus). Three trees of Bethel at the Station, Fredericton, N.B., have shown a distinct interveinal mottle for 7 years, but their growth seems to be unaffected. One seedling in the Laboratory orchard has shown pronounced interveinal mottling and severe leaf distortion for 10 years. The tree is now dwarfed and the fruit small (D.J. MacLeod).

BITTER PIT (non-parasitic) affected 3 out of 10 Baldwin and 3 out of 7 Spy trees in an orchard in Lincoln Co., Ont. The crop on affected trees was light and about 5% of the fruit was badly pitted (G.C. Chamberlain).

DROUGHT SPOT, etc. (boron deficiency). Three growers who had taken over neglected orchards in the Creston district, B.C., reported abnormal growth. In each case boron deficiency was found to be the cause. Severe die-back occurred in Delicious and drought spot in McIntosh. There was no record of boron having been applied previously (M.E. Welsh). Two examples of affected fruit were seen in P.E.I. (R.R. Hurst).

LEAF MOTTLE (nutritional deficiency). Young apple and plum trees in a garden at Yorkton, Sask., showed interveinal mottling in an area where subsoil from an excavation had been added; trees elsewhere in the garden were unaffected (T.C. Vanterpool).

WATER CORE (physiological) was moderate in King and Charles Ross at Saanichton, B.C. King is very susceptible (W. Jones). Considerable water core was seen in susceptible varieties at Fredericton in September and October, but it gradually disappeared in storage (J.L. Howatt).

WINTER INJURY. Most orchards in the St. John R. Valley, N.B., showed slight to moderate damage to the intermediate buds of the previous year's growth, especially near the top of the tree. Injured buds, when not killed, were delayed 2-3 weeks in opening and their foliage was chlorotic, crimped and small (J.L. Howatt). Severe injury occurred on all Spy trees in an orchard in Queens Co., P.E.I. The trees made poor growth and bore small leaves and fruit. This condition was apparently due to the fibrous roots being torn off by frost action when the ground was bare. On examination new roots were seen to be forming at the points of fracture (R.R. Hurst).

PEAR

TWIG BLIGHT (Botrytis cinerea). This organism was isolated from dead twigs of a few trees at Sidney, B.C. Its pathogenicity was not tested (W. Jones).

FIRE BLIGHT (Erwinia amylovora). The plantings in the Creston Valley, B.C., were severely blighted in 1947. By fall it was hard to find a completely unaffected tree. In many young trees cankers reached the scaffold limbs and trunks. The provincial department of agriculture is undertaking the inspection of all plantings during the winter (M.F. Welsh). Three adjacent trees in the centre of a block of 300 young Bartlett in Lincoln Co., Ont., were completely killed, but the remainder were unaffected. The infected trees were 500 ft. from a wild apple tree. Scattered trees of Bartlett showed twig and branch infection in several other orchards in the county in May and infected Flemish Beauty was seen in one. In Wentworth Co., blossom and twig infection of 1946 resulted in severe killing of branches in a Bartlett orchard; some trees lost 50% of the bearing wood. Infection was most severe in an area close to a block of King apples in which blight was present. The pear orchard was in sod but had received 1 1/2 lb. cyanamid per tree in 1946. Kieffer in the same orchard escaped infection. Little current season's infection was seen in the Niagara Peninsula (G.C. Chamberlain).

BLOSSOM and TWIG BLIGHT (Sclerotinia laxa) caused alight to moderate damage to Bartlett and, especially, Anjou at Sidney, B.C. The fungus was isolated and the Monilia stage also occurred on the blossoms. First report to the Survey on pear. (W. Jones).

PINK ROT (Trichothecium roseum) affected about 10% of Clapp's Favorite at Kentville, N.S., following heavy scab. The affected fruit was too bitter to eat. First report on pear (K.A. Harrison).

SCAB (Venturia pirina) was seen on several varieties, particularly Flemish Beauty, in the Fraser Valley, B.C. (R.E. Fitzpatrick). Flemish Beauty in an orchard in Lincoln Co., Ont., showed 20-30% severe fruit infection and 50% leaf infection (G.C. Chamberlain). Infection was a trace to moderate at Ste. Anne de la Pocatiere, Que. (R.O. Lachance). Scab severely damaged Bartlett in an orchard at Charlottetown, P.E.I. (R.R. Hurst).

STONY PIT (virus). Several specimens of Bosc were submitted from the lower Fraser Valley, B.C. (R.E. Fitzpatrick). The suspected occurrence of stony pit in Ont. (P.D.S. 25:90) was confirmed in 1947 when all the fruits of a tree grafted with scions from the diseased Anjou were pitted and malformed. The fruit resembled that described as due to stony pit. This was the first fruit harvested from the tree since it was grafted. The disease was also found on Anjou in a second orchard (G.C. Chamberlain).

DROUGHT SPOT (boron deficiency). Severely affected fruits were received from Covehead, P.E.I. (R.R. Hurst).

WINTER INJURY. Wilting and die-back of 1-3 year old wood of Kieffer and Bartlett was common in young orchards in Norfolk, Brant and Lincoln Co., Ont., in June. The condition resembled fire blight but no pathogen was present. The injury was associated with excessive growth and lack of crop in 1946 and consequent immaturity of wood. It may have been aggravated by ice on the trees in December and January (G.C. Chamberlain).

B. STONE FRUITS

APRICOT

CORYNEUM BLIGHT (Clasterosporium carpophilum). Fruit scab and leaf spot were severe on all varieties throughout the Kootenay district, B.C. (M.F. Welsh).

BLACK KNOT (Dibotryon morbosum) caused slight damage to Anida at Agassiz, B.C. (T. Anstey).

CHERRY

CROWN GALL (Agrobacterium tumefaciens) was found to be attacking a few unthrifty trees at Keating, B.C. (W. Jones).

CORYNEUM BLIGHT (Clasterosporium carpophilum). The leaf spotting and defoliation seen in Creston Valley, B.C., appears to be due to C. carpophilum rather than Higginsia hiemalis. Fruit damage was seen on a few trees in sprinkled home gardens in Creston (M.F. Welsh).

BLACK KNOT (Dibotryon morbosum) caused severe damage in one orchard near Charlottetown, P.E.I. (R.R. Hurst).

LEAF SPOT (Higginsia hiemalis) was severe on leaves and fruit pedicels in most of the more humid parts of the Kootenay district, B.C., including Boswell, Crawford Bay, Riondel, Sunshine Bay and Willow Point, causing defoliation and reduction of fruit quality in all varieties

(M.F. Welsh). Leaf spot was prevalent on sour cherry in the Fonthill district, Ont., in mid June, and was epidemic on Montmorency. In the main fruit belt below the escarpment little damage occurred before the end of July where full spray schedules were followed; but in some orchards with a light crop spraying was neglected and the disease caused premature defoliation. It was general and prevalent late in the season on Schmidt's Bigarreau and Napoleon Bigarreau sweet cherries in Lincoln Co., causing early defoliation. Other commercial varieties are less susceptible (G.C. Chamberlain).

BLOSSOM BLIGHT (Sclerotinia laxa) caused slight damage at Royal Oak, B.C. (W. Jones).

BROWN ROT (Sclerotinia fructicola). In an orchard at Kootenay Bay, B.C., most of the crop was lost through blossom blight. There was also some twig blight and rotting of ripe fruit (M.F. Welsh). In the Niagara Peninsula, Ont., unsprayed sweet cherries suffered 100% rotting of blossom pedicels, and losses were 5-90% in sprayed or dusted orchards according to the timeliness of application. Losses were 25-40% in Montmorency sour cherry. With continued wet weather after bloom 3-25% rotting of green fruit occurred, commonly starting where blossom remnants adhered to the young fruit (G.C. Chamberlain).

WITCHES' BROOM (Taphrina ?Cerasi) heavily infected a planting of six dwarf cherries at Stanhope, P.E.I.; first record in P.E.I. (R.R. Hurst).

LAMBERT MOTTLE (virus). Little typical Lambert mottle was seen in the Okanagan Valley, B.C., but what seems to be a severe form of it was found on Lambert in a few orchards where it had not been seen before (T.B. Lott).

LITTLE CHERRY (virus). Extensive surveys by Provincial and Dominion staffs, covering nearly all the bearing cherry trees in the Okanagan Valley, B.C., failed to show any definite little cherry. A single tree was removed on suspicion, under the new Provincial compulsory removal order, although the symptoms were not typical (T.B. Lott). Little cherry now occurs in all cherry-growing districts in the Kootenays, having been detected for the first time in the Rhondel and Canyon districts. In Creston Valley increase of the disease was indicated by a seriously reduced crop quality. An extensive survey by workers in Washington State revealed little cherry in all important cherry-growing districts east of the Cascades (M.F. Welsh). It may be noted that little cherry appears particularly amenable to detection by the method recently described by R.C. Linder (A rapid chemical test for some plant virus diseases. Science 107:17-19. 1948).

NECROTIC RING SPOT (virus). Six orchards of Montmorency sour cherry in Lincoln Co., Ont., were surveyed in 1945. Of these 5 were then known to have 56-72% infected trees, but the virtual absence of trees showing the severe (shock) symptoms associated with current season infection suggested that infection had nearly reached saturation and it was estimated at about 96%; for trees with long-standing infection often

are nearly symptomless. In the sixth orchard the 16% of trees known to be infected was taken to be a reliable figure because the number of trees with shock symptoms suggested invasion of the block to be in an early phase. Re-examination of these orchards supported these views for only in the sixth orchard were there many new trees showing symptoms. Of 21 Montmorency blocks surveyed for the first time, 3 (316 trees) showed no symptoms; 8 (964 trees) showed 1.7-20.4% (av. 10.4%) mild symptoms only; 6 (1362 trees) showed 0.7-15.2% (av. 5.4%) mild symptoms, and 0.6-3.8% (av. 1.6%) shock symptoms; and 4 (650 trees) showed 7.5-20.8% (av. 11.1%) mild symptoms, and 14.1-25.7% (av. 18.5%) shock symptoms, indicating active spread. Figures for mild symptoms may be low owing to masking by spray residue. Six blocks in an isolated plantation in Halton Co. on the south slope of the escarpment showed a range of 0-2.7% (av. 1.1%) mild symptoms, and 0-1.9% (av. 0.6%) shock symptoms. These blocks range from 2 to 30 years in age. Infection was presumably introduced with the nursery stock (R.S. Willison). See R.S. Willison, G.H. Berkeley and G.C. Chamberlain. Yellows and necrotic ring spot of sour cherries in Ontario, distribution and spread. Phytopathology, in press.

RASP LEAF (virus) was seen in two orchards in the Okanagan Valley, B.C., about 15 miles from the nearest known infection. Eight infected trees were found in one and two in the other a quarter mile away. Infection appeared to be recent (T.B. Lott). Three infected trees of Lambert were found in June in a small block at Erickson, one having all foliage affected and the others with a single affected branch apiece. In September two more diseased trees were found in this block and one in an adjacent block. This is the first report of rasp leaf in the Kootenays (M.F. Welsh).

SMALL BITTER CHERRY (cause unknown). During extensive cherry surveys in the Okanagan Valley, B.C., a few affected trees were found in addition to ones seen in previous years. All diseased trees found have been in the southern part of the area where western X disease of peach is common. Except for one Lambert, all affected trees seen have been Bing. In Lambert the symptoms are similar and are quite distinct from those of little cherry (T.B. Lott). See T.B. Lott, Sci. Agric. 27:260-262. 1947. This trouble is not considered important except for possible confusion with little cherry. Affected trees bear both normal fruits and stunted, malformed, unpalatable ones that never ripen fully. Attempts to transmit the condition by grafting have failed.

TATTER LEAF (virus). In a survey of 26 sweet cherry orchards in the Niagara Peninsula, Ont., two were found to contain suspected but no positively infected trees; in the remainder definite infection ranged from 0.9 to 42.9%. One grower reported that a 60-year-old Schmidt's Bigarreau had shown symptoms of the disease ever since he bought the orchard 20 years ago, and that he had sprayed it annually in the belief that the trouble was shot hole. On sweet cherry fine brown lines delimit necrotic areas, which soon absciss to give a tattered effect. Some leaves show only chlorotic spotting or oak-leaf patterns. The symptoms are confined to leaves formed early in the spring and are usually recurrent. An expert and observant grower reports that in his

orchard Deacon is most severely affected, failing to ripen its fruit normally. Seneca is also severely affected. In Elkhorn the foliage is badly shredded but the effect on the crop is not conspicuous. Bing, Lambert, Windsor, Tartarian, and Schmidt's and Napoleon Bigarreau show varied degrees of tattering but no serious effect on the crop (R.S. Willison).

TWISTED LEAF (virus). No new infections were seen in the Okanagan Valley, B.C. (T.B. Lott).

YELLOWS (virus). In eight orchards of Montmorency sour cherry in Lincoln Co., Ont., first surveyed in 1945, the average definite infection increased from 34 to 39%, but, owing to weak symptoms or heavy shot-hole infections in some blocks, actual infection may have been about 50%. In several blocks a number of trees that had shown yellows in 1945 showed no symptoms in 1947. Symptoms are usually recurrent in this disease and the reason for these apparent recoveries is not known. In 20 newly surveyed blocks infection ranged from 2.6 to 58.0%, averaging 20.7% plus 3.6% doubtful trees. In 6 blocks in Halton Co. infection was 3.9-59.7%, average 40.5% plus 3.6% doubtful trees (R.S. Willison).

DIE BACK (boron deficiency). In three widely separated orchards in the Kootenays, B.C., which had not received boron applications, slow emergence from dormancy, death of many buds and distortion of leaves were seen. All trees showed at least partial recovery late in the season (M.F. Welsh).

CRINKLE (bud sport) was seen in 7 of 26 sweet cherry orchards in southern Ont. surveyed in 1947, usually in Black Tartarian or Bing. Four trees were affected in one block of seven. Elsewhere infection ranged up to 8.5%. Usually only small parts of trees were affected, suggesting that such sports may occur relatively frequently. Occasionally a whole tree is affected, indicating that the condition may be distributed in propagating stock (R.S. Willison). Previously reported from B.C.

MOTTLED FOLIAGE (cause unknown) was seen in Lincoln Co., Ont., during surveys of Montmorency orchards. Up to 40% of the trees were affected, but generally the rate was less than 5%. One form of mottling may be due to growth factors; but the second, less regular form suggests prune dwarf infection. There is no apparent injury. In various sweet cherry varieties up to 30% of the trees showed a mottling distinct from the growth mottle type, often in the form of faint rings of various sizes; this may be prune dwarf but the cause has not yet been determined. Indexing has shown that both prune dwarf and necrotic ring spot are often present in sweet cherries although usually more or less masked (R.S. Willison).

PEACH

SCAB (*Cladosporium carpophilum*). Three affected fruits were received from Toronto, Ont. (H.N. Racicot).

CORYNEUM BLIGHT (Clasterosporium carpophilum). Several specimens of infected fruit were received from the lower Fraser Valley, B.C. (R.E. Fitzpatrick). All phases of this disease are serious throughout the Kootenays, and a few trees were killed. Growers in the Creston Valley have started to spray with 4-6-40 Bordeaux (M.F. Welsh).

BROWN ROT (Sclerotinia fructicola). Following a heavy hailstorm in Essex Co., Ont., on 30 Aug., all orchards in the affected area of 6 sq. mi. were severely attacked by brown rot within a week; up to 60% of the fruit was lost. The large amount of inoculum in the hailed orchards aggravated brown rot injury elsewhere in the county (L.W. Koch).

In the Niagara Peninsula blossom blight was serious and was not easily controlled with the ordinary spray schedule. In spray experiments infection of Valiant averaged 35% in sprayed blocks and 40% in the checks; in Rochester infection was 16 to 24% in sprayed blocks and 26.5% in the check; in Elberta 2 applications of wettable sulphur gave 2% infection against 7% in the check. Losses from brown rot were generally heavy in mid-season varieties, which provided heavy inoculum for the late crop; but dry weather in September kept losses fairly low. Rot in late varieties was very variable. It was correlated to some degree with prevalence of fruit moth, but other factors were involved. These include: poor spray cover or timing; incomplete spray schedule, often because of inability to get spray equipment between trees near harvest time; faulty air drainage, due to topography, windbreaks, close planting or dense foliage; thin or injured skin, due to rapid growth or rough handling; lack of sanitary precautions in orchard or packing house; and failure to let fruit dry before picking. Observations at Vineland Station indicate that some growers' packs are much more subject to decay than others. In a test on Valiant for the comparison of spray schedules, the full schedule gave one third as much rot in the orchard as the check, an extra prepick spray gave no improvement, and eliminating the later sprays gave some increase of rot. In a test with Rochester wettable sulphur with a sticker gave good control, little more than half the rot with wettable sulphur alone and one sixth that in the check. In a test with Elberta wettable sulphur, especially with a sticker, was also outstanding. In these three tests observations on stored fruit showed similar trends (R.S. Willison). Brown rot caused little loss in N.S.; up to 2-3% infection occurred in some early varieties (K.A. Harrison).

LEAF CURL (Taphrina deformans) was seen on all varieties in unsprayed and inadequately sprayed orchards in the moister districts in the Kootenays, B.C. (M.F. Welsh). In the Niagara Peninsula, Ont., leaf curl was epidemic in poorly sprayed or unsprayed orchards, but was negligable where efficient spraying was done (G.C. Chamberlain).

CANKER (Valsa sp.) was severe on young trees of Veteran and Vedette at Cliffside, Vancouver Island, B.C. (W. Jones).

WILT (Verticillium ?albo-atrum) attacked 4 trees in a block of 100 2-year-old Fisher in Lincoln Co., Ont. The affected trees showed

heavy defoliation in late July. Tomatoes had preceded the peach trees and had been used as an intercrop (G.C. Chamberlain).

WART (virus). A single infected tree was found, for the first time, in the Okanagan Valley, B.C. (T.B. Lott).

WESTERN X DISEASE (virus) continued to spread slightly in the southern Okanagan Valley, B.C. In mapped orchards new infections were somewhat fewer than in some recent years (T.B. Lott).

X DISEASE (virus). Infection was seen in three trees out of several hundred 2-year-old budded seedlings in Wentworth Co., Ont. Chokecherries occurred about 500 ft. away (G.C. Chamberlain).

RUSTY SPOT (cause unknown). This trouble was seen on scattered trees in the Okanagan Valley, B.C. It seriously injures the affected trees, but is of little importance because few trees are attacked. It has been seen for about 15 years in this area, but shows no definite signs of spread (T.B. Lott).

SPRAY INJURY. Arsenical injury was caused in the laboratory orchard, St. Catharines, Ont., (1) by the addition of polyethylene polysulphide to the regular mixture of sulphur, lead arsenate, lime and zinc sulphate; and (2) by using the arsenical mixture with aluminum sulphate and lime sulphur. In commercial orchards arsenical injury resulted from the occasional omission of lime or from using slowly dissolving forms of zinc sulphate (R.S. Willison).

PLUM

CORYNEUM BLIGHT (*Clasterosporium carpophilum*) caused severe leaf spotting on a few trees at Milner, B.C. (W. Jones). At Creston considerable damage occurred in Peach plum and Santa Rosa prune, especially where inter-planted with peach or apricot. In one orchard the fruit scab on Peach plum rendered the crop unfit for picking (M.F. Welsh).

BLACK KNOT (*Dibotryon morbosum*). A trace was found at Courtenay and Saanichton, for the first time on Vancouver Island, B.C. It is widespread in the Fraser Valley (W.R. Foster). It is present in all parts of the lower Fraser Valley and appears to be increasing rapidly especially in the Chilliwack and Mission districts (R.E. Fitzpatrick). Scattered infections were seen on Reine Claude in a commercial orchard in Lincoln Co., Ont. (G.C. Chamberlain). Specimens were received from Toronto (L.T. Richardson).

BRANCH ROT (*Schizophyllum commune*) was seen at Delhaven, N.S., on trees apparently injured by wet soil (J.F. Hockey).

BROWN ROT (Sclerotinia fructicola) fruited on specimens received from Windsor, Ont. (H.N. Racicot). Incidence of brown rot on unsprayed fruit at St. Catharines was: Monarch 16%, Lombard 14%, Yellow Egg 10%, Imperial Gage 6%, Opinogea 5%, Reine Claude 4%, and Italian Prune 1.5% (G.C. Chamberlain). Specimens of severely rotted blue plums were received from Smith's Falls (L.T. Richardson). Some brown rot was present in specimens from Laverlochère, Que., and all the fruit of a single tree at Westmount was infected (H.N. Racicot). Despite spraying, brown rot was heavy in the orchard at the station, Kentville, N.S., damage ranging from 5 to 30% (K.A. Harrison). Infection was 25% on Victoria at Southport, P.E.I. (R.R. Hurst).

PLUM POCKET (Taphrina communis). Damage was a trace at Alameda, Sask. (W.W.M.). Specimens were received from Wapella (T.C. Vanterpool). Specimens and reports of 100% infection were received from Kenora, Chelmsford and Haileybury, Ont., and Laverlochère, Que. (H.N. Racicot, L.T. Richardson). One specimen was brought in from Charlottetown, P.E.I. (R.R. Hurst).

RUST (Tranzschelia Pruni-spinosae) caused light damage at Chilliwack, B.C.; first report from the mainland (J.W. Eastham). This material has not been seen. Two specimens from Vancouver Island, collected at Cowichan (P.D.S. 25:71) and Sidney, are assignable to the variety discolor (D.B.O.S.).

DIE BACK (boron deficiency). Several trees in a small prune orchard in the Sumas district, B.C., showed typical symptoms (R.E. Fitzpatrick). Gummosis and corky areas in fruit of Italian prune were common in the Grand Forks and Salmon Arm districts (G.E. Woolliams).

SAND CHERRY

POWDERY MILDEW (Podosphaera Oxyacanthae) was severe on leaves and fruit of several bushes in a garden at Red Deer, Alta. (M.W. Cormack).

C. RIBES FRUITS

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola) caused heavy defoliation of Black Giant and Boskoop Giant at Vineland, Ont., and it was commonly seen in nurseries in Lincoln, Welland and Elgin Co. (G.C. Chamberlain). Rusted black currant leaves were received from Campbellford and York Mills (H.N. Racicot). Rust was heavy on black currant at Charlottetown, P.E.I. (D. Robinson), and infected leaves were received from Summerside (R.R. Hurst).

ANTHRACNOSE (Drepanopeziza Ribis). A moderate general infection of unsprayed Black Giant was seen in Lincoln Co., Ont. (G.C. Chamberlain).

SEPTORIA LEAF SPOT (Mycosphaerella Grossulariae) was severe on red and black currants at the Experimental Farm, Indian Head, Sask. A moderate infection was also seen in a garden at Saskatoon (R.J. Ledingham).

POWDERY MILDEW (Sphaerotheca mors-uvae) caused slight damage to black currants at L'Assomption, Que. (L.T. Richardson).

GOOSEBERRY

WHITE PINE BLISTER RUST (Cronartium ribicola) was general, but caused slight damage, on Poerman at Duncan, B.C. (W. Jones).

SEPTORIA LEAF SPOT (Mycosphaerella Grossulariae) varied from a trace to heavy in a garden at Charlottetown, P.E.I. (W. Hodgson).

POWDERY MILDEW (Sphaerotheca mors-uvae). A specimen was received from D'Arcy, Sask., moderate damage in a garden being reported (H.W.M.). A moderate infection occurred on English gooseberry in Lincoln Co., Ont., but repeated spraying effectively protected the fruit (G.C. Chamberlain). Specimens were received from Kamouraska Co., Que., with the statement that all the fruit became infected (H.N. Racicot).

D. RUBUS FRUITS

RASPBERRY

CROWN GALL (Agrobacterium tumefaciens) was found on Latham at Campbellford, Stayner and Port Burwell, Ont., during roguing of virus-infected plants (G.C. Chamberlain). A single infected plant was found at the Botanical Garden, Montreal, Que., and a severe infection was seen in the town of Mount Royal (J.E. Jacques). In a Viking plantation in York Co., N.B., 50% of the plants showed severe infection (D.J. MacLeod). A single infected plant of Washington was found at Kentville, N.S., during roguing for virus diseases (K.A. Harrison).

SPUR BLIGHT (Didymella applanata) was found on a few plants at Edmonton, Alta. (A.W. Henry). Spur blight is very common on Latham in Ont., especially in plantations used for propagation. It was prevalent in 15 out of 33 plantings of Latham examined. Indian Summer, Marcy and Taylor were also found infected (G.C. Chamberlain). Specimens were received from Port Colborne and Brockville, Ont., and Hudson Heights, Que. (H.N. Racicot, L.T. Richardson). Infection was 30-40% in a 1/2 acre planting of Newburg and Gatineau in Yamaska Co. (B. Desmarteau). Spur blight was severe on almost all varieties in nurseries at Ste. Anne de la Pocatière and Deschambault. Mortality was high in one new

planting (C. Perrault). Damage was very severe in a planting at Kentville, N.S. There was some spotting of the leaves in addition to the cane lesions (K.A. Harrison). Spur blight was widespread and very injurious throughout P.E.I. (R.R. Hurst).

ANTHRACNOSE (Elsinoe veneta). A trace was found on Herbert in a nursery at Carman, Man. (W.E. Sackston). The unsprayed part of a 1/2 acre of Taylor in Lincoln Co., Ont., showed 65%. In sprayed areas infection was 8-45% with greatly decreased severity. Anthracnose was prevalent, reducing growth, killing tips and cracking open the canes of Bristol and Morrison black raspberries at Port Burwell; Marion and Sodus purple raspberries suffered less damage. The disease was heavy and caused death of the tips of Columbian purple raspberry at Bloomfield, Prince Edward Co.; secondary infection by cane blight was also a factor (G.C. Chamberlain). A trace of anthracnose was seen in a nursery at Deschambeault, Que. (C. Perrault). In the mulch plots at the Station, Kentville, N.S., infection was 100% on Newburg, Taylor and Viking. Percentage of cane survival was less for all varieties in hay-mulched plots than in clean plots; but sawdust mulch gave increased survival of Newburg and Viking, and reduced survival of the susceptible Taylor. Some spur blight was also present in these plots (K.A. Harrison). At the Station, Charlottetown, P.E.I., infection was heavy on Lloyd George, Rideau and Trent; moderate on Gatineau; and trace on Madawaska, Viking and 0263 (R.R. Hurst).

DRY BERRY (Haplosphaeria deformans) affected half the fruit of Lloyd George at Agassiz, B.C.; this variety appears to be very susceptible under conditions of poor air drainage (W. Jones).

CANE BLIGHT (Leptosphaeria Coniothyrium) was heavy at Kentville, N.S. (D. Creelman), and specimens were received from Colchester, Hants and Kings Co. (J.F. Hockey).

SEPTORIA LEAF SPOT (Mycosphaerella Rubi) was fairly common on Rubus macropetalus at Courtenay, B.C. (W. Jones).

YELLOW RUST (Phragmidium Rubi-idaei). Traces occurred in a garden patch of Washington at Summerland, B.C. (G.E. Woolliams).

LATE YELLOW RUST (Pucciniastrum americanum) was general on Viking in a nursery propagation bed at Stayner, Ont., but the effect on cane growth was negligable despite early leaf fall. Specimens of Viking were received from Renfrew; the rust was said to have caused early defoliation and to have infected the fruit (G.C. Chamberlain). Two severely rusted leaves were received from Hemmingford, Que., with the statement that three rows of a one acre planting were affected (H.N. Racicot). Severely affected fruit of Viking was brought in at Charlottetown, P.E.I. (R.R. Hurst).

POWDERY MILDEW (Sphaerotheca Humuli) was common in a nursery at Carman, Man.; it was less prevalent on Newman and Chief than other varieties (W.E. Sackston). In propagating beds and plantations in Ont.,

Latham is often stunted and the cane tips spindly. Ottawa is also susceptible and Viking is occasionally attacked (G.C. Chamberlain).

WILT (Verticillium albo-atrum) seriously injured 1600 out of 2000 plants in a year old patch of Viking at Dixie, Ont. A cool, wet spring and the growing of tomatoes on the land in 1946 aggravated the attack (G.C. Chamberlain).

DECLINE (virus). Several examples of what appeared to be this disease were seen in the Fraser Valley, B.C. (R.E. Fitzpatrick).

LEAF CURL (virus), probably mixed with some other virus, was sent in from a garden at Humboldt, Sask. (T.C. Vanterpool). Scattered infections were seen in three commercial plantings of Cuthbert, Viking and Taylor in Ont. All infected stools were severely stunted and worthless (G.C. Chamberlain). Infection was 2% in a Viking plantation near Fredericton, N.B. (D.J. MacLeod). Three plants were affected in a 1/2 acre block at Kentville, N.S. (K.A. Harrison).

MOSAIC (virus) completely ruined a small patch at Edmonton, Alta. A moderate infection occurred in Chief and Gatineau at the Beaverlodge Station (J.D.G.). Scattered infections occurred in 18 of 133 plantings inspected in Ont. The varieties most commonly infected were Latham, Viking, Ottawa, and Taylor. Plantings of Starlight and Early Sunrise were found with 15-25% infection. Two commercial blocks of Taylor showed 5-10% infection with marked stunting of diseased plants. Taylor shows little tolerance of mosaic (G.C. Chamberlain). Infection was 7-8% in a 1-acre field at Abbotsford, Que. (R. Desmarteau). Up to 5% infection was seen in Viking and Newburg plantings at Kentville, N.S. (D. Creelman). At the Station, Kentville, infection was 2% in Viking and Taylor, the latter being most seriously affected (K.A. Harrison). Infection was 4% in a planting of Lloyd George at Charlottetown, P.E.I. (R.R. Hurst).

E. OTHER FRUITS

BLUEBERRY

CANKER (Godronia Cassandrae) was present in all plantations examined in N.S., at Aylesford, Kentville, Upper Dyke and Scotsburn, infecting Grover, Pioneer and seedlings. Generally only one or two shoots of a plant were attacked. Apothecia were found on 3-year-old cankers in one plantation. Previously reported from B.C. and Que. (D. Creelman).

POWDERY MILDEW (Microsphaera Alni var. Vaccinii). Traces were seen at Aylesford and Kentville, N.S. (D. Creelman).

STUNT (virus) infected 1% of about 1000 plants at Kentville, N.S. The affected plants were rogued in the fall. First report to the Survey (J.F. Hockey).

FIG

TWIG BLIGHT (Botrytis sp.) was seen at the Station, Saanichton, B.C. (W. Jones).

GRAPE

DEAD ARM (Fusicoccum viticola) caused stunting and dying back of 8% of a block of 864 vines of Concord in Lincoln Co., Ont. Infection was 12% in the Laboratory vineyard, St. Catharines. The disease is present in most Concord plantings (G.C. Chamberlain).

BLACK ROT (Guignardia Bidwellii). Pedicel infection was seen on Ontario near Harrow, Ont. (A.A. Hildebrand). Infected clusters were seen on 2% of the vines of a block of Delaware used in a spray experiment for downy mildew control in Lincoln Co. Traces were also seen in a block of Fredonia (G.C. Chamberlain).

DOWNY MILDEW (Plasmopara viticola). On 10 July observations in Lincoln Co., Ont., showed infection as follows: Fredonia, 48% of vines infected and considerable fruit infection; Agawam, 31% of vines infected with a trace on fruit; Delaware, 29% of vines infected only on foliage. (G.C. Chamberlain).

POWDERY MILDEW (Uncinula necator) was a trace on unsprayed Delaware in Lincoln Co., Ont. (G.C. Chamberlain).

CHLOROSIS (cause unknown) is common in Lincoln Co., Ont. In one Concord vineyard 250 of 1000 vines were affected. Severe chlorosis is accompanied by stunting of growth and small, late maturing fruit clusters (G.C. Chamberlain).

STRAWBERRY

ROOT and CROWN ROT (?Botrytis sp.). Killing of plants in patches in a large commercial planting at Edmonton, Alta., was seen in May and September. Botrytis sp. was isolated on each occasion (T.R. Davidson).

LEAF SPOT (Mycosphaerella Fragariae) was general in a 10 acre field of Pitt at Bradner, B.C. (W. Jones). Infection was 100% and damage about 20% in a field at Lanoraie, Que. The disease spread from a weedy corner of the field (F. Godbout).

RED STELE (Phytophthora Fragariae) caused moderate damage in wet parts of a field at North Saanich, B.C. (W. Jones). Red stele was found on 30% of the farms of growers who applied for certification of plants. Over 2,000,000 plants were certified as apparently free from red stele in the first year of certification, of which 1,600,000 were

sold. These plants appear to have helped growers to keep their land free from the pathogen. Ridging to improve drainage seems to reduce losses (W.R. Foster).

LEAK (Rhizopus nigricans) was severe in a planting of Senator Dunlap in Queens Co., P.E.I. Slug injury may have initiated some of the infection (D. Robinson).

POWDERY MILDEW (Sphaerotheca Humuli) was fairly prevalent on several seedlings at the Station, Saanichton, B.C. (W. Jones).

CRINKLE (virus). Traces were seen in three plantations of Senator Dunlap in Queens Co., N.B. (D.J. MacLeod).

MILD MOSAIC (virus) affected 2% of one and 3% of a second planting of Senator Dunlap in Queens Co., N.B. (D.J. MacLeod).

WITCHES' BROOM (virus) affected about 1% of a large plantation of British Sovereign in the Fraser Valley, B.C., set out in 1946. Infected plants produced no saleable crop (R.E. Fitzpatrick). Twenty-two infected plants, which bore little or no crop were found in a field of Senator Dunlap in Queens Co., N.B. (D.J. MacLeod).

YELLOW EDGE (virus) was a trace in two fields of Senator Dunlap in Queens Co., N.B. (D.J. MacLeod).

JUNE YELLOWS (genetic breakdown) affected 15% of Premier, with some stunting, in a new plantation in Lincoln Co., Ont., set with plants from Waterford. About 10% of the plants in six other fields were affected (G.C. Chamberlain). An entire plantation of Premier in Queens Co., N.B., showed this condition on 16 June, but the symptoms disappeared later (D.J. MacLeod). Plantings of Premier in Kings and Annapolis Co., N.S., showed 50-100% of plants affected, except the Lowden strain, which was free from any symptoms (J.F. Hockey).

ROOT ROT (cause unknown) occurred extensively on Premier in southern Ont., in plantings with poor natural drainage. Heavy rain and poor growing conditions in May aggravated the injury. The failure of 25,000 plants to become established in one field was ascribed to this disease. In three other plantings root rot was confined to poorly drained areas (G.C. Chamberlain).

V. DISEASES OF TREES AND SHRUBS

ACER - Maple

Leaf Spot (Phleospora Aceris) was very heavy on A. spicatum 30 miles north-east of St. Leonard, N.B., on 30 Aug.; most of the leaves were tattered and dying; the microconidial stage was abundant (D.B.O. Savile).

Leaf Blight (Ramularia lethalis Ell. & Ev.) was heavy on A. rubrum in two localities near Danford Lake, Que., following Taphrina Dearnessii (q.v.). On 1 July the Taphrina predominated, but by 11 July the Ramularia was the only conspicuous fungus to be found and injury had greatly increased. The season had been very wet up to this time and it is believed that R. lethalis, which was described from London, Ont., may be an important pathogen under such conditions, but it is not known whether it can become established in the absence of Taphrina. The lesions are large, irregular, often confluent, blackish brown, with the fungus fruiting below as a white, delicate mould; spores 6-10 x 1.7-2.5 microns, continuous, in branching chains (D.B.O. Savile).

Tar Spot (Rhytisma acerinum) covered 75% of the leaf surface of trees of A. saccharum about 15 years old on a hill at Ste. Anne de la Pocatiere, Que. (A. Payette). These hills are often above the base of low cloud sheets for considerable periods, which might increase the amount of infection.

Leaf Blister (Taphrina Dearnessii Jenkins, Journ. Wash. Acad. Sci. 29:222-230. 1939) was heavy on A. rubrum in two localities near Danford Lake, Que. In this specimen asci were 12.5-25 x 7-12 microns, with stalk cells 3.5-8 x 8-15 microns; Jenkins gives 17-29 x 8-13 microns for the asci and 6-12 x 10-18 microns for the stalk cells. Specimens from Portland, Ont. (P.D.S. 17:69-70. 1938) also on A. rubrum yield asci 21-34(39) x 10.5-14 microns with stalk cells 9-13 x 15-21 microns, and a collection on the same host from Davidson, Que., yields asci 25-32 x 10.5-13 microns with stalk cells 9-13 x 12-15 microns. We believe all these specimens to be the same fungus, on the basis of host, symptoms and morphology, despite the length of the asci in the last two mentioned, and all are filed as T. Dearnessii; but there seems to be some doubt whether T. Dearnessii is actually distinct from all of the species described on Acer. In both these outbreaks Ramularia lethalis (q.v.) followed the Taphrina (D.B.O. Savile).

AESCULUS - Horsechestnut

Leaf Blight (Guignardia Aesculi) was moderate to severe on all trees of Ae. Hippocastanum at the Station, Kentville, N.S., late in the summer (D. Creelman). It was a trace to heavy in Queens Co., P.E.I. (R.R. Hurst).

Canker (Nectria sp.) was heavy on a dying tree at Charlottetown, P.E.I. (R.R. Hurst).

ALNUS - Alder

Powdery Mildew (Microsphaera Alni) was heavy on A. crispa var. mollis near Perce, Que., on 28 Aug. (D.B.O. Savile).

Leaf Spot (Passalora bacilligera Mont. & Fr.) was light on A. crispa var. mollis near Perce, Que., on 28 Aug. Passalora is very close to Cercospora, the spores being 2-celled with the lower cell appreciably broader than the upper. This fungus has been described as Cercospora Alni

Chupp & Greene (H.C. Greene, Farlowia 1:550. 1944), following its discovery on A. crispa in Wis. The name Cercospora bacilligera had already been applied to a fungus on Rhamnus (D.B.O. Savile).

AMELANCHIER

Leaf Spot (Entomosporium maculatum). A specimen on A. alnifolia was received from Aspen Beach, Alta. (A.W. Henry).

Rust (Gymnosporangium spp.). G. juvenescens was reported to have caused severe damage in a planting of A. alnifolia at Drumheller, Alta. (L.E. Tyner). G. sp. was heavy on leaves of A. alnifolia received from Oyen (H.N. Racicot).

Seedling Blight (Pythium spp.). Many seedlings were killed in nursery beds at the Station, Beaverlodge, Alta. Pythium spp. and other fungi were isolated (J.D.G.).

BETULA - Birch

Die-Back (cause unknown) was severe in many parts of the Gaspe Peninsula, Que. and in northwestern N.B. Adjacent cutting, burning or construction work may often have been a factor, but serious killing had also occurred in some areas where no change in the environment was apparent (D.B.O. Savile). In order to study this disease in its early stages, an area in Pictou Co., N.S., was selected in 1947 in which die-back is of fairly recent origin. It has been established that die-back of twigs, and even some branches, in the top of the crown can occur in the complete absence of the bronze birch borer. Trees thus affected are soon attacked by the borer and killed. The cause of the initial die-back is still not known. Excavation of the root system of large trees has shown practically no killing except of the ultimate rootlets; and only a slightly higher proportion of rootlets was dead in diseased than in apparently healthy trees; but no conclusions can be drawn from these studies until more is known of the condition of the roots of normal, vigorous trees. Many fungi have been isolated from affected twigs, but their pathogenicity has yet to be tested. The possibility that reduced precipitation over the whole affected area is a contributing factor has received some support from increment and meteorological data. These studies are being made in co-operation with the N.S. Dept. of Lands and Forests (A.J. Skolko). Few trees in P.E.I. do not show symptoms of die-back (R.R. Hurst). L.S. Hawboldt (Jour. For. 45: 414-422. 1947) suggests that irregular precipitation, exposure during logging of other trees, injury during logging, defoliating insects, and injury by sapsuckers, rabbits and porcupines have all weakened stands and laid them open to attack by various weakly parasitic fungi and the bronze birch borer.

CARAGANA

Leaf Spot (Septoria Caraganae) is present each year at Regina, Sask., and is often conspicuous and severe. The cumulative effect is serious and it is largely responsible for the poor condition of many hedges. Crown rot (? Fusarium sp.) may also be a factor (T.C. Vanterpool).

CHAMAECYPARIS

Canker (Rectalotia funerea associated) was present in 1946 on C. Lawsoniana var. erecta in a nursery at Vancouver, B.C. Adjacent C. L. Allumii was unaffected (W. Jones).

CORNUS - Dogwood

Leaf Blight (Monilia Cornu) was light but general on C. Nuttallii in 1946 at North Saanich, B.C. (W. Jones).

CRATAEGUS - Hawthorn

Scald (Entomosporium Thuemenii) caused severe defoliation in a hedge of C. Oxyacantha at Agassiz, B.C. (W. Jones).

Rust (Gymnosporangium clavariaeforme) was a trace at Charlottetown, P.E.I. (G.W. Ayers).

FRAXINUS - Ash

Rust (Puccinia sparganioides) was heavy on F. americana at L'Islet, Que., severely distorting leaves, fruits and young twigs. Spartina pectinata was also heavily rusted (A. Payette).

JUGLANS

Leaf Spot (Marssonina Juglandis). Infected leaves of J. nigra were received from Smiths Falls, Ont. (Ruth Macrae).

JUNIPERUS

Rust (Gymnosporangium Juniperi-virginianae). Specimens of J. virginiana were received from Welland Co., Ont. The affected tree was close to a shrub of Malus Sargenti and 300 yds. from apple trees (G.C. Chamberlain).

MALUS

Scab (Venturia inaequalis). Specimens of the ornamental crab, M. Scheideckeri, from Toronto, Ont., showed twig stunting and leaf scorching; the leaves were completely overrun by scab. M. ioensis was reported to be less severely affected (G.C. Chamberlain).

OSTRYA - Hop-Hornbeam

Leaf Spot (Cylindrosporium Pearnessii) was heavy on and caused moderate damage to O. virginiana at Danford Lake, Que. (D.B.O. Savile).

POPULUS - Poplar

Rust (Melampsora medusae) was heavy and general on P. balsamifera in Sept. at Dunrobin (H.N. Racicot) and Westboro, Ont. (D.B.O. Savile).

Yellow Leaf Blister (Taphrina aurea) was common on P. trichocarpa at Duncan, B.C. (W. Jones).

QUERCUS - Oak

Anthracnose (Gloeosporium nerviseguum). Specimens of Q. alba were received from Niagara-on-the-Lake, Ont. (I.L. Conners). It was severe on a number of trees of Q. macrocarpa near Ottawa, Ont. (D.B.O. Savile).

Leaf Blister (Taphrina coerulescens) was heavy and caused moderate damage on Q. borealis at Danford Lake, Que. (D.B.O. Savile). It was heavy on a branch of Q. borealis at Kentville, N.S.; first record from N.S. (J.F. Hockey).

RHAMNUS - Buckthorn

Rust (Puccinia coronata). Aecia on R. cathartica, past prime, were collected at Macdonald College, Que., on 19 June (W.C. Broadfoot).

Infection was heavy on a hedge and scattered shrubs of R. Frangula at Fredericton, N.B. (J.L. Howatt). Infection of R. cathartica was light at Charlottetown, P.E.I. (G.W. Ayers).

SALIX - Willow

Scab (Fusicladium salicisperdum) caused about 50% defoliation of French willow in Kings Co., N.S. Spraying is holding the disease in check at Grand Pre Park (K.A. Harrison).

Anthracnose (Gloeosporium Salicis) was heavy on an isolated tree of Salix sp. at Ottawa, Ont. (D.B.O. Savile).

Rust (Melampsora spp.) M. Abieti-capraearum was general but not severe on S. Bebbiana at Kedgwick, N.B. M. Bigelowii was heavy and hastened defoliation of several trees of S. alba var. vitellina at Britannia, near Ottawa, Ont. (D.B.O. Savile).

Powdery Mildew (Uncinula Salicis) was general on S. sp. about North Saanich, B.C. (W. Jones).

Die-Back (Valsa ambiens). A large tree of Wisconsin willow at Strathroy, Ont., bore many affected branches and showed considerable die-back of the current season's growth (G.C. Chamberlain).

SORBUS - Mountain Ash

Fire Blight (Erwinia amylovora). The branch tips of 3 trees of S. aucuparia in a garden at Montreal, Que., were severely blighted (J.E. Jacques).

ULMUS - Elm

Dutch Elm Disease (Ceratostomella Ulmi). Work was continued during 1947 on a co-operative basis by the Dominion Department of Agriculture, the Quebec Department of Lands and Forests, and the Ontario Department of Agriculture. The eastern section of Ontario was scouted intensively but no positive cases of diseased trees were found. In Quebec there was an extension of the infected area westward north of the Ottawa River, five infected trees being found in Argenteuil County. The nearest of these was about three miles from the Ontario border, across the Ottawa River. In the eastern and south-eastern part of the infected area, in Lotbiniere, Richmond, and Megantic Co., there was considerable intensification of the disease. In 1946 there were 2114 infected trees located in Quebec and in 1947 the number of such trees was 840. These figures, however, are not comparable and the greatly reduced number of diseased trees found in 1947 does not indicate a corresponding reduction in the incidence of the disease.

The removal of diseased trees as a means of control was continued, except in the very heavily infected area in the vicinity of Sorel, and spraying experiments to prevent beetles emerging from diseased trees and also to prevent them from entering healthy trees were initiated (A.W. McCallum).

Coral Spot (Tubercularia ulmea Carter). This organism, which has previously been referred to Nectria cinnabarina, has recently been described by J.C. Carter (Phytopath. 37:243-246. 1947) as Tubercularia ulmea. Coral spot was again very prevalent among hedges of U. pumila at the Botanical Garden, Montreal, Que. (J.E. Jacques). A young tree of U. americana was girdled near the ground by Nectria sp. at Charlottetown, P.E.I. (R.R. Hurst).

VI. DISEASES OF ORNAMENTAL PLANTS

ACHILLEA

Rust (Puccinia Ptarmicae) was observed in the same locations as last year (P.D.S. 26:81. 1947) and elsewhere in Kamouraska Co., Que., on A. Ptarmica var. The Pearl. It was also found at Ste. Luce, Rimouski Co. (A. Payette, R.O. Lachance).

ACONITUM - Monkshood

Yellows (Callistephus virus 1). Two severely affected plants were found in a garden at Fredericton, N.B. (D.J. MacLeod).

ALTHAEA ROSEA - Hollyhook

Rust (Puccinia Malvacearum) was found on some plants at Edmonton, Alta., and was severe on plants at Brooks (J.D.G.). Rust was general at the Botanical Garden, Montreal, Que. (J.E. Jacques). It was heavy and caused severe damage at Kentville, N.S. (D. Creelman). Fourteen specimens were brought in for diagnosis at Charlottetown, P.E.I.; infection was a trace to very heavy (R.R. Hurst).

ANTIRRHINUM - Snapdragon

Powdery Mildew (Oidium sp.) caused slight damage to A. majus in a greenhouse at Sooke, B.C. (W. Jones). Erysiphe Polygoni and E. Cichoracearum are reported on Antirrhinum, but this is the first report to the Survey of any powdery mildew on this host.

Rust (Puccinia Antirrhini) was general on A. majus in a garden at Agassiz, B.C. (W. Jones).

Yellows (Callistephus virus 1). A trace was found in two gardens in York Co. and one in Sunbury Co., N.B. (D.J. MacLeod).

AQUILEGIA - Columbine

Leaf Blotch (Haplobasidium pavoninum v. Höhn.) was collected on Aquilegia sp. at Elk Lake, B.C. It was recognized by Dr. K.F. Baker. This is the first Canadian record of this fungus (W. Jones). Dr. Baker reports that this disease was very destructive in California in 1940, the first year that it was recognized. It has occurred sporadically since, but has always been less severe. The name peacock leaf spot has been used in the United States, but in our material the lesions are not conspicuously zonate, and the term leaf blotch used by W.C. Moore (Trans. Brit. Mycol. Soc. 22:266-277. 1939) seems preferable. Notes supplied by Dr. Baker indicate that many species and varieties may be attacked but that marked differences in susceptibility may be found. Our material agrees closely with the description given by Moore except that the swollen conidiophores often bear up to about 10 sterigmata rather than 1-4. These sterigmata, which are often dumbbell-shaped, bear 1-4 scars at the apex, similar to those on the conidiophore from which they arise, and each of these scars is the point of attachment for a chain of spores. Conidiophores about 25 microns high, 5-6 microns broad near base, 12-14 microns at flattened head; sterigmata 9.5-17.0 x 5.5-8.5 microns; spores 4.8-9.5 microns diam., spherical to broadly ellipsoid, minutely roughened, light yellow to greyish brown when cleared in lactophenol (D.B.O. Savile).

ARABIS - Rock-Cress

White Rust (Cystopus candidus) moderately infected A. alpina in a rock garden at Victoria, B.C., in 1946; first report on Arabis from B.C. (W. Jones).

ASTER

Powdery Mildew (Erysiphe Cichoracearum). A. novae-angliae and A. novi-belgii were severely attacked at the Botanical Garden, Montreal, Que. (J.E. Jacques).

BEGONIA

Leaf Nematode (Aphelenchoides fragariae). Many plants in a commercial greenhouse at Montreal, Que., were badly affected; previously reported from B.C. (J.E. Jacques).

Bacterial Leaf Spot (Xanthomonas begoniae). Several species were affected in the greenhouses at the Botanical Garden, Montreal, Que. (J.E. Jacques).

BERBERIS - Barberry

Rust (Puccinia graminis). The first pycnia were starting to secrete nectar on 30 May 1947 in the Arboretum, Ottawa, Ont. (I.L. Conners, D.B.O. Savile). Rust was very heavy on some escaped bushes at Fredericton, N.B. (J.L. Howatt).

BOLTONIA

Streak (virus) affected 40% of the plants in the border at the Station, Fredericton, N.B. (D.J. MacLeod).

CALENDULA

Yellows (Callistephus virus 1) severely damaged 50% of the plants of C. officinalis in the border at the Station, Fredericton, N.B. (D.J. MacLeod). Infection was 100% in a planting of Orange King, and was generally severe at Charlottetown, P.E.I. (R.R. Hurst).

CALLISTEPHUS CHINENSIS - China Aster

Wilt (Fusarium oxysporum f. Callistephi). A few plants in a seed crop were affected at Saanich, B.C. (W. Jones). Wilt was found in a garden at Edmonton, Alta. (A.W. Henry). This disease was destructive in a commercial planting of a reputedly wilt-resistant variety at Fort Garry, Man.; the organism was isolated (W.L. Gordon). Wilt killed 15 out of 300 plants in a mixed bed in the Arboretum, Ottawa, Ont. (D.B.O. Savile).

Yellows (Callistephus virus 1). A specimen was received from Caughnawaga, Que. (D.B.O. Savile). Yellows was general and severe in York, Sunbury, Queens, and Westmorland Co., N.B. (D.J. MacLeod).

CAMPANULA

Rust (Coleosporium Campanulae), reported last year (P.D.S. 26:82. 1947) from L'Islet and Kamouraska Co., Que., on Campanula rotundifolia var. intercedens, was found on the same host near Bonaventure, some 220 miles further east (D.B.O. Savile).

CENTAUREA

Rust (Puccinia Cyani) was severe in 1946 on a few plants of C. Cyanus in a nursery at Langley, B.C. (W. Jones).

Root Rot (Pythium sp.) severely injured plants of C. Cyanus received from Gananoque, Ont. The trouble was stated to be severe in one bed but absent from others (D.B.O. Savile).

Leaf Spot (Septoria centaureicola var. brevispora) caused slight damage to a few plants of C. Cyanus in a garden at Langley, B.C.; previously reported from Man. and Ont. (W. Jones, D.B.O. Savile).

CENTRANTHUS

Yellows (Callistephus virus 1). Three affected plants of C. ruber were found in a garden at Fredericton, N.B. (D.J. MacLeod). First report to the Survey on this host.

CHRYSANTHEMUM

Nematode (Aphelenchoides fragariae) affected a few plants at Victoria, B.C. (W. Jones). Many plants were attacked in a greenhouse at North Saanich (J. Bosher). This trouble was very prevalent in a commercial greenhouse at Montreal, Que., most of the plants being infected (J.E. Jacques).

Powdery Mildew (Erysiphe Cichoracearum) was becoming conspicuous in a greenhouse at Montreal, Que., on 13 Oct. (J.E. Jacques).

Leaf Spot (Septoria chrysanthemella) injured a few plants of C. maximum in a garden at Courtenay, B.C., in 1946 (W. Jones). The lower leaves of chrysanthemums in a commercial greenhouse at Montreal, Que., were heavily spotted in Oct. (J.E. Jacques).

Canker (?bacterial). Specimens were received from Brampton, Ont., that had been topped to stimulate flowering. Each stem was blackened about the cut and sometimes for 3-4 in. downward, the cortex was softened, and the pith and xylem were brown. A bacterium was consistently isolated (R.G. Atkinson).

Chimera (cause unknown). Specimens of December Gold, received from Crystal Beach, Ont., were seriously disfigured by pale streaks on the leaves. Other varieties were stated to be unaffected. The affected areas ran out from the veins and were pale green and slightly sunken when above, and grey green and markedly sunken when on the lower surface; occasionally lesions on both surfaces overlapped to give white areas. Sections showed that the affected tissue consisted of small, undifferentiated parenchyma cells, lacking chloroplasts and similar to the border parenchyma (D.B.O. Savile).

Stunt (cause unknown, possibly virus). A new disease of chrysanthemums has been encountered in several commercial plantings in Ont., of cuttings originating from Yoder Bros., N.Y. State. At St. Catharines 30% of a planting of Snow were affected. Other varieties found especially affected were Anaconda, Apricot, Queen Argo, Betsy Ross, Detroit News, Friendly Rival, and Nevada (G.H. Berkeley). Stunt has become a serious problem in a large commercial greenhouse at Falmouth, N.S., during the last two years. This establishment obtains most of its rooted cuttings from Yoder Bros. In the imported stock infection was over 50%, whereas it was less than 1% in stock rooted locally (J.F. Hockey). Although this trouble, traces of which have recently been observed in intercepted nursery stock from Yoder Bros., has the appearance of a virus disease, no success has been

reported in transmitting it. Hockey's observation of small amounts of the trouble in locally rooted cuttings might be interpreted as evidence of spread; but the trouble might be physiological and the different amounts of it explainable by different conditions of rooting (D.B.O. Savile).

CLEMATIS

Rust (Puccinia Clematidis) was light on C. sp. at Lethbridge, Alta. (M.W. Cormack).

CONVALLARIA MAJALIS - Lily-of-the-Valley

Blight (Botrytis cinerea) caused considerable damage at New Westminster, B.C. (R.J. Hastings).

Anthracnose (?Gloeosporium Convallariae) was heavy on three leaves received from Oakville, Ont. The lower limits of the spore size agreed with G. Convallariae, but the great variability in the spores leaves the identity in doubt (D.B.O. Savile).

COREOPSIS

Yellows (Callistephus virus 1) affected one plant of C. tinctoria at Fredericton, N.B. (D.J. MacLeod).

COSMOS

Blight (Botrytis cinerea) caused slight damage at Charlottetown, P.E.I. (R.R. Hurst).

CROCUS

Wilt (Botrytis sp.) attacked a few plants of a yellow variety at Gordon Head, B.C., in 1946 (W. Jones).

CYCLAMEN

Root Knot (Heterodera marioni) was affecting about 700 out of 1100 plants in a commercial greenhouse at Ottawa, Ont., in mid August, symptoms ranging from slight yellowing or curling to complete death. Eventually almost all the plants were lost. Tomatoes grown in a sample of the compost used for these cyclamen remained healthy. It is believed that the nematodes had been present previously in the greenhouse on a tolerant host and had passed unobserved (D.B.O. Savile).

DAHLIA

Mosaic (virus) was seen in several varieties in many gardens at Charlottetown, P.E.I. (R.R. Hurst).

DAPHNE

Anthracnose (Marssonina Daphnes) caused considerable defoliation of D. Mezereum at Cobble Hill, B.C., in 1946 (W. Jones).

DELPHINIUM - Larkspur

Powdery Mildew (Erysiphe Polygoni) severely injured the plants in the University plots, Edmonton, Alta. (J.D. Gilpatrick). It was heavy in a garden at Arundel, Que. In a garden at Perce it was heavy in one bed but absent from a second (D.B.O. Savile). Mildew was heavy in a garden at Charlottetown, P.E.I. (W.A. Hodgson, R.R. Hurst).

Wilt (?Fusarium sp.). One dying plant was found at Lethbridge, Alta., and F. sp. was isolated (M.W. Cormack).

Bacterial Blight (Pseudomonas delphinii). Severe damage was seen in the University plots, Edmonton, Alta. (J.D. Gilpatrick). Infection was heavy on certain plants at the Experimental Farm, Indian Head, Sask.; there appear to be considerable varietal differences in susceptibility (R.C. Russell). A few plants at the Botanical Garden, Montreal, Que., were attacked after flowering (J.E. Jacques).

Mosaic (?Cucumis virus 1) affected a few plants in a garden at Agassiz, B.C., in 1946 (W. Jones). A single plant was brought in at Charlottetown, P.E.I. (R.R. Hurst).

Yellows (Callistephus virus 1). Two affected plants were found in a garden in Sunbury Co., N.B. (D.J. MacLeod).

DIANTHUS

Wilt (Fusarium spp.). F. Equiseti was isolated from a plant of D. Caryophyllus var. Polyanna at Esquimalt, B.C., 24 Jan. 1946 (W. Jones, W.L. Gordon). Wilt, with F. sp. present in specimens caused severe stunting, yellowing and leaf curling of D. Caryophyllus vars. Peter Fisher and Virginia at Brampton, Ont., in June; the soil in the bed had not been changed or sterilized for several years (D.B.O. Savile).

Leaf Rot (Heteropatella valtellinensis (Trav.) Wollenw.) recently intercepted by the U.S.D.A. in a shipment of carnation cuttings from New Westminster, B.C., and was soon afterwards discovered to be established in the neighbourhood of Seattle, Wash. According to W. Buddin and E.M. Wakefield (Trans. Brit. Mycol. Soc. 14:215-221. 1929), who described the fungus as Heteropatella Dianthi, large, soft, greyish or brownish lesions are formed on the leaves and stems, on which can be seen the small, raised fruit bodies. The fruit bodies may be accompanied by a hyphomycetous phase (Pseudodiscosia Dianthi Host. & Laub.), which is the only spore form seen in culture. The conidia are typically 20-25 x 4-5 microns, excluding a short basal and a 12-20 (30) micron apical appendage, and 2-3-septate. Under dry conditions the spores are smaller, 0-1-septate and generally lack appendages. Plant pathologists are asked to examine carnations carefully to determine the range of this disease, which has not previously been found outside Europe. The fungus was originally described from D. carthusianorum; other Dianthus spp. should therefore be examined. Optimum growth in culture occurs at 19-20°C. and Buddin and Wakefield suggest that the disease is favoured by cool, wet conditions (D.B.O. Savile).

Leaf Spot (Heterosporium echinulatum) caused considerable damage to D. barbatus var. Scarlet Beauty at Brentwood and Gordon Head, B.C., in July 1946. It proved injurious and difficult to control on D. Caryophyllus in a greenhouse at Langley in June 1946 (W. Jones).

Bacterial Leaf Spot (Pseudomonas woodsii (E.F. Smith) Stevens) caused moderate damage to D. Caryophyllus in a greenhouse at London, Ont., in February (R.G. Atkinson).

Leaf Spot (?Septoria Dianthi Desm.) occurred on plants at Edmonton, Alta. (A.W. Henry).

DIMORPHOTHECA - Cape Marigold

Yellows (Callistephus virus 1). Three plants were affected at the Laboratory, Fredericton, N.B. (D.J. MacLeod).

ERYTHRONIUM

Blight (Botrytis ?Tulipae) affected a few blossoms of E. grandiflorum, 9 Apr. 1947, at North Saanich, B.C. Isolations yielded a fungus similar in culture to B. Tulipae, and inoculation of tulip gave lesions similar to those of fire. Later the fungus was found also on dying leaves of E. grandiflorum, and finally what appeared to be typical B. Tulipae from tulip was found to be pathogenic to Erythronium in the greenhouse (W. Jones).

Rust (Uromyces heterodermus) was common at North Saanich, B.C. (W. Jones).

ESCHSCHOLZIA

Yellows (Callistephus virus 1) was severe on 3% of the plants of E. californica at the Laboratory, Fredericton, N.B. (D.J. MacLeod).

FREESIA

Mosaic (Phaseolus virus 2). Infection was 95% in 15 flats of Marie in a greenhouse at Toronto, Ont., with severe mottling and stunting, and necrosis of the upper parts of the leaves. Infection was 5% in 15 flats of Red, but symptoms were confined to mottling and slight stunting. No infection was observed in Blue, Golden Giant, Oriole, White and Yellow. The corms had originated from California (C. Copeland, D.B.O. Savile). This disease has recently been shown to be due to the same virus that causes the widespread mild mosaic of gladiolus and the serious yellow mosaic of bean. See P. Brierley and F.F. Smith (Current status of gladiolus virus disease problems. The Gladiolus Magazine 12:38-40, 46. 1948) for discussion of this virus.

GAILLARDIA

Smut (Entyloma Compositarum). A trace to moderate damage was seen in several plantings of G. aristata at or near Ottawa, Ont. (D.B.O. Savile).

Yellows (Callistephus virus 1). A single plant of G. aristata in the Arboretum, Ottawa, Ont., showed what appeared to be current season infection; the earliest heads were normal, later ones slightly stunted, and the latest very abnormal or completely sterile (D.B.O. Savile). A trace was seen at the Laboratory, Fredericton, N.B. (D.J. MacLeod). G. aristata var. Dazzler in a planting at Charlottetown, P.E.I., showed 10% infection with severe injury (V. Clark).

GEUM - Avens

Downy Mildew (Peronospora Gei Syd. ex Gäumann) was general, and caused severe damage to a seed crop of G. chiloense var. Mrs. Bradshaw at Keating, B.C. First report to the Survey. Spores mostly 15-19 x 13-17 microns; in P. Potentillae, to which this form was at first assigned, the spores are mostly 23-30 x 14-21 microns (W. Jones, D.B.O. Savile).

GLADIOLUS

Yellows (Fusarium oxysporum) was definitely present in King of Hearts, and was suspected in Alladin and Chianti, in specimens received from Toronto, Ont., in July. Infection was severe in August in 5 out of 5 corms of Mrs. E. Both, imported from the United States,

but no infection was seen in 500 corms of other varieties in the same garden at Toronto (D.B.O. Savile). Specimens were brought in from four gardens at Charlottetown, P.E.I. (R.R. Hurst).

Scab (Pseudomonas marginata) was heavy in specimens received from Penticton, B.C., in May. It was very heavy in all corms received from Terrace in November, and a number had also been attacked by Penicillium and Botrytis, which had penetrated through the scab lesions. Infected corms of several varieties were received from Foremost, Alta., in November; new land was stated to have been used, but very wet weather in June is believed to have caused rapid spread. Severely infected corms were received from Welland, Ont., in March. Infected plants of Alladin and King of Hearts were received from Toronto in June; the lesions were still visible on the old corms (D.B.O. Savile). Odd infected corms were found in storage in spring at the Botanical Garden, Montreal, Que., and a few plants showed symptoms during the summer. Specimens were received from Quebec with the statement that the disease was very prevalent in a large plantation (J.E. Jacques). Infection was moderate to severe, with secondary Penicillium and Botrytis infection, in corms of several varieties received from Truro, N.S., in December (D.B.O. Savile).

Core Rot (Sclerotinia Draytoni) caused considerable loss in February and March at Hatzic and Brentwood, B.C. (W. Tourneau). Specimens were received from Welland, Ont., in March (D.B.O. Savile).

Dry Rot (Stromatinia Gladioli (Drayton) Whetzel). Slight damage was seen on corms at Victoria, B.C., in December (W. Jones). Diseased Vagabond Prince, received in a shrivelled state from Grand Forks had been attacked by dry rot at least in part. Seventy other varieties were said to be unaffected (D.B.O. Savile).

Hard Rot (Septoria Gladioli) was heavy in corms received from Penticton, B.C., in May (D.B.O. Savile). The corms of one variety were heavily infected at Thorsby, Alta. (M.W. Cormack). A single infected corm of Rosa van Lima was received from Magnetawan, Ont., and unidentified corms were received from Welland in March. Heavily infected corms were received from Amherst, N.S., in Jan. 1948 (D.B.O. Savile). Hard rot infection was 10% in one lot and 50% in a second in May at Charlottetown, P.E.I. (R.R. Hurst).

Bacterial Blight (Xanthomonas gummisudans) was moderately heavy on young plants of three varieties and a trace on others in the Arboretum, Ottawa, Ont. (D.B.O. Savile). In Jan. 1948 corms of White Gold were received from Burlington with ring-shaped lesions, superficially suggestive of white grub injury, surrounding the basal plate where the old corms had made contact. Slight to extensive bacteria-filled gum was present on all lesions (D.B.O. Savile).

Mosaic (Phaseolus virus 2). A markedly mottled plant was received from Lennoxville, Que. See discussion under mosaic of Freesia. It is now apparent that the slight mottle that often nearly uniformly affects certain stocks of some varieties is due to the bean yellow mosaic virus. It may prove to be impossible to secure disease-free stocks of certain varieties. It is important that growers should be warned to segregate all gladiolus plantings from peas, beans, common clover and sweet clover, and in particular to segregate nursery stocks from commercial gladiolus plantings as well as from all legumes (D.B.O. Savile).

GODETIA

Rust (Pucciniastrum Epilobii) caused slight damage to G. grandiflora at Brentwood, B.C., in 1946; first report from B.C. on Godetia (W. Jones). This specimen agrees closely in urediniospore size with specimens on Epilobium sect. Lysimachion from coastal B.C. In view of the finding (P.D.S. 25:106. 1944) that the rust on the latter hosts freely attacks Clarkia, it is probable that it is also a source of inoculum for Godetia (D.B.O. Savile).

GYPSOPHILA

Yellows (Callistephus virus 1). A trace was found in two gardens at Fredericton, N.B. (D.J. MacLeod).

HELENIUM - Sneezeweed

Fasciation (Corynebacterium fascians). A single affected plant of H. autumnale was received from Pointe Claire, Que. (D.B.O. Savile).

Yellows (Callistephus virus 1) severely injured two plants of H. autumnale at the Laboratory, Fredericton, N.B. (D.J. MacLeod).

HELICHRYSUM - Everlasting

Yellows (Callistephus virus 1) was seen on everlasting (?H. bracteatum) in four gardens in York Co., N.B.; infection was 2-7% (D.J. MacLeod). Infection was 6% in a garden at Charlottetown, P.E.I. (G.W. Ayers).

HYACINTHUS - Hyacinth

Yellows (Xanthomonas hyacinthi) was present in a few bulbs bought at a retail store at Vancouver, B.C., in April 1946, probably Dutch imports (W. Jones). Severely stunted plants were received from Windsor, Ont., in Jan. 1948. The disease was said to predominate in a lot of 400 imported bulbs (D.B.O. Savile).

HYDRANGEA

Powdery Mildew (Oidium sp.) was stated to be defoliating a single plant in a house at Almonte, Ont. (D.B.O. Savile). It was general but not severe in the greenhouse at the Botanical Garden, Montreal, Que. (J.E. Jacques).

IRIS

Leaf Spot (Didymellina macrospora) was common and often destructive at North Saanich; the spores were abundant on the lower leaves in May (W. Jones). Specimens were received from Toronto, Ont., with information that it was heavy on 100 plants in a garden (D.B.O. Savile). Specimens were received from Shallow Lake (I.L. Conners). At the Botanical Garden, Montreal, Que., plants in slightly acid soil were severely spotted, whereas no sign of the disease was seen in beds with soil at pH 8.0 (J.E. Jacques). A moderate infection occurred at Kentville, N.S. (D. Creelman). Leaf spot was heavy and caused severe injury in a planting at Charlottetown, P.E.I., and three specimens were brought in for identification (R.R. Hurst).

Bulb Nematode (Ditylenchus dipsaci) was seen in P. de Ridder, grown from Dutch imported bulbs at Victoria, B.C. (R.J. Hastings).

Soft rot (Erwinia carotovora) caused slight damage to several varieties of rhizomatous iris in the Arboretum, Ottawa, Ont.; there was considerable leaf infection aggravated by slug injury; May and June were very wet (D.B.O. Savile). Severe soft rot, following borer attack, developed in a planting at Charlottetown, P.E.I. (R.R. Hurst).

Bacterial Leaf Blight (Bacterium tardicrescens McCull.). Nearly all plants of Mount Royal were more or less affected at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Mosaic (virus) was common in Sierra Blue and El Capitan, but not in 30 other varieties in the same garden at Winnipeg, Man. (T. Johnson). Infection was 80% in a greenhouse planting of Wedgewood at Windsor, Ont., in Feb. 1948 (D.B.O. Savile).

LATHYRUS

White Mould (Ramularia sp.) slightly damaged the lower leaves of L. odoratus at Saanichton, B.C. (W. Jones). H.M. Good (Studies on the Cladosporium blight of sweet pea. Can. J. Res. 25(c): 137-154. 1947) failed to infect L. latifolius and several other leguminous genera. He questions whether Erostrotheca multiformis is the perfect stage of the white mould organism, as he was unable to develop it in culture, and he uses the name Cladosporium album Dowson. Actually it is difficult to see why this organism, a typical Ramularia despite Dowson's claims to the contrary, was ever placed in Cladosporium. Apart from the question of its genetic connection with E. multiformis, C. album does not appear to have been proved to be morphologically distinct from Ramularia Lathyri Hollos (1910) and other species of Ramularia and Ovularia described on Lathyrus. In view of the great variability of many members of this group of fungi such proof is clearly desirable (D.B.O. Savile).

Root Rot (Fusarium sp.). Specimens of L. odoratus were received from North Bay, Ont. (D.B.O. Savile).

Powdery Mildew (Microsphaera diffusa). Infection was a trace to moderate on L. odoratus vars. Amethyst, Fortune, King Lavender, and Sextet Queen, in a garden at Charlottetown, P.E.I. (R.R. Hurst).

Mosaic (Pisum virus 2) attacked a few seed plants of L. odoratus at Saanichton, B.C. (W. Jones). Two plants were infected in a 50 ft. row at Charlottetown, P.E.I. (R.R. Hurst).

Bud Drop (excess nitrogen) was severe in a greenhouse crop of L. odoratus var. Rose Queen near Montreal, Que., in Dec. 1947; the plants were stated to be 12 ft. high (D.B.O. Savile). Traces occurred on Amethyst and King Lavender in a garden at Charlottetown, P.E.I. (R.R. Hurst).

LILIUM - Lily

Nematode Blight (Aphelenchoides ritzema-bosi) caused severe damage to L. longiflorum vars. Croft and White Queen in a greenhouse at Esquimalt, B.C. Experimental transfers from chrysanthemums reproduced the disease, showing that the same form of the nematode attacks both plants. Natural infection of lilies outdoors has not been seen in B.C., but it is important in Washington State (R.J. Hastings).

Blight (Botrytis elliptica) was fairly general, 22 July, at Oyster River, B.C., and was severe on L. speciosum (W. Jones).

Bulb Rot (?Fusarium sp.). A specimen from Beaverlodge, Alta., yielded Fusarium sp. (J.D.G.).

Stump Rot (Phytophthora parasitica Dast.). Severely rotted mature plants of L. regale were received in early June from Ingersoll, Ont., and P.

parasitica was isolated. Infection was stated to be heavy in the bed and in a bed of 200 seedlings of L. regale and L. tenuifolium, but L. candidum and some Creelman lilies were unaffected. The tops of the plants fell over abruptly from when the stems were barely through the ground until they were about a foot high. What was clearly the same disease was received in late May from Port Hope, again in L. regale, but although coenocytic mycelium was present secondary decay made isolation impossible; 12 plants were affected out of several hundred and loss was stated to have been 50% in 1945. This is the first report to the Survey of this disease, but the pathogen may be widely distributed and the trouble is to be expected in exceptionally wet springs (D.B.O. Savile, L.T. Richardson).

Fasciation (Corynebacterium fascians) attacked several plants of L. speciosum at Oyster River, B.C. (W. Jones).

Mosaic (virus). All plants of L. canadense at the Botanical Garden, Montreal, Que., showed typical symptoms early in the season, but flowering was not markedly affected and symptoms later disappeared (J.E. Jacques).

LONICERA - Honeysuckle

Leaf Blight (Glomerularia Lonicerae) was general on an extensive hedge of L. sp. near Montreal, Que. Infection was very heavy on specimens received from St. Eustache (D.B.O. Savile).

Powdery Mildew (Microsphaera Alni) was general and severe in hedges at the Botanical Garden, Montreal, Que. (J.E. Jacques).

LUPINUS - Lupine

Leaf Spot (Ascochyta Pisi var. Lupini) was general on the lower leaves of L. polyphyllus (Russell hybrids) at Pointe Claire, Que. Considerable necrosis had occurred, for most of which the fungus appeared to be responsible. First report from Que. (D.B.O. Savile).

Rust (Uromyces Lupini) occurred on a few plants in a garden at Chilliwack, B.C. in 1946 (W. Jones).

MAHONIA

Rust (Cumminsiella sanguinea) was abundant on a bush of M. aquifolium at Cowichan, B.C., in May 1946 (W. Jones).

Rust (Puccinia Koeleriae) was seen on M. aquifolium at Saanichton, B.C., in July 1946; det. G.B. Cummins; first report to the Survey although previously collected in B.C. on this host (W. Newton).

MATHIOLA - Stock

Yellows (Callistephus virus 1). Four severely affected plants of M. incana were seen at the Station, Fredericton, N.B. (D.J. MacLeod).

NARCISSUS

Dry Rot (Armillaria mellea) affected a few plants of King Alfred at Bradner, B.C., in May 1946 (W. Jones). Recorded from north-western United States and England, usually on recently cleared land, but not previously reported to the Survey.

Fire (Sclerotinia polyblastis) was fairly general on Poetaz at Bradner, B.C., in May (R.J. Hastings).

Leaf Scorch (Stagonospora Curtisii) was seen on Forerunner and and King Alfred at Abbotsford, B.C. Forerunner is very susceptible (R.J. Hastings).

Mosaic (virus) occurred in a few plants of King Alfred at Gordon Head, B.C. (R.J. Hastings). Plants showing leaf distortion and striping were received from Halifax, N.S. (J.F. Hockey).

OXALIS - Wood Sorrel

Rust (Puccinia Oxalidis Dietel & Ellis). Uredinia of this rust were collected, 6 June, by Dr. M.I. Timonin in a commercial greenhouse at Ottawa, Ont., on O. corymbosa DC. (O. Martiana Zucc.). When the greenhouse was visited a few days later it was found that O. corymbosa had completely overrun all sections and that nearly every plant was heavily rusted. O. rubra bore a few pustules but appeared to be quite resistant. Hosts determined by Dr. G.H.M. Lawrence. The natural distribution of the rust is southern United States, Mexico, West Indies and South America. The greenhouse changed ownership in 1945, at which time O. corymbosa, was already well established. Presumably the rust was originally introduced with imported Oxalis plants (I.L. Conners).

PAEONIA - Peony

Blight (Botrytis Paeoniae). Several infected stems were received from Invermere, B.C. (D.B.O. Savile). Blight was severe in gardens at Edmonton, Alta., and in the plots at Olds (J.D.G.). Severely infected plants with the pathogen in fruit were received from Montreal, Que. (D.B.O. Savile). Specimens were received from Ste. Rose with information that the disease was very severe (J.E. Jacques). The late buds were all blighted (?B. cinerea) at Ste. Anne de la Pocatiere (C. Perrault). Blight caused slight damage at Charlottetown, P.E.I. (R.R. Hurst).

Leaf Blotch (Cladosporium Paeoniae). Occasional spots were found at the Botanical Garden, Montreal, Que. (J.E. Jacques). Specimens in good fruit were received from Pointe au Pic, Charlevoix Co. (D.B.O. Savile).

Phytophthora Blight (P. Paeoniae Cooper & Porter) was found at Morin Heights, Argenteuil Co., Que., and the organism was isolated. The symptoms are very similar to those of Botrytis blight (J.E. Jacques). First report to the Survey, but the disease may have passed unnoticed for some time owing to its resemblance to the universally present Botrytis blight.

Leaf Spot (Septoria Paeoniae) was severe on a few plants in the plots at Olds, Alta. (L.E. Tyner).

Mosaic (virus) occurred in one clump at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Ring Spot (virus). Seven plants were infected in a plot at the Station, Fredericton, N.B. They are gradually degenerating (D.J. MacLeod).

PELARGONIUM - Geranium

Grey Mould (Botrytis cinerea). Leaves received from Montreal, Que., in June shewed spotting and red and yellow coloration. B. cinerea fruited on some spots but may not have been the primary cause of the trouble (D.B.O. Savile). An affected plant was brought in at Charlottetown, P.E.I., in March (R.R. Hurst).

Leaf Curl (virus). Infection was 10% in pink varieties in a greenhouse at Aldershot, Ont. Plants were seriously stunted and blossoms were blasted (G.C. Chamberlain). It was heavy in the municipal greenhouses at Verdun, Que., on Salmon procured from a Montreal florist, but was not seen in Radio Red from the same source or in various varieties grown on the premises. Spotting was very pronounced in the specimens received (D.B.O. Savile).

PHLOX

Powdery Mildew (Erysiphe Cichoraceorum) was prevalent at the Botanical Garden, Montreal, Que., and in several private gardens in the district (J.E. Jacques). It was heavy in many clumps in some gardens at Montmagny, but others were free (D.B.O. Savile).

Blight (?virus). Most varieties of P. paniculata at the Botanical Garden, Montreal, Que., are more or less affected (J.E. Jacques). It was severe on 3% of the plants in the border at the station, Fredericton, N.B., and was common in York and Sunbury Co. (D.J. MacLeod).

Yellows (Callistephus virus 1) attacked scattered plants of Frau Anton Buchner and Mia Ruys at the Botanical Garden, Montreal, Que. (J.E. Jacques). Three per cent of the plants at the Station, Fredericton, N.B., were severely affected and yellows was general in York and Sunbury Co. (D.J. MacLeod).

PORTULACA - Purslane

Wilt (Fusarium sp.). Infection was a trace to 10% in seed crops at Grand Forks, B.C. (G.E. Woolliams).

ROSA - Rose

Crown Gall (Agrobacterium tumefaciens) severely damaged two plants of Paul's Scarlet at Charlottetown, P.E.I. (R.R. Hurst).

Leaf Spot (Diplocarpon Rosae) was again heavy and caused premature defoliation in many rose gardens in the Niagara Peninsula, Ont. (G.C. Chamberlain). Heavily infected specimens were received from Ottawa, Ont., and Knowlton, Que. (D.B.O. Savile). Several varieties were infected at the Botanical Garden, Montreal (J.E. Jacques). A lightly infected specimen was brought in at Charlottetown, P.E.I. (R.R. Hurst).

Stem Canker (Leptosphaeria Coniothyrium). Specimens received from a greenhouse at Brampton, Ont., in February had stems completely girdled near the base (R.G. Atkinson). Dying back from pruning stubs was common on several varieties of hybrid teas and hybrid polyanthas at St. Catharines in April (G.C. Chamberlain).

Leaf Spot (Mycosphaerella (Cercospora) rosicola). A light infection occurred at Kentville, N.S. (D. Creelman).

Rust (Phragmidium spp.). P. americanum caused some early defoliation of a bush of Paul Neyron hybrid polyantha at St. Catharines, Ont. (G.C. Chamberlain). A light infection by P. speciosum was seen at Kentville, N.S. (D. Creelman).

Powdery Mildew (Sphaerotheca pannosa). A trace occurred on a few varieties at the Botanical Garden, Montreal, Que. (J.E. Jacques). A moderate infection occurred on a rambler at Kentville, N.S. (D. Creelman). A trace was seen at Charlottetown, P.E.I. (R.R. Hurst).

Mosaic (virus). A single infected plant was seen at Kentville, N.S. (D. Creelman).

SYRINGA - Lilac

Powdery Mildew (Microsphaera Alni). Traces were seen on several trees at the Botanical Garden, Montreal, Que. (J.E. Jacques) and at Charlottetown, P.E.I. (R.R. Hurst).

Blight (Pseudomonas syringae). Specimens were received from Sheridan, Ont., with blighted tips and with small to moderately large cankers on the current and previous years' growth. Damage was severe and several hundred plants were said to be affected (D.B.O. Savile). Several bushes were badly blighted in a garden at Montreal, Que. (J.E. Jacques). It caused moderate damage at Ste. Anne de la Pocatière, where it had not been seen since 1936; apparently the weather favoured its development (A. Payette).

Graft Blight (lilac-privet incompatibility). Three bushes at the Station, Fredericton, N.B., developed severe chlorosis, then wilted and died; the privet stocks remained alive. This trouble has become common wherever privet stock is used in the province. The bush usually dies when 7-10 years old (D.J. MacLeod).

TAGETES - Marigold

Yellows (Callistephus virus 1) affected 17% of T. erecta at the Station, Fredericton, N.B. (D.J. MacLeod).

TULIPA - Tulip

Fire (Botrytis Tulipae). Specimens were received from Shallow Lake, Ont., and Malartic, Que., with reports of heavy damage (D.B.O. Savile). Several varieties were seriously affected at the Botanical Garden, Montreal (J.E. Jacques). Traces were seen in a garden at Charlottetown, P.E.I. (R.R. Hurst).

Shanking (?Phytophthora sp.). A specimen from Baie Comeau, Que., showed typical symptoms and contained coenocytic mycelium, but was too severely overgrown by saprophytes to permit isolation (D.B.O. Savile).

Root Rot (Pythium ultimum) caused considerable stunting and delayed flowering of forced plants in a greenhouse at Langley, B.C. The fungus was isolated and proved pathogenic to potato (W. Jones).

Stem Rot (Sclerotinia sclerotiorum) caused slight damage to William Pitt in a greenhouse at Brentwood, B.C. (R.J. Hastings, J.W. Groves).

Gummosis (physiological). Specimens were received from London, Ont., with the statement that 90% of the bulbs in 2 6-quart baskets of mixed varieties were affected. The bulbs were cured and stored in a cellar. This condition is generally regarded as due to insufficient ventilation in storage; affected bulbs usually grow normally (D.B.O. Savile).

Topple (physiological) affected a few plants growing outdoors at Vancouver, B.C. (W. Jones).

VIOLA

Blossom Blight (Botrytis sp.) was common and caused considerable damage to seed crops of V. tricolor var. hortensis at Oyster River, B.C. (W. Jones).

Leaf Spot (Cercospora Violae) was heavy, as a result of wet weather up to mid July, in a bed of mixed pansies, V. tricolor var. hortensis, at Ottawa, Ont. Many plants were nearly killed in early August when red mite and a sudden drought caused added injury (D.B.O. Savile).

Stem Rot (Myrothecium roridum Tode) killed 10% of Swiss Giant pansies in a seed crop at Elk Lake, B.C. The pathogen was isolated (W. Jones). First report to the Survey. N.C. Preston (Tr. Brit. Mycol. Soc. 26:158-168. 1943) was able to infect Viola with isolates from Dolichos and Hibiscus; the fungus attacks several unrelated genera as well as occurring on various non-living substrates.

Leaf Spot (Ramularia lactea) caused slight damage to pansies at Cobble Hill, Courtenay and Oyster River, B.C. (W. Jones).

ZINNIA

Yellows (Callistephus virus 1) affected 4 plants of Z. elegans in a garden in Sunbury Co., N.B. (D.J. MacLeod).

INDEX OF HOSTS

Achillea 103
Acer 99
Aconitum 103
Aesculus 99
Alfalfa 22
Alnus 99
Althaea 103
Amelanchier 100
Antirrhinum 103
Apple 83
Apricot 87
Aquilegia 103
Arabis 104
Asparagus 40
Aster 104

Barley 11
Bean 40
Beet 43
Beet, Sugar 36
Begonia 104
Berberis 104
Betula 100
Blueberry 96
Boltonia 104
Broccoli 43
Buckwheat 27

Cabbage 44
Calendula 104
Callistephus 104
Campanula 104
Caragana 100
Caraway 44
Carrot 45
Cauliflower 46
Celery 47
Centaurea 105
Centranthus 105
Chamaecyparis 100
Cherry 87
Cherry, Sand 93
Chives 48
Chrysanthemum 105
Clematis 106
Clover, Common 26
Clover, Sweet 25
Convallaria 106
Coreopsis 106
Corn 28
Corn, Sweet 74
Cornus 101
Cosmos 106
Crataegus 101
Crocus 106
Cucumber 48
Currant 93
Cyclamen 106

Dahlia 106
Daphne 106
Delphinium 106
Dianthus 107
Dimorphotheca 107

Eggplant 50
Erythronium 108
Eschscholzia 108

Fig. 97
Flax 28
Fraxinus 101
Freesia 108

Gaillardia 108
Geum 108
Gladiolus 108
Godetia 110
Gooseberry 94
Grape 97

Grasses, Cultivated 37
Gypsophila 110

Helenium 110
Helichrysum 110
Hops 50
Horse Radish 50
Hyacinthus 110
Hydrangea 110

Iris 110

Juglans 101
Juniperus 101

Lathyrus 111
Lettuce 50
Lilium 111
Lonicera 112
Lupinus 112

Mahonia 112
Malus 101
Mangel 33
Mathiola 112
Melon 51
Mustard 34

Narcissus 112

Oats 7
Onion 52
Ostrya 101
Oxalis 113

Paeonia 113
Parsnip 53
Pea 53
Peach 90
Pear 86
Pelargonium 113
Pepper 56
Phlox 114
Plum 92
Populus 101
Portulaca 114
Potato 57

Quercus 101

Raspberry 94
Rhamnus 101
Rhubarb 73
Rosa 114
Rust Nurseries 14
Rusts, Cereal, Physiologic Races 15
Rye 13

Salix 102
Salsify 73
Sorbus 102
Soybean 34
Spinach 73
Squash 73
Strawberry 97
Swiss Chard 74
Sunflower 36
Syringa 114

Tagetes 115
Tobacco 74
Tomato 77
Tulipa 115
Turnip 80

Ulmus 102

Vegetable Marrow 82
Viola 115

Wheat 1

Zinnia 116