FOREWORD

This report presents in addition to the usual annual summary of the plant disease situation in Canada a few photographs and charts to illustrate more fully the conventional text.

Several special contributions are scattered through the report. In the introduction appear "Notes on Some Nematode Problems, 1953" by Dr. A.D. Baker and phenological data compiled by Dr. R.C. Russell and Mr. I.J. Bassett. In the body of the report are published the following contributions: "Rust Nurseries in Canada in 1953" by B. Peturson, G.J. Green, T. Johnson and A.M. Brown; "Physiologic Races of Cereal Rusts in Canada in 1953" by T. Johnson, B. Peturson, G.J. Green and A.M. Brown; "Ergot in Cereals in Western Canada in 1953" by I.L. Conners; "Diseases of Forage Legumes in Eastern Canada" by R.J. Baylis, W.G. Benedict and R.O. Lachance; "Flax Diseases in Manitoba in 1953" by W.E. Sackston; "Flax Diseases in Saskatchewan in 1953" by T.C. Vanterpool; "Diseases of Soybeans in Southwestern Ontario in 1953" by A.A. Hildebrand: "Sunflower Diseases in Manitoba in 1953" by W.E. Sackston and a special report on tobacco diseases by Z. Patrick and L.W. Koch.

No attempt is made here to mention by name the many contributors to the present report. However, I wish to take this opportunity to express my indebtedness to the following non-members of the Division, who have contributed: Mr. S.F. Clarkson and Mr. S.R. Colpitts; Mr. D. Leblond and Mr. J. Ringuet; Frere M. Claude; Prof. C.B. Kelly; Mr. J.H. Phillips; Dr. A.W. Henry; Mr. W. Lobey; Mr. W.R. Foster and Mr. I.C. MacSwan and all District Potato Inspectors. Mr. G.C. Morgan has again contributed notes on diseases of crops other than potatoes found in Newfoundland. Mr. Albert Payette has translated into French the summary "New and Noteworthy Diseases".

The present report is appearing somewhat later than usual partly because other duties have delayed its preparation and partly because I have undertaken to compile the complete report. Dr. D.B.O. Savile, who assisted me in compiling the previous eleven reports, is devoting all his time to mycological research, particularly of the plant rusts and smuts. He has been of great assistance in the search for and identification of parasitic fungi on ornamental plants.

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New and Noteworthy Diseases

Stem rust (Puccinia graminis) was epidemic on wheat in Man. and south-eastern Sask. and was primarily responsible for losses in yield estimated at not less than 25 million bushels. In general, durum wheat was damaged more severely than bread wheat, although formerly the reverse was true. Losses in 1953 were the heaviest experienced in any year since 1935. Of the 5,000,000 acres in wheat in the heavy rust area, yield was reduced 50% on about 1,500,000 acres of late-sown Thatcher, Redman, and Lee and bushel weight was down about 6 pounds. Half of the early sown crop also suffered slight damage. In most localities in the rust area the new variety Selkirk carried only traces of stem rust, but a new rust race 15B-3, known from only two collections was found to attack the variety and its parent McMurachy. However, the predominant race was 15B-1.

Since its discovery in 1952 it has been established that dwarf bunt was present in Ontario in 1947 and is now present in several wheat-growing sections of the province. It is also noted that the causal organism, Tilletia brevifaciens G.W. Fischer is indistinguishable morphologically from T. contraversa Kühn originally described in 1874 on Agropyron repens but also known on other species of Agropyron in Europe.

Streak mosaic (virus) was prevalent in winter wheat areas in southern Alta. and caused severe damage to some fields of both winter and spring wheat. Since the discovery of the mite vector Aceria tulipae the natural spread of streak mosaic has been studied. Volunteer wheat provides the important source of infection of the new crop of winter wheat.

A special survey for ergot in Western Canada revealed that the disease was more prevalent in some crop districts in Alta. and western Sask. than elsewhere in the Prairies. The level of infection was much greater in rye than in wheat and barley and in some districts affected volunteer rye in fields of other cereals probably accounts for much of the ergot appearing in the harvested grain. Inspection records suggested that the amount of ergot in the crop may fluctuate widely from year to year.

Bacterial wilt (Corynebacterium insidiosum) is evidently continuing to spread in alfalfa in Ont. Recent studies on winter crown rot of Alfalfa indicate that the production of hydrogen cyanide by the low temperature basidiomycete under certain conditions causes injury to or death of the crown.

In 1953, in contrast to the two previous seasons, manganese deficiency occurred widely on soybeans on clay soils in Essex County and parts of Kent County in Ont. On the other hand, fungus diseases were of little importance. Stem canker (Diaporthe sp.), which was severe from 1949 to 1951 and moderate in 1952, caused negligible damage although numerous spur and petiole infections occurred earlier in the season. These differences in disease behaviour in 1953, when compared to previous years, are attributed to drought conditions prevailing during the last three weeks of August and the first week of September. Bacterial pustule (Xanthomonas phaseoli var. sojensis), not previously recorded in Canada, was found on soybeans at Ottawa, Ont.

Although bacterial ring rot (Corynebacterium sepedonicum) of potatoes has occurred at one time or another in almost all parts of Canada, its prevalence in

the different provinces varies widely. In P.E.I. where great stress is placed on the production of potatoes for seed, the strictest watch for its occurrence has been maintained, and when the disease is found a sustained effort is made to eliminate all stocks that might have become contaminated by disposing of them at once as table stock combined with a thorough cleaning of premises and implements. As a result, potato stocks in P.E.I. are very rarely infected. Ring rot has also never become established in B.C. Bt 1942, when the disease was first found in the province, the means by which it could be accurately diagnosed and successfully combatted has been worked out. Prompt action then and since against diseased table stock entering the province as well as against its presence in the field has effectively protected B.C. against ring rot. In Alta. and Ont., where ring rot gained considerable foothold before active measures were taken to halt its spread, the disease usually occurs only in trace amounts, but about 10% (Alta.) of the fields are found affected each year. As in these provinces potatoes are grown primarily for local consumption, the annual surveys insure the growers against any real loss, but because traces of ring rot are virtually impossible to detect, it is hardly feasible to undertake its complete eradication. A long growing season favours the detection of the disease and almost invariably fewer cases are found the following year. Except in Nfld., where the disease was first found in 1953, losses from ring rot are probably somewhat higher in the other provinces than in those discussed above, but data on which to base an opinion are meagre.

For the second successive year late blight (Phytophthora infestans) was reported from every province in Canada. The disease was late in developing in B.C., but on account of tuber rot, the losses were the heaviest since 1948. Some tuber rot also occurred in central Alta., eastern Sask. and northeastern Que. Losses were also quite heavy in unsprayed fields in N.S. The epidemic was severe in P.E.I., but the death of the vines was so rapid that tuber rot was negligible. Reduction in yield was placed at 10 bu. per acre in the seed potato crop, or under 300,000 bu. Late blight was quite widespread in tomatoes, but heavy losses were reported only in the occasional field.

Losses from wart (Synchytrium endobioticum) were heavy in Nlfd., weather conditions being ideal for the disease. Sebago continues to be highly resistant. Ascochyta lycopersici Brun. was recently identified as the cause of a leaf spot of potato collected in 1949 at Saanichton, B.C.

Diseases of the aster yellows (virus) type appear to have been usually prevalent, especially in the Prairie Provinces. It was reported on carrots from nearly every province from Alta. eastward, on celery from Ont. and N.B.,on parsnips from Alta. and N.B., on spinach from Alta., on onions from Man., on squash from N.B. and on a wide variety of ornamental plants. Purple top of potatoes was also recorded frequently from Alta. eastward. A disease of this group was reported for the first time on flax in Sask., Man. and Ont. In Sask. and Man., infection ranged from a trace in most fields to 5-25% in a few. Yellows was also recorded on sunflowers for the first time in Man. where it was first noticed in 1952 and was conspicuous in the plots at Winnipeg and Morden in 1953. The same disease also was noticed on rape in Man.

Although pink rot has been repeatedly reported in onions grown on muck soils in Ont., only in the last year was it shown to be essentially a deficiency disease that may be controlled by the addition of manganese to the fertilizer. The organisms associated with the decay appear to be only secondary although each

in turn has been considered the cause of the disease. Bacterial blight (Bacterium stewartii) was present in Essex and Kent counties in Ont., the only previous outbreak in Canada was in 1932 and 1933. It may be noted that Michigan Bay State and Vineland 508 proved resistant to leaf mould (Cladosporium fulvum) in greenhouses around Leamington, Ont., whereas V121, Vulcan, and Michigan Forcing were heavily attracked. Ghost spot caused by Botrytis cinerea was reported on tomatoes for the first time in Canada although the organism is often observed as the cause of a decay. Another new disease of the stem and leaves was bacterial spot (Pseudomonas syringae) on lima beans in Ont.

The epidemic of fire blight (Erwinia amylovora) that developed suddenly in 1948 in pear orchards in the Kootenays and the Creston Valley, B.C., subsided in 1952. Strict orchard control reduced its occurrence to a few cankers in scattered orchards in 1953. A special survey in N.S. failed to reveal its presence in apple and pear trees in that province. Instead, branches in suspected cases proved to be affected by black rot (Physalospora malorum) and European canker (Nectria galligena). The same fungi were also isolated from apple twigs submitted from N.B.

Apple scab (Venturia inaequalis) was unusually prevalent in Canada in 1953. Besides being heavy early in the season in the B.C. interior, losses from pinpoint scab were also substantial. From Ont. eastwards periods of heavy ascospore discharge were frequent at the earliest stages of bud development. There was, however, little development of late scab except in N.S.

Because of the susceptibility of the Washington raspberry to yellow rust (Phragmidium rubi-idaei), spraying for the control of rust on this variety is now recognized as a profitable practice in B.C.

From the number of reports being received particularly from B.C. and Ont., it is becoming increasingly evident that plants showing lack of vigour or pronounced symptoms of disease may be suffering from attack by nematodes.

Although observations on diseases of trees and shrubs are mostly of an incidental nature, there are nearly always a few of interest. New records this year were: Prosthecium innesii (Curr.) Wehm. on Acer pseudoplatanus in N.S.; Phyllosticta gallarum Thuem. on Caragana in Que.; Verticillium dahliae, a common pathogen, on Lonicera morrowi in Ont. and Taphrina populi-salicis Mix on Populus trichocarpa in B.C. Phleospora ulmi was also severe on Ulmus americana in N.S. Field observations in the B.C. interior indicated that Larix occidentalis and Salix bebbiana are affected by Melampsora epitea (M. bigelowii) wherever the two hosts grew in association. Field observations in the same area confirmed the experimental evidence of W.G.Ziller (shortly to be published) that the Melampsora occidentalis on Populus trichocarpa and M. albertensis on P. tremuloides have aecial states on Pseudotsuga.

Diseases on ornamental plants worthy of mention are: Bacterial leaf spot (Xanthomonas dieffenbachiae) on Dieffenbachia in Ont., root knot (Meloidogyne sp.) on Scindapsus in Ont., boron deficiency disease in gloxinia (Sinningia) in P.E.I., leaf spot (Alternaria raphani) on Mathiola in Que. and decline (Pratylenchus penetrans) in narcissus and tulip in B.C., all of which appear to be new. Rust (Puccinia chrysanthemi), said to be common in the United States, was found for only the second time in Ont. Both powdery mildew (?Erysiphe cichoracearum on tuberous begonia and blight (Alternaria zinniae) appear to be spreading rapidly in one or more provinces.

Maladies Nouvelles ou d'Importance*

La rouille de la tige (Puccinia graminis) a sévi à l'état épidémique sur le blé au Manitoba et dans le sud-ouest de la Saskatchewan et a été la grande responsable d'une diminution de rendement estimée à au moins 25 millions de boisseaux. En général, le blé dur a été plus gravement endommagé que ne l'a été le blé panifiable, bien que ce fût autrefois l'inverse. Les pertes ont été plus élevées en 1953 qu'en toute autre année depuis 1935. Dans la région où la rouille a le plus sévi, région qui avait une emblavure de 5 millions d'acres, il y eut une diminution de rendement de 50 p. 100 dans à peu près 1,500,000 acres de Thatcher, Redman et Lee semés tard, et le poids du boisseau a diminué de près de 6 livres. Il y eut aussi de légères pertes dans la moitié des emblavures précoces. Dans la plupart des localités de la région où la rouille a sévi, la nouvelle variété Selkirk n'avait que des traces de la rouille de la tige, mais une nouvelle race de rouille, la race 15B-3, connue par deux collections seulement, a pu attaquer cette variété et sa parente McMurachy. Toutefois, la race prédominante était la race 15B-1.

Depuis sa découverte en 1952, on a établi que la carie naine était présente en Ontario en 1947 et qu'elle se trouve maintenant dans nombre de secteurs de cette province où se cultive le blé. On fait également remarquer que l'organisme pathogène, Tilletia brevifaciens G.W. Fischer, ne se distingue pas morphologiquement de T. contraversa Kuhn originairement décrit en 1874 sur l'Agropyron repens, mais aussi connu sur d'autres espèces d'Agropyron en Europe.

La mosaique striée (virus) prédominait dans les régions à blé d'hiver du sud de l'Alberta et a causé de lourdes pertes dans certains champs de blé d'hiver et de printemps. Depuis la découverte de la mite virufère Aceria tulipae, on a étudié la dissémination naturelle de la mosaique striée. Le blé spontané constitue le foyer de contamination important de la nouvelle culture de blé d'hiver.

Une enquête spéciale sur l'ergot dans l'Ouest canadien a révélé que la maladie prédomine dans certaines régions agricoles de l'Alberta et de l'ouest de la Saskatchewan plus que dans les autres régions des provinces des Prairies. Le taux d'infection était beaucoup plus élevé chez le seigle que chez le blé et l'orge; dans certaines régions, le seigle infecté venant à l'état spontané dans des champs d'autres céréales compte probablement pour beaucoup dans l'incidence de l'ergot chez les grains récoltés. Les rapports d'inspection portent à croire que la proportion d'ergot dans les cultures peut varier considérablement d'une année à l'autre.

Il est évident que la flétrissure bactérienne (Corynebacterium insidiosum) continue de se répandre dans la luzerne, en Ontario. Des études récentes sur la pourriture hivernale de la couronne de la luzerne indiquent que le cyanure d'hydrogène produit dans certaines conditions par le basidiomycète de basse temperature endommage la couronne et peut la faire mourir.

En 1953, par contraste avec les deux campagnes agricoles précédentes, la carence de manganèse était répandue ches les fèves soja en sols argileux dans le comté d'Essex et certaines parties du comté de Kent, en Ontario. Par ailleurs, les mycoses étaient de peu d'importance. Le chancre de la tige (Diaporthe sp.), qui avait été grave de 1949 à 1951, et modéré en 1952, n'a pas fait de dommages

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appréciables, bien qu'il y ait eu de nombreuses lésions sur les dards et les pétioles plus tôt dans la saison. On a attribué à la sécheresse persistante des trois dernières semaines d'août et de la première semaine de septembre ce comportement différent de la maladie par rapport aux années précédentes. Sur la fève soja, à Ottawa (Ont.), on a trouvé, pour la première fois au Canada, des pustules bactériennes causées par Xanthomonas phaseoli var. sojensis.

Bien que la flétrissure bactérienne ou pourriture du cerne (Corynebacterium sepedonicum de la pomme de terre se soit manifestée à diverses périodes dans presque toutes les parties du Canada, sa prédominance dans les diverses provinces varie considérablement. Dans l'Ile du Prince-Edouard, où il se produit surtout des pommes de terre de semence, on continue à surveiller la maladie de très près et, dès qu'on l'aperçoit, on s'applique à éliminer tous les stocks soupçonnés de contamination en disposant promptement comme stocks de table, sans négliger de nettoyer à fond les locaux et l'outillage. Comme résultat, on trouve rarement de l'infection dans les stocks de pommes de terre de l'Ile du Prince-Edouard. De même, la flétrissure ne s'est jamais installée en Colombie-Britannique. Vers 1942, quand on a trouvé la maladie pour la première fois dans cette province, on s'est immédiatement appliqué à la diagnostiquer méticuleusement et à la combattre jusqu'au bout. Depuis cette date, l'empressement à empêcher les stocks de table contaminés d'entrer dans la province aussi bien que la diligence dans l'extermination de la maladie dans le champ ont efficacement protégé la Colombie-Britannique contre la pourriture du cerne. Dans l'Alberta et l'Ontario, où la flétrissure avait gagné beaucoup de terrain avant qu'on eut pris les mesures nécessaires pour l'enrayer, la maladie ne se présente généralement qu'à l'état de traces, mais on trouve à peu près 10 p. 100 (Alberta) des champs contaminés chaque année. Comme dans ces provinces, on cultive la pomme de terre principalement pour la consommation locale, les enquêtes annuelles visent à préserver les producteurs de toute perte sérieuse, mais vu la quasi-impossibilité de dépister des traces de flétrissure, on ne peut guère envisager la possibilité de l'enrayer complètement. Une longue saison de végétation facilite le dépistage de la maladie, ce qui fait que moins de cas se présentent presque invariablement l'année suivante. Excepté dans Terre-Neuve, où l'on a trouvé la maladie pour la première fois en 1953, les pertes dues à la flétrissure sont probablement quelque peu plus élevées dans les autres provinces que dans celles dont il a été question ci-dessus, mais les données sont maigres pour se faire une opinion fondée.

Pour la seconde année consécutive, on a signalé le mildiou (Phytophthora infestans) dans chaque province du Canada. La maladie s'est développée de façon "tardive" en Colombie-Britannique, mais en raison de la pourriture des tubercules, les pertes ont été les plus élevées depuis 1948. Il y eut aussi quelque pourriture des tubercules dans le centre de l'Alberta, l'est de la Saskatchewan et le nord-est de Québec. Dans les champs non arrosés de la Nouvelle-Ecosse, les pertes ont aussi été très lourdes. L'épidémie a été grave dans l'Ile du Prince-Edouard, mais les fanes ont péri si vite qu'il n'y eut pas de pourriture appréciable des tubercules. On a estimé à 10 boisseaux à l'acre la diminution de rendement dans la récolte de pomme de terre de semence, soit moins de 300,000 boisseaux. Le mildiou était très répandu sur la tomate, mais on n'a signalé de lourdes pertes que dans les champs isolés.

Grâce à des conditions climatiques tout à fait favorables, la galle verruqueuse (Synchytrium endobioticum) a causé de lourdes pertes dans Terre-Neuve. La Sebago continue de manifester beaucoup de résistance. On a déterminé,

récemment, qu'Ascochyta lycopersici Brun. a été la cause d'une tache des feuilles de la pomme de terre, dont on avait récolté, en 1949, un spécimen à Saanichton (C.-B.).

Les maladies du type de la jaunisse de l'aster (virus) ont paru se généraliser, surtout dans les provinces des Prairies. On en a signalé sur la carotte, dans presque chaque province, depuis l'Alberta, vers l'est; sur le céleri, dans l'Ontario et le Nouveau-Brunswick; sur le panais dans l'Alberta et le Nouveau-Brunswick; sur l'épinard, en Alberta; sur l'oignon au Manitoba; sur la courge, au Nouveau-Brunswick, ainsi que sur une forte proportion de plantes ornementales diverses. On a aussi signalé fréquemment, depuis l'Alberta vers l'est, la "purpurescence" (purple top) de la pomme de terre. On a noté pour la première fois la présence, sur le lin, d'une maladie du même groupe, en Saskatchewan, au Manitoba et en Ontario. En Saskatchewan et au Manitoba, l'infection variait de l'ordre de traces, dans la plupart des champs, à 5-25 p. 100 dans quelques-uns. On a, de plus, au Manitoba, mentionné la présence d'une jaunisse sur le tournesol, maladie qu'on avait d'abord aperçue en 1952 et qu'il a été facile d'observer en 1953 dans les parcelles de Winnipeg et de Morden. On a aussi constaté la présence, au Manitoba, d'une maladie similaire sur la navette.

Bien qu'on ait à maintes reprises signalé la présence, chez les oignons, de la pourriture rose dans les terres noires d'Ontario, ce n'est que l'an dernier qu'on a démontré que cette maladie n'est autre chose qu'une carence de manganèse et qu'on peut y remédier par l'addition de manganèse aux engrais chimiques. Il appert que les organismes associés à cette pourriture ne sont que secondaires, bien qu'on les ait considérés tour à tour responsables de la maladie. La brûlure bactérienne (Bacterium stewartii) s'est présentée dans les comtés d'Essex et de Kent (Ontario); auparavant, on n'avait noté qu'un cas au Canada, en 1932 et 1933. Il est à noter que les variétés Michigan Bay State et Vineland 508 se sont montrées résistantes à la moisissure des feuilles (Cladosporium fulvum) en serre, près de Leamington (Ont.), alors que les variétés V121, Vulcan et Michigan Forcing ont été gravement attaquées. La tache spectrale causée par Botrytis cinerea a été signalée pour la première fois au Canada sur les tomates, bien qu'il soit souvent question de cet organisme comme agent de pourriture. Une autre maladie nouvelle de la tige et des feuilles a été la tache bactérienne (Pseudomonas syringae) sur les fèves lima en Ontario.

L'épidémie de brûlure bactérienne (Erwinia amylovora) qui, en 1948, s'était abattue soudainement sur les vergers de poiriers dans les "Kootenays" et la vallée Creston, en C.-B., a lâché prise en 1953. Des mesures de protection rigides ont limité ses méfaits à quelques chancres dans de rares vergers isolés en 1953. En Nouvelle-Ecosse, une enquête spéciale n'a pas permis de trouver cette maladie sur les poiriers ni sur les pommiers de cette province. Par contre, dans les cas douteux, on a trouvé que les branches étaient atteintes de pourriture noire (Physalospora malorum) ou de chancre européen (Nectria galligena). De plus, on a isolé les mêmes champignons de rameaux de pommiers en provenance du Nouveau-Brunswick.

La tavelure du pommier (Venturia inaequalis) a été exceptionnellement répandue au Canada en 1953. Dans l'intérieur de la Colombie-Britannique, elle abondait de bonne heure dans la saison, et, par surcroît, il y eut des pertes substantielles causées par des infections tardives de la tavelure. Depuis l'Ontario vers l'est, les périodes de libération dense d'ascospores ont été fréquentes dès les premiers stades de développement des bourgeons. Il y eut,

toutefois, peu d'évolution de la maladie à sa phase tardive, excepté en Nouvelle-Ecosse.

En raison de la sensibilité de la framboise Washington à la rouille orangée (Phragmidium rubi-idaei), on reconnait maintenant, en Colombie-Britannique, que l'arrosage de cette variété contre cette rouille est une mesure profitable.

Il ressort du nombre de rapports reçus, surtout en provenance de la Colombie-Britannique et de l'Ontario, que les nématodes peuvent être responsables du manque de vigueur des plantes et de leur apparence nettement maladive.

Bien que les observations sur les maladies des arbres et des arbustes soient le plus souvent occasionelles, il s'en présente presque toujours quelques-unes d'intéressantes. Nouvelles constatations cette année: Prosthecium innesii (Curr.) Wehm. sur l'Acer pseudoplatanus, en Nouvelle-Ecosse; Phyllosticta gallarum Thuem. sur le caragana, dans le Québec; Verticillium dahliae, organisme pathogène commun, sur le Lonicera morrowi, en Ontario et Taphrina populi-salicis Mix sur le Populus trichocarpa en Colombie-Britannique. Le Phleospora ulmi a également été grave sur l'Ulmus americana, en Nouvelle-Ecosse. Les observations sur les lieux à l'intérieur de la Colombie-Britannique ont indiqué que le Larix occidentalis et le Salix bebbiana sont atteints du Melampsora epitea (M. bigelowii) là où les deux hôtes poussaient en association. Des observations semblables dans la même région ont confirmé les résultats des expériences faites par M. W.G. Ziller (qui seront publiés prochainement) à l'effet que le Melampsora occidentalis sur le Populus trichocarpa et le M. albertensis sur le Populus tremuloides ont des stades écidiens sur le Pseudotsuga.

Les maladies des plantes d'ornement, dignes de mention sont: La tache bactérienne de la feuille (Xanthomonas dieffenbachiae) sur le Dieffenbachia, en Ontario; le nodule de la racine (Meloidogyne sp.) sur le Scindapsus, en Ontario; une déficience de bore chez le gloxinia (Sinningia) dans l'Ile du Prince-Edouard; la tache de la feuille (Alternaria raphani) sur le Mathiola dans le Québec et le "déclin" (Pratylenchus penetrans) sur les narcisses et les tulipes, en Colombie-Britannique: il s'agit là apparemment de nouveaux cas. La rouille (Puccinia chrysanthemi), qui est commune, dit-on, aux Etats-Unis, n'a été trouvée que pour la deuxième fois en Ontario. Le blanc (?Erysiphe cichoracearum) sur le bégonia tubéreux, et la brûlure (Alternaria zinniae) semblent se propager rapidement dans une ou plusieurs provinces.

The Weather and its Influence on Disease

The winter on Vancouver Island, B.C., was noticeably mild and wet, the precipitation in January being the highest on record. Also the average number of hours of sunshine was lower than usual throughout the 1953 season. During the mild wet winter there was considerable systemic downy mildew infection in alfalfa and Phytophthora basal rot in overwintered cabbage, turnip and wallflower about Saanichton. Tulip fire was more general than usual as a result of showery, dull weather in the spring. A moderate epidemic of late blight developed in mid-August in the Comox district, where dry weather kept the disease in check in the previous three years. The season was also favourable for other diseases such as apple scab. On the other hand, soil moisture was ample as indicated by the virtual absence of drought necrosis in the potato crop (W. Jones).

On the lower mainland, the winter was unusually mild and there was no winter injury to small fruits. The spring was early but April was very dull and wet. A sharp frost on 30 May discoloured the flesh of the fruit of the high bush blueberries on Lulu Island, but the fruit outgrew the injury and the loss was slight. Rainfall during the summer was above normal and late blight of potato was more prevalent than in the last few years (H.N.W. Toms).

In the Kootenays, the winter was unusually mild. The ascopores of the apple scab fungus were fully mature before the apple buds opened; even the pre-pink spray was often too late to prevent early infection. Dry sunny weather prevailed in March and early April followed by abnormally wet weather until June. In consequence peach leaf curl was severe and Coryneum blight, cherry leaf spot, blossom blight, brown rot and apple scab were prevalent. The summer and autumn were dry except a prolonged wet period in mid-September (M.F. Welsh).

In Alberta rainfall was above average until mid-August. Moisture was so abundant in the Calgary area that spring planting was delayed and as a result crops were late. Leaf diseases were unusually severe particularly in heavy crops of barley. A 5-inch rain on 31 July-1 August in the Edmonton area caused severe flooding of fields. Many plantings of potatoes rotted in the ground and large areas of cereal crops were drowned out. Warm nights and high humidity favoured late blight, which caused considerable damage about Edmonton. Cooler weather beginning 13 September checked its further advance. The high incidence of ergot in cereals and grasses appears to be associated in part with high rainfall over the last 3 years in central Alberta (W.P. Campbell).

At Saskatoon, Sask., the rainfall from May to September was about normal, but the crops were benefited more than usual by the moisture because evaporation was low and during the first half of the season the temperature and the amount of sunshine were less than usual. As a result yields of all crops were remarkably good (T.C. Vanterpool).

The season was late in most areas of Saskatchewan. Except for a few days early in May temperature was below normal until after mid-July. Rainfall was above normal in all parts of the province and was so abundant in parts of southern and eastern Sask. that seeding was delayed appreciably. However, in the western areas rainfall was below normal and germination was delayed. Late in June heavy rains in south and east central Sask. flooded and destroyed many crops. Cool weather in late June and early July delayed the development of stem rust, which

eventually caused considerable damage in the south-east corner of the province. Lack of moisture and some short periods of high temperature in the western areas favoured the development of common root rot. Considerable blasting of heads of wheat also occurred following a short heat wave in late July. The crop matured slowly but in good condition and was harvested during almost perfect fall weather (H.W. Mead).

Development of cereal rusts in the Prairie Provinces, in 1953, was greatly favoured by the weather conditions which prevailed during the growing season. The spring and summer precipitation was much above normal throughout the agricultural areas of Manitoba and eastern Saskatchewan. Most districts in the above mentioned region also received excessive amounts of rainfall. Both high precipitation and heavy dews, which occurred practically every night during the whole of the growing season including the moderately dry month of August, provided conditions extremely favourable for the germination of rust spores. Temperatures were also quite favourable for rust development. They were almost exactly normal for May, June, and July, and about 4°F. above normal for August over most of the Prairie Provinces. Evidence of the favourable influence of the high rainfall on rust development in the Prairie Provinces is indicated by the fact that the area of severe rust infection coincided almost exactly with the area that received precipitation in excess of 4 inches for each of the months of June and July (B. Peturson).

The unusually hot and dry conditions experienced in the vegetable growing areas in the southern part of Essex Co., Ontario, from June to October reduced the incidence of certain vegetable diseases and favoured others. Septoria leaf spot caused negligible damage in all fields of tomatoes except some irrigated early crops. On the contrary, sunscald and blossom-end rot of tomato and pepper were worse than usual. Powdery mildew was severe on cucumbers and muskmelons. Etch virus in tobacco and pepper crops was much less prevalent than in the last 2 or 3 years. Its low incidence may have resulted from the absence of succulent growth in these crops, a condition unfavourable to vector (aphid) feeding (C.D. McKeen).

Showery cool weather in April interfered with timely and thorough application of the dormant peach spray in many orchards in the Niagara Peninsula. As a result peach leaf curl was often epidemic particularly in orchards not sprayed by 15-16 April. Excellent control was obtained in orchards where the dormant spray was applied in the fall of 1952. Rainfall in May totalled 5.74 inches, a 25-year record at St. Catharines. Moreover, there were several prolonged wet periods during which numerous apple scab infections occurred. The first scab spots began to appear on 15 May when the trees were in full bloom. Rainy periods in late May and again in June permitted the disease to become very prevalent and severe by the end of June. Hot dry weather checked further development during mid-summer. However, late in the season new infections appeared on the terminal growth and pin-point scab showed on the fruit at harvest. Downy mildew of grapes developed rapidly in mid-August, during a spell of unusually warm damp weather. Hail caused injury to grapes and fruit trees on 21 May and sour cherries were bruised on 1 July, permitting brown rot to develop. The fall was featured by good weather. Many growers applied the dormant spray for peach leaf curl in the fall this year (G.C. Chamberlain).

At Ottawa, the winter was mild and with light snow cover. Temperatures were far above average in January, February and March, and slightly so in April.

Sunshine was above average in February, but far below in January, March and April. The snow disappeared quickly in March. From May onward growing conditions were generally good with temperatures at or slightly above average, and adequate moisture except for mid-July and late August. September and early October were unusually wet, favouring late blight of potato, Colletotrichum phomoides on late tomato fruits, and pin-point apple scab. However, the last three weeks of October were warm and dry, providing good conditions for late harvesting. November and December were exceptionally mild, but December was wet. Dandelions produced flowers and seeds sporadically until mid-December. Light snowfalls in late December left the ground covered at the year's end (D.B.O. Savile).

Weather conditions in southwestern Quebec were generally favourable for diseases that develop early in the season as the spring was wet and several long rains occurred in April, May, and June. On the other hand, long dry hot spells in August and September were unfavourable to disease development except for the powdery mildews, which were prevalent on cultivated and wild plants (L. Cinq-Mars).

The 1953 growing season was particularly dry in eastern Quebec. Snow disappeared rapidly and no serious frost injury occurred. Vegetative growth began early. May was cool and the latter half of the month was also dry. The Gymnosporangium rusts were conspicuous on native Juniperus as was blister rust on white pine. Other plant diseases were negligible. Despite the hot dry weather in June aecia were abundant on the common barberry and the European buckthorn. Crops such as strawberries and raspberries suffered greatly from drought as July was hot and dry. A few light rains fell in August, and it was not until the end of September that there was sufficient moisture for late blight to become active on potatoes to cause some tuber rot in the harvested crop. October and November were mild. On 9 Dec. snow covered the unfrozen ground at Ste. Anne de la Pocatiere (A. Payette).

At Fredericton, N.B., January, February and March were exceptionally mild, the mean temperature for January was a record high of 23.2°F. and that for February was a near record. Most of the precipitation was in the form of rain. In consequence, snow coverage was very light and frost penetrated deeply into the ground and many plants suffered severe winter or spring injury. Most of the clover was killed off over the entire province. Temperature and rainfall were above average in April. A week of fine weather beginning 10 May allowed considerable planting. A severe drying wind storm over eastern N.B. caused severe damage, particularly on the windward side, to the half-opened buds of trees and shrubs. A poor set of apple fruits occurred in many localities apparently as a result of poor weather during pollination. Over 7 inches of rain fell in July resulting in enhanced growth of grasslands but strawberry root rot caused severe losses in many plantings. August was fairly dry. September and October were fine months providing excellent harvest conditions. Some frost damage occurred in the potato crop in Victoria Co. November was mild with abundant rain. A light blanket of snow covered the frost-free ground the third week of December. Apple scab spore discharge occurred first on 14 May with additional infection periods in the last two weeks of May and the second week of June (J.L. Howatt).

In N.S. a very open winter with little snow cover was followed by an early development of vegetation in the spring of 1953. Temperature and rainfall were slightly above normal. Rainy periods were favourable for apple scab, tulip fire, peony blight, and lily blight, and wet weather in August and September favoured outbreaks of late blight and powdery mildew and black spot of roses as

well as late infections of apple scab. The summer was known locally as "wet and cool" in spite of average rainfall and nearly normal mean temperatures. The hurricane "Carol" was more destructive to crops mechanically than in providing conditions favourable to pathogenic organisms. The autumn was open, but most trees were fully dormant before the frosts in November with the exception of some apple orchards in which the foliage was frozen on the trees (J.F. Hockey).

At Charlottetown, P.E.I. mean temperatures were above normal for the first four months of 1953. Little or no injury to overwintering crops or ornamentals occurred despite the frequent lack of snow cover. Snow on 13 March covered the ground to the depth of 5 inches but had disappeared by 23 March. Although growth made an unusually early start it received a setback early in May. On 3 May six degrees of frost were recorded at Charlottetown; it caused slight injury to the foliage of some maple and horsechesnut trees.

Because of the unusually dull, wet weather that prevailed throughout the growing season, several plant diseases caused more than the normal amount of damage. Apple scab was severe in all orchards, both on foliage and fruit. Black leg was general in potato fields. A severe epidemic of late blight developed on the potato foliage, but the disease did not cause as much tuber rot as expected on account of the rapid death of the vines in unsprayed and poorly sprayed fields. In the few areas where club root is a problem, fields of Laurentian swedes were completely destroyed. Verticillium wilt, which normally takes its toll in certain potato varieties, did not present as serious a problem as usual. Good growth was maintained throughout the season and pastures, in particular, provided excellent herbage (J.E. Campbell).

The early part of the winter was mild in eastern Newfoundland. Some snow fell in January, but rain on 17 days in the month quickly melted the snow. March was the coldest month of the year with a mean temperature of 26.2°F. and a low of 7.5°F. As a result of the low temperatures, winter killing was severe in clover, orchard grass, strawberries, lilac and birch trees. From December to April a total of 70.3 inches of snow and 19.52 inches of rain were recorded. Rain and snow fell on 25 days in April. May was cool with rainfall slightly above average. June was relatively warm with rainfall below average. Frequent showers during the late summer and autumn favoured late blight development, but a frost in early August caused some damage to the vines and seemed to check its further spread. The weather was warm into October but frosts on 1, 21 and 22 October caused defoliation of potato plants and some injury to the tubers (G.C. Morgan).

Notes on Some Nematode Problems, 1953

A.B. Baker

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The golden nematode, Heterodera rostochiensis (Wollenweber, 1923) Franklin, 1940, has not yet been found in Canada and considerable attention has been given to measures aimed at preventing its introduction. It has been recorded from the northern part of Mexico. Some interest has been focused on what appeared to be very similar forms that have been encountered elsewhere, but these have since been found to be distinct species. One of these forms was found

attacking tobacco in Connecticut and it has now been named Heterodera tabacum Lownsbery & Lownsbery, 1954. Distinct taxonomic characters have been recorded for this species and it does not attack the potato, and attempts to rear the golden nematode on tobacco have been unsuccessful. Another species of this group is Heterodera leptonepia Cobb & Taylor, 1953, which was intercepted by officers of the U.S.D.A. from soil with small potatoes, presumably grown in Peru. These three species, as well as the wheat nematode, Heterodera punctata Thorne, 1928, have a cyst with a rounded posterior. This is in contrast to the lemon-shaped cysts of the majority of the species belonging to this genus.

The sugar-beet nematode, Heterodera schachtii Schmidt, 1871, has shown no sign of spread in Canada beyond the areas previously reported. Experimental work on this pest is being continued at Sarnia and some of the new information being obtained on control will have indirect value in attempting to deal with new infestations of other species of this genus that may occur. Side-row applications of fumigants proved ineffective. Other fumigation methods may greatly reduce the nematode populations, but crop rotation is the more economical means of control.

The oat nematode, Heterodera avenae Lind, Rostrup, and Ravn, 1913, continued to present an important problem in Ontario. Crop rotation is of considerable value in reducing the populations. However, as corn has been reported as a host of this species, this fact must now be taken into consideration in planning the rotations.

The situation in regard to other species of Heterodera reported previously in Canada remains about the same. It is of some interest that Heterodera cruciferae Franklin, 1945, has been reported from the United States.

The root-lesion nematodes of the genus Pratylenchus show increasing evidence of being important crop pests in Canada as well as in other countries. Our findings to date indicate that there are at least four or five of these species present in this country. Pratylenchus penetrans Cobb, 1917, has been the species most frequently encountered and Pratylenchus pratensis (deMan, 1880), is not uncommon. All the nematodes of this genus are very small and may be easily overlooked by anyone not well acquainted with them. Accurate determination of the species involved is sometimes difficult, and the difficulty is not lessened by the fact that in most cases host preferences are not at all sharply defined. In addition, there is some evidence of the presence of some undescribed species.

The reported occurrence of the potato-rot nematode, Ditylenchus destructor Thorne, 1945, in Wisconsin has tended to focus renewed attention on this pest. On the other hand, apprehension of this species has declined to some degree as our knowledge of the pest has increased. For example, it is now recognized that potato cropping greatly reduces the populations. Meanwhile there are some important questions to which we do not yet have clear answers. The range of characters in the populations in potato varies to a rather remarkable degree. Some of these variations extend beyond the limits indicated for D. destructor. One possible explanation is that a complex of species may exist. Another is that the range of characters of this species may be much greater than the original description indicated. If only one species is involved, the original description will have to be considerably amended. To name and describe the forms differing most widely from destructor as new apecies would not be

sufficient or very helpful until these forms have been isolated and propagated. To do this it is necessary to build up populations from single females. This type of work is being pursued at the Ottawa Laboratory, and has been greatly helped by our finding that these nematodes are fungus feeders. (Baker, A.D., Georgiana L. Brown and Audrey B. James. Science 119:92-93. 1954). Isolation, propagation, and study is a rather lengthy undertaking, and, though the species question is not yet clear, preliminary observations indicate that at least some of the taxonomic characters used to separate destructor from dipsaci fluctuate widely within pure populations. An answer to this important problem is necessary before final conclusions are made on mass transfers of these nematodes from one plant to another. However, until we have clear evidence to the contrary, it appears expedient to assume tentatively that only one species is involved, but such reporting should be adequately qualified until clear answers have been obtained.

A root-knot nematode, Meloidogyne hapla Chitwood, 1949, was identified from sugar beets near Sarnia, Ont., by Miss G.L. Brown. It was also collected from the roots of tomato at Ste. Genevieve, Que. Further records of root-knot nematodes are reported in The Canadian Insect Pest Review 31(7).

Three items of some additional interest were the collection and identification by Dr. S.A. Sher of Tylenchorhynchus claytoni Steiner, 1937, from soil around red clover at Ottawa, of Pratylenchus sp. from chrysanthemum at St. Catharines, Ont., and of Trichodorus sp. from soil around red clover at Ottawa. Anguina agrostis (Steinbuch, 1799) Filipjev, 1946, was reported by V.E. Henderson from Prince Edward Island attacking Agrostis alba L.

Phenological Data - 1953

The season opened somewhat earlier than usual at Winnipeg but cool weather in mid-May retarded growth and from then on to the end of June the plants observed came into flower a little later than usual. Wheat sown moderately early developed slowly during the latter part of the season and ripened quite late.

At Saskatoon the season opened rather late and the development of native plants and of wheat was somewhat retarded throughout the season.

Recorded dates of flowering at Edmonton fluctuated from early to late during the season and wheat sown nearly a week late was ripe slightly earlier than the normal date for maturity (R.C. Russell).

Throughout the spring and summer the first flowering dates for the majority of plants recorded at Ottawa were from 4 to 11 days earlier than average. Anthesis dates were as follows:

Acer saccharinum	30/3	11E	Bromus inermis	17/6	2E
Populus tremuloides	5/4	10E	Sambucus nigra	13/6	4E
Ulmus americana	13/4	6E	Rhus typhina	18/6	6E
Acer negundo	30/4	1L	Catalpa speciosa	6/7	7L
Acer saccharum	5/5	4E	Phleum pratense	23/6	2E
Prunus pensylvanica	10/5	3E	Tilia americana	6/7	N
Smilacina stellata	15/5	5E	Cephalanthus occidentalis	12/7	5E
Pinus sylvestris	21/5	7E	Solidago canadensis	5/8	4L
Anemone canadensis	27/5	6E	Cassia hebecarpa	27/7	6E
Carya cordiformis	10/6	3E	Hamamelis virginiana	4/9	19E

(I.J. Bassett)

Summary of Phenological Data

Taken at Winnipeg, Saskatoon, and Edmonton in 1953

Species	Winnipeg		Saskatoon		Edmonton	
Corylus rostrata	--	--	--	--	27/4	6L
Shepherdia canadensis	--	--	--	--	4/5	?
Pulsatilla ludoviciana	--	--	20/4	2L	6/5	14L
Populus tremuloides	--	--	23/4	1L	4/5	9L
Phlox hoodii	--	--	5/5	8L	--	--
Salix petiolaris	--	--	9/5	6L	5/5	5L
Acer negundo	5/5	1E	9/5	3L	7/5	5L
Betula papyrifera	--	--	14/5	5L	8/5	N
Thermopsis rhombifolia	--	--	15/5	5L	--	--
Amelanchier alnifolia	11/5	5E	21/5	8L	21/5	6L
Prunus americana	7/5	6E	--	--	--	--
Hierochloe odorato	--	--	26/5	9L	--	--
Prunus pensylvanica	--	--	26/5	8L	19/5	2L
Viola rugulosa	--	--	24/5	3L	25/5	4L
Smilacina stellata	--	--	4/6	12L	25/5	2E
Crataegus sp.	25/5	3L	2/6	6L	30/5	N
Prunus melanocarpa	29/5	6L	5/6	10L	1/6	5L
Viburnum lentago	8/6	6L	--	--	--	--
Cornus stolonifera	3/6	5L	5/6	7L	10/6	9L
Elaeagnus commutata	--	--	11/6	8L	3/6	1E
Lonicera glaucescens	--	--	14/6	7L	4/6	3E
Thalictrum turneri	--	--	--	--	8/6	6L
Viburnum trilobum	8/6	N	--	--	--	--
Viburnum pubescens	12/6	3L	--	--	--	--
Anemone canadensis	8/6	2L	8/6	2E	24/6	1E
Achillea lanulosa	--	--	15/6	6L	5/7	9L
Maianthemum canadense	--	--	--	--	6/6	3L
Diholcos bisulcatus	--	--	15/6	4L	--	--
Galium boreale	--	--	18/6	5L	27/6	8L
Rosa alcea	--	--	26/6	7L	10/6	?
Bromus inermis	23/6	3L	23/6	6L	4/7	7L
Gaillardia aristata	--	--	1/7	7L	--	--
Chrysopsis hirsutissima	--	--	7/7	7L	--	--
Spiraea alba	--	--	5/7	4L	6/7	?
Symphorocarpos occidentalis	29/6	5L	2/7	2E	6/7	3L
Campanula petiolata	--	--	2/7	7L	8/7	?
Phleum pratense	--	--	--	--	8/7	1L
Chamaenerion spicatum	--	--	--	--	7/7	2E
Agastache anethiodora	--	--	--	--	12/7	1L
Apocynum androsaemifolium	--	--	--	--	24/7	20L
Solidago canadensis	--	--	--	--	3/8	15L
Aster conspicuus	--	--	--	--	24/7	1L
Aster laevis	--	--	--	--	31/7	N
Wheat -						
Sown	23/4	3E	8/5	9L	5/5	6L
Emerged	6/5	?	20/5	9L	17/5	7L
Headed	6/7	8L	8/7	7L	--	--
Ripe	18/8	12L	16/8	7L	18/8	2L

I. DISEASES OF CEREAL CROPS

WHEAT

BLACK MOULD (Alternaria tenuis and Cladosporium sp.) was so heavy at Kindersley, Sask., according to the agricultural representative, that the spores, as a greenish black powder, could be scooped up from the swathers. Four other specimens of black mould were received from scattered places in Sask. (T.C. Vanterpool). Infection was 3-tr. 2-sl./674 fields examined in Alta. The affected heads were all in fields n. of Vegreville (W.P.C.).

ERGOT (Claviceps purpurea). A single affected head was brought in from Queens Co., P.E.I. (R.R. Hurst). See Ergot Survey.

POWDERY MILDEW (Erysiphe graminis) infection was 1-sev./6 fields of winter wheat at Creston, B.C., and 2-tr. 3-sl./13 fields in s. Alta. The disease was relatively prevalent on spring wheat in s. Alta. where the infection was 26-tr. 7-sl. 3-mod./79 fields; only a trace occurred in one field in the Peace River area and in one in central Alta. out of the 576 examined (W.P.C., J.S.H.). Powdery mildew was sev. on the lower leaves in many fields of winter wheat about Harrow, Ont. (C.D. McKeen). See Rust Nurseries.

HEAD BLIGHT (Fusarium spp.). A tr. infection was observed in one field at Leross, Sask. (H.W. Mead). Infection was a trace in the 4 samples examined. The following species were isolated: Man.-Winnipeg, F. culmorum; Morris, F. graminearum; Kemnay, F. poae; Que.- Normandin, F. poae (W.L. Gordon).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Damage was 1-tr. 2-sl./6 fields of winter wheat at Creston, B.C. and 1-sl. /13 fields in s. Alta. (J.S.H.). Damage was 298-tr. 258-sl. 60-mod. 8-sev./655 fields of spring wheat in Alta. Damage was tr.-sl. in the Peace River area and over most of central Alta., but it was mod.-sev. east of a line joining Vegreville and Drumheller. The disease was more prevalent and destructive than usual in s. Alta. where some late-maturing heavy stands contained up to 10% prematurity blight (W.P.C., J.S.H.).

Common root rot was much more common in Sask. in 1953 than in the preceding year. The average disease rating of 12.22 was exceeded only in 1949 (13.39) and 1951 (13.66). The rating in 1952 was only 7.46. Although the crop yields were relatively high (provincial mean about 22 bu. per acre) in 1953, growing conditions were generally less favourable and root rot infections were consequently higher than in 1952. Rainfall was less favourably distributed in 1953 than in the previous season and some hot weather occurred in late July and mid-August. Disease ratings in 1953 for crop districts 1-9 were 7.6, 11.4, 15.6, 13.3, 6.6, 11.7, 12.5, 18.0, and 10.9 respectively. September estimates of wheat yields for crop districts 1-9 were 22, 21, 23, 20, 26, 22, 22, 26, and 20 bu. per acre respectively. Unlike most years, there is little correlation between disease ratings and estimated yield. The prematurity blight phase of common root rot was more common than usual. It occurred in 18 fields out of 206 surveyed. The average damage was a trace, although the loss in individual fields ranged up to 5%. Specimens identified as affected by prematurity blight were received from 10 localities. The condition was present in e. and central Sask.

An examination was made of the root rot disease ratings over the years 1941 to 1953 when the data were taken on a comparable basis. A marked upward trend is evident in the disease rating for the province when the average annual ratings are plotted. In Fig. 1, the fluctuation from year to year is shown by the dotted line joining the annual ratings, and the upward trend by a heavy line showing the five-year moving average, and by a straight line fitted to the data by the method of least squares. The latter line shows an average annual increment in the disease rating of 11.23 - 0.30 = 0.297 over the period. The low disease

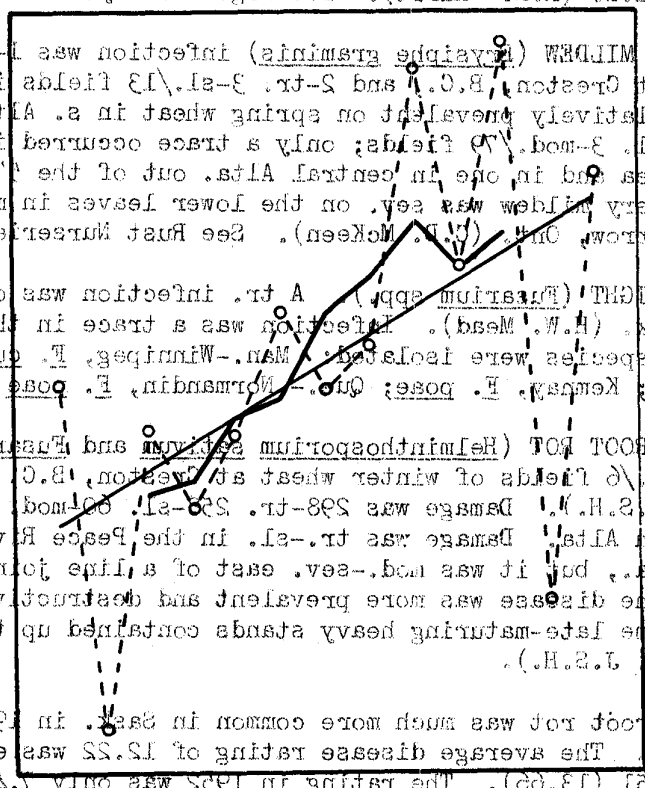

FIGURE 1

Fig. 1 Upward trend in common root rot over a period of 13 years in Sask. Dotted lines connect annual provincial averages. The heavy line represents the five-year moving average, while the light straight line was fitted by the method of least squares.

ratings for the excellent crop years of 1942 and 1952 appear to have interrupted the regular increase in the disease, so that the line based on the moving five-year average may represent the data better than the straight line of best fit. Evidence of an upward trend emphasizes the importance of the annual survey for common root rot in order to assess its progress (B.J. Sallans).

Common root rot was heavy in a field, which appeared to be slightly alkaline, near Dafoe, Sask. Root rot was present on specimens received from Cavalier, Prince Albert, and Stockholm; the basal nodes appeared to have been injured by 2,4-D. Root rot also appeared responsible for the poorly filled heads in a sample of winter wheat from the Tisdale area. (T.C. Vanterpool).

SPOT BLOTCH (Helminthosporium sativum). A sl. infection was noted in a field at Portage la Prairie and in one at Poplar Point, Man. (J.E.Machacek).

TAKE-ALL (Ophiobolus graminis). Damage was 1-mod./6 fields of winter wheat examined at Creston, B.C., and 3-tr. 3-sl. 1-mod. 1-sev./13 fields in s. Alta. (J.S.H.). Damage was 72-tr. 66-sl. 20-mod. 17-sev./655 fields of spring wheat in Alta. The damage was considerable in east-central Alta., in an area between Vermilion, Coronation, and Camrose, being sev. about Strome and Killam (W.P.C., J.S.H., A.W. Henry). Take-all was observed in 15/206 fields examined in Sask. The disease was common in n.e.Sask., about 2% loss occurring at Dafoe, Quill Lake, and McKague. In 2 fields (second crop after summer fallow) at Elrose visited on request, about 5% of the plants were severely stunted (B.J. Sallans). Take-all was observed in 6 fields in an area east and north of Quill Lake, infection being a trace to 10-15%. Near Clair, large affected spots, visible from the road, were present with a scattered infection throughout one large field. Diseased specimens were received from 4 widely scattered points also in n.e. Sask. (T.C. Vanterpool). Affected winter wheat specimens were received in 1952 from Bowmanville and Bradford, Ont. (E.T. Reeder).

On slight evidence Petrak has supported Fitzpatrick et al. (Mycologia 14:30-37. 1922) in considering Ophiobolus graminis as a later synonym of O cariceti. He concludes that Gaeumannomyces is synonymous with Linocarpon Sydow and therefore reduces G. graminis (Sacc) v. Ark & Olivier (see P.D.S. 31:2) to his new combination Linocarpon cariceti (Berk. & Br.) Petr. (Sydowia 6:387. 1952) (I.L. Conners).

BASAL GLUME ROT (Pseudomonas atrofaciens) was reported to be sev. in a field near Berwyn, Alta. (W.P.C.). A sl. infection was observed in 9 fields in the Indian Head-Melville area, Sask., during the annual survey (H.W. Mead).

Cultures of Pseudomonas sp. pathogenic to seedlings were isolated from large bacterial lesions on the shot-blade and sheath of both durum and common wheat varieties. The disease was found at Morden, Poplar Point, and Pilot Mound, Man. (W.A.F. Hagborg).

STRIPE RUST (Puccinia glumarum[1]) infection was 1-tr. 1-sl. 11-sev. in

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[1] According to Hylander,Jørstad and Nannfeldt (Opera Bot. Soc. Bot. Lund 1 (1):75. 1953), the correct binomial for this rust is Puccinia striiformis West., being the oldest name "founded on descriptions of the teleuto state". Previously most authors considered P. striiformis a synonym of P. rubigo-vera.

wheat at Creston, B.C. (J.S.H.); a trace was also found near Dawson Creek (W.P.C.). See also Rust Nurseries.

STEM RUST (Puccinia graminis) infection was 1-sl./6 fields of winter wheat at Creston, B.C. but none was found in s. Alta. Infection was 145-tr. 35-sl. 6-mod. 8-sev/655 fields of spring wheat in Alta. No rust was found west of Pincher Creek, but it was sev. in early September on late-sown Lemhi at Brooks. Pustules of stem rust were unusually common on the leaves (J.S.H.). Although stem rust was generally distributed through central Alta., the attack came too late to cause damage except in 4 fields of Thatcher found damaged near Lloydminster. The fact that Thatcher was rusted suggests the presence of race 15B. No stem rust was found in the Peace River district (W.P.C.). Stem rust was present in most fields in Sask., but mod.-sev. infections were confined to the s.e. quarter of the province. Shrivelling of the grain was common in this area (H.W.Mead). Stem rust was generally sl. in N.B. this year. In the Station plots, Fredericton, infection was nil on Selkirk and R.L. 2629, mod. on Cascade, Huron and Acadia, and sev. on Climax (J.L. Howatt). Stem rust rarely caused damage even to susceptible varieties in P.E.I., probably because the crop was sown early; damage was sev. in one field of Garnet (R.B. McLaren). For a more complete discussion of stem rust development in the Prairies see Rust Nurseries.

LEAF RUST (Puccinia triticina). Infection was 1-tr. 3-sl. 1-mod./6 fields of winter wheat at Creston, B.C., and 1-tr./13 fields in s. Alta. (J.S.H.). Infection was recorded as 159-tr. 97-sl. 23-mod. 1-sev./655 fields of spring wheat examined in Alta. It was found in most fields examined in s. Alta., but it came too late to cause much damage. Rust was generally scattered in central Alta., but it was not seen in the Peace River area (J.S.H., W.P.C.). Leaf rust infection was fairly widespread in Sask., the heaviest infections were in s.e. and s. central Sask.; infection was sev. in 53 fields (W.H. Mead). Leaf rust infection was generally sl. in fields in N.B. and in the plots at Fredericton (P.N.Grainger). See also Rust Nurseries.

BROWNING ROOT ROT (Pythium spp.). Affected specimens received 9 June from Three Hills, Alta. (A.W. Henry). Although no enquiries about browning root rot were received in Sask. in June and July, plants, 36-37 in. tall, the heads of which were empty were sent in on 26 Aug. Most of the roots were filled with numerous Pythium oospores. The accompanying soil sample revealed a peaty, fluffy soil. Browning root rot has never been seen so severe on such tall plants or so late in the season. However, some of the most severe cases of browning root rot ever encountered were seen at Brancepeth, near Birch Hills, on peaty soil in the 1930's. What conditions favoured the late infection this year are unknown (T.C. Vanterpool).

ROOT ROT (Rhizoctonia solani). Mod. infection on a planting of Selkirk at Portage la Prairie, Man. Stem bases, crowns, and roots were partly rotted and the typical mycelium of R. solani was abundant in the decayed tissues (J.E. Machacek).

In May 1953, attention was drawn to a conspicuous yellowing and stunting of winter wheat in s.w. Ont. The centre of the affected area was located on the lighter soils in Kent Co., particularly in the vicinity of Highgate. The

disease occurred in patches in the field; within these patches the wheat plants were stunted and sometimes dead and the surviving plants were reduced in vigour; maturity would be delayed and yield low. It was estimated that the stand of plants in the affected areas was reduced 50% and the remaining plants had made only 40% as much growth as normal plants elsewhere in the same field. A tan-coloured cortical rot of the root system and dark zonate lesions on the basal leaf sheaths were the conspicuous symptoms on the plants.

Rhizoctonia solani was the chief fungus found in rotted stem and root tissues near the crown. The fungus appeared responsible for the severe basal rot, but was also present in less diseased plants. In addition, parasitic nematodes, chiefly Pratylenchus sp. were numerous in the root tissues of affected plants. Experiments to date have disclosed that R.solani alone may cause some stunting of wheat especially at high temperatures, but that when the nematodes are also present the stunting is more than doubled. It is suggested that the two pathogens must interact in some manner to produce this root rot of wheat. (W.G.Benedict, W.B.Mountain).

GLUME BLOTCH (Septoria nodorum) was not noted at Creston, B.C., but infection was 2-tr. 1-sl./13 fields of winter wheat examined in s. Alta. (J.S.H.). Infection was 76-tr. 73-sl. 38-mod. 12-sev./655 fields of spring wheat, being generally distributed in Alta. (W.P.C., J.S.H.). A sl. infection was found in 3 widely separated fields of the 190 examined in Sask. (H.W. Mead). Specimens received from Annaheim (T.C.Vanterpool).

SPECKLED LEAF BLOTCH (Septoria spp.). Infection was 1-tr. 2-sl. 3 mod./6 fields of winter wheat at Creston, B.C., and 6-tr. 4-sl./13 fields in s. Alta. (J.S.H.). In spring wheat, the infection was 119-tr. 242-sl. 156-mod. 38-sev./655 fields, being general in Alta., and most severe in the more mature fields (W.P.C., J.S.H.). Infection (S. avenae f. sp. triticea) was 2-tr. 16-sl. 6 mod. 5-sev./190 fields examined in Sask. It became rather prevalent late in the season in the eastern part of Sask. (R.J.Ledingham, H.W.Mead). From specimens submitted by R.J.Ledingham, typical S. avenae f. sp. triticea was found in a collection from Bruno, Sask., whereas Solenophoma donacis var. stomaticola occurred on one from Hawarden (I.L. Conners). S. avenae f. sp. triticea was mod. on varieties in the Que. Seed Board Plots at St. Charles de Caplan, Que. (D. Leblond, D.B.O.Savile). See Rust nurseries.

A grey leaf spot was observed on wheat seedings sent from Yorkton, Sask., on 26 June; it may have been caused by a Septoria, but no spores were seen (T.C. Vanterpool).

COMMON BUNT (Tilletia caries and T. foetida). The data presented in Table 1 were obtained from the records of the Board of Grain Commissioners. The percentage of cars graded smutty during the first quarter of the present crop year shows a slight increase over the final figures for the last two years, but it is still quite low (W. Popp).

Table 1. Common Bunt in Wheat in Western Canada

Class of Wheat	Aug. 1, 1952 to July, 1953			Aug. 1 to Oct. 31, 1953		
	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty
Hard Red Spring	267,784	339	0.13	49,667	62	0.12
Amber Durum	5,202	11	0.21	2,742	6	0.22
White Spring	272	0	0.00	61	0	0.00
Alberta Red Winter	276	10	3.60	150	6	4.00
Garnet	1,844	6	0.32	484	1	0.21
Mixed Wheat	393	1	0.25	89	0	0.00
All classes	275,771	367	0.13	53,193	75	0.14

Out of 674 fields examined in Alta., infection was 10% and tr. in 2 fields near Lacombe and tr. in one field in s. Alta. (W.P.C., J.S.H.). Bunt was seen less frequently than usual in Sask.; only a tr. was found in 3/212 fields examined (R.C.Russell). Bunt was not found in the 93 fields examined in Man. (W. Popp). During a field survey of winter wheat for dwarf bunt in Ont., observations were also made on common bunt. Heads were collected for the physiologic form survey; only T. foetida was found. Out of 164 fields surveyed, 28 were affected by common bunt and two by both common and dwarf bunt. Infection varied from a tr. to 25%, av. 0.77%. As at least half the fields examined were on the farms of the better growers it is probable that common bunt would be found in more than 18% of the fields if a purely random survey were made.

Conners and Skolko (Can. J. Agr. Sci. 33(6):597-605. 1953) have drawn attention to the prevalence of common bunt in winter wheat in Ontario. Another year's figures may now be added to those given in their Table 1, p. 602.

They are:

Crop year	Class	Estimated production '000,000 bu.	Inspected '000 bu.	Graded Smutty '000 bu.	Percentage smutty
1953	White Winter		4,925	108	2.2
(Aug.-Oct.)	Total	26.6	7,866	161	2.0
1952	White Winter		5,635	214	3.8
	Total	20.8	9,432	304	3.2

These figures suggest come improvement (I.L. Conners, R.V. Clark).

DWARF BUNT (Tilletia contraversa Kühn). A tr. was seen in one field at Creston, B.C. (J.S. Horricks) and a single head was collected in the variety plots

at the Creston Substation (D.B.O. Savile).

A field survey for dwarf bunt was carried out in Ont. 1-18 July to obtain information on the present distribution of the disease in the province. As a result dwarf bunt was found in 25 out of 164 fields examined; in 2 fields common bunt (T. foetida) was also present. The affected fields by counties were distributed as follows: Bruce 3/12, Simcoe 17/30, York 4/11, Ontario 1/10. Infection appeared to be very uneven in the fields, but it was most readily found about the entrance to the field; it varied from a tr. to 25% about the entrance to some fields. Since the survey was completed, a bunt ball of dwarf bunt was seen in a grain sample from Middlesex Co. An extensive examination of grain samples by the Plant Products Division, in the Department of Agriculture indicates that dwarf bunt is even more widespread than the field survey suggested.

The most striking character of the affected plants is their dwarf stature. Affected heads on the primary culm are fully as large as healthy heads, but the culms carrying them rarely exceed half the height of the healthy culms. Although diseased plants may be present throughout the field, they are most easily located wherever the stand is poorer, i.e. about the entrance to the field, along the edges, in the dead furrows or where some erosion of the soil has occurred. (I.L. Conners, R.V. Clark).

In January 1954, an old collection of bunted heads of Dawson's Golden Chaff made 26 July 1947 from the same farm where dwarf bunt was found in 1952 was handed to us for examination; the heads proved to be affected by the dwarf bunt organism. As these heads came from a crop that had been treated by hot water to control loose smut and were found in that part of the field where wheat was grown in 1945, the inference is that dwarf bunt was present in Ont. previous to the introduction of Cornell wheat. However Cornell is not the only New York State variety that has been grown in Ont.; dwarf bunt may have been introduced in such varieties as Yorkwin. This belated discovery points to the difficulty formerly experienced in recognizing the organism from an examination of the spores. Undoubtedly the sample, if examined, was identified as T. caries (A.J. Skolko, I.L. Conners).

In a paper prepared for publication in the Can. Journal of Botany, the results are reported of a re-study of several species of Tilletia attacking the ovaries of grasses. It was concluded that Tilletia brevifaciens described by Fischer as the organism causing dwarf bunt of wheat and several grasses is not specifically distinct from T. contraversa Kühn originally described in 1874 on Agropyron repens, but also known on other species of Agropyron. Wheat probably first contracted dwarf bunt in the mountainous areas of Europe, where native species of Agropyron are found naturally infected by T. contraversa. The pathogen has been introduced into North America (I.L. Conners).

LOOSE SMUT (Ustilago tritici). Infection was 1-tr./13 fields of winter wheat examined in s. Alta. and 12-tr. 2 sl./655 fields of spring wheat in Alta., 9 in s. Alta. and 3 at Drumheller (W.P.C., J.S.H.). Loose smut was observed in 1/212 fields examined in Sask., but it was noticed several times in plots of Lee (R.C. Russell). The average infection in the 93 fields examined in Man. was 0.6%; in Lee, however infection varied from 0.1 to 5% and averaged 2.4% (W.Popp). Less than 1% of the heads were affected in a 40-acre field of winter wheat at Nictaux, N.S. (K.A. Harrison).

BACTERIAL BLACK CHAFF (Xanthomonas translucens). A tr. was seen in one field in s. Alta. (J.S. Horricks). In s. Man. the disease infected 80-100% of the leaves in the fields examined and destroyed 15-35% of the leaf area. The pathogen was isolated from samples collected at Boissevain, Brandon, Deloraine, Morden, Pipestone and Virden. It was isolated from Agropyron repens from Broomhill and Deloraine, A. sp. from Oak Lake and Bromus inermis from Deloraine (W.A.F. Hagborg).

STREAK MOSAIC (virus) was prevalent in the established winter wheat areas of s. Alta., where it was first recognized in 1952 (P.D.S. 32:7). (J.T. Slykhuis. Can. J. Agr. Sci. 33(2):195-197. 1953). It overwintered in many fields of winter wheat and seriously affected growth in the spring. At least 4 fields were considered worthless and were cultivated up and planted to other crops. In 25 other fields, winter wheat suffered sev. damage, with yields reduced in some from a possible 40 bu. per acre of No. 2 Northern to 5-6 bu. of No. 4 Northern. Severe damage in winter wheat was again correlated with early seeding in proximity to a source of infection. Several fields of spring wheat located near diseased winter wheat suffered sev. damage. Many other fields of winter and spring wheat were mod. or sl. affected by the disease.

The 1953 season afforded the first opportunity since the discovery of the mite vector Aceria tulipae to study the natural spread of streak mosaic in the field. The mites were always present where mosaic was abundant, but they were never found in districts where mosaic did not occur. During the late spring and summer, the mites and the virus were spread from diseased wheat crops and volunteer wheat in nearby fields. By harvest time, volunteer wheat was the main carrier of the mites and the virus was therefore the important source of infection of winter wheat sown in the fall. Many of these young stands became infected to varying degrees (J.T. Slykhuis).

BRITTLE DWARF (Brachycolus tritici) was conspicuous and severe on spring wheat growing near the University winter wheat plots. Aphids were present on all affected plants (T.C. Vanterpool). See P.D.S. 26:6.

HEAD STERILITY (Cause unknown) has been common in recent years than formerly particularly in n. and n.e.Sask. in wheat and less often in barley on plants otherwise well developed and without any discoloration being present at the base of the culm. It is suggested that heavy rains at a critical stage in the plants, growth about flowering or heading time result in the soil being water-logged for a few days so that roots do not receive sufficient air to sustain the plants. As a consequence of the disturbed water relations, the heads fail to set seed. It seems evident that some other factor than invasion by commom root rot organisms is responsible and should be looked for (T.C. Vanterpool).

SEEDLING DEATH appeared to be due to too deep seeding followed by 2-3 hot days soon after the seedlings emerged in material received from Prince Albert, Sask. This combination of factors operates quite often in Sask. to reduce cereal stands (T.C. Vanterpool).

2,4-D DAMAGE. Sl. injury to the crowns was observed in 2 fields (at Kelfield and St. Louis) in Sask. (H.W. Mead) and to the heads in a field at Perdue (T.C.Vanterpool).

WIND DAMAGE. The heads in 4 replicates of the durum variety D.T. 137 were partially or completely blighted at the Station, Morden,Man. (J.E. Machacek).

OATS

ERGOT (Claviceps purpurea) was a tr. in one field near Colinton out of 297 examined in Alta. (W.P. Campbell). See also Ergot Survey.

ROOT ROT (Fusarium spp.). Damage was 9-tr. 4-sl. 1-mod./297 fields examined at scattered locations throughout Alta. (W.P.C., J.S.H.). A heavy infection (3-5%) was observed in a field near Clair, Sask. (T.C. Vanterpool).

Fusarium graminearum was readily isolated from a specimen of oat stubble collected by Dr. J.H. Craigie from a field of oats that had badly lodged at Merrickville, Ont. Perithecia of Gibberella zeae were found on a few stems in the stubble specimen. Single ascospore cultures made from the perithecia were the usual 'wild type' and were identical with single conidial cultures of the wild type of F. graminearum obtained from corn in Southern Rhodesia. The collection of perithecia of G. zeae on oats is believed to be the first record of the occurrence on this host in Canada (W.L. Gordon).

LEAF BLOTCH (Helminthosporium avenae). Infection was: 4-tr. 11-sl. 1-mod./294 fields scattered through Alta.; sl. in 3 fields near Creston, B.C. (W.P.C., J.S.H.) 10% in 3 fields in Kings Co., N.S. (D.W. Creelman) and sl. in a field at Hunter River, P.E.I. (J.E. Campbell).

ROOT ROT (Helminthosporium victoriae caused 30% damage to Beaver oats in the oat trials at Notre Dame du Lac, Que. (L.J. Coulombe, R.V. Clark).

HALO BLIGHT (Pseudomonas coronafaciens) caused sl. damage to oats at Minnedosa, Jordan, and Winnipeg, Man. (W.A.F. Hagborg). Infection was 90-tr. 85-sl. 29-mod. 4 sev./297 fields examined in Alta., the more sev. infections being in central Alta. (W.P.C., J.S.H.).

STRIPE BLIGHT (Pseudomonas striafaciens). Infection was sev. on seedlings at Brandon, Man., on 15 June, but later growth was less heavily infected, only a trace occurring on the uppermost leaves on 15 July (W.A.F. Hagborg).

CROWN RUST (Puccinia coronata). Infection was only 1-tr./25 fields in s. Alta. (J.S. Horricks). Only 15 fields were examined in Sask., but infection was 1-tr. 2-sl. 2-sev. mostly in e.-central Sask.; the rust was fairly heavy on late oats at Saskatoon (W.H. Mead). Crown rust became quite heavy on several varieties in the test at Ste Anne de la Pocatiere, Que., by 10 Aug., but infection was nil on Len. 39 and a trace on 4367-122 and 4274-37-4 (L.J. Coulombe). Crown rust was observed in several fields in Rouville and St. Hyacinthe Counties (L. Cinq-Mars, R. Crete). Crown rust was again light in N.S.; tr. infections observed at Kentville and South Ohio (D.W. Creelman). Infection varied from tr. to 10% in fields across P.E.I. (R.R. Hurst). See also Rust Nurseries.

STEM RUST (Puccinia graminis). Tr. found in 2 fields near Stettler, Alta. (W.P.C.). Infection was 4-tr. 5-sl. 2-mod. 1-sev./15 fields examined in Sask. (H.W.Mead). A 5% infection was recorded in several fields in Rouville and St. Hyacinthe Counties, Que. (L. Cinq-Mars, R. Crete). Damage was sev. in a field of Ajax at Woodstock, N.B.; the crop lodged early and kernels were poorly developed at harvest (S.R. Colpitts). Infection was tr. at Kentville and Grand Pre in Kings Co. and 25% at Upper Clyde, Shelburne Co., N.S. (D.W. Creelman). Very little stem rust was observed in P.E.I. this year (R.B. McLaren). See also Rust Nurseries.

SPECKLED LEAF BLOTCH (Septoria avenae). Infection was 15-tr. 27-sl. 6-mod./297 fields examined in Alta., almost entirely in n. and central Alta. (W.P.C., J.S.H.). The disease was quite heavy on some varieties in the plots at Ste Anne de la Pocatiere and Notre Dame du Lac, Que. (L.J. Coulombe). Speckled leaf blotch was general in Kings Co., N.S., and infection averaged 10-15%, but was less prevalent than last year (D.W. Creelman). A 5% infection was seen in a field in Queens Co., P.E.I. (R.R. Hurst). See Rust Nurseries.

SMUT (Loose Smut, Ustilago avenae and Covered Smut, U. kolleri) infected 51/297 fields examined in Alta.; infection was generally distributed and ranged tr.-35%, av. 3.2% in affected fields (W.P.C., J.S.H.). Covered smut was found in 10/15 fields inspected in Sask.; infection tr.-15%, av. 2.5%. No loose smut observed (R.C. Russell). Smut in oats was not severe in Man., infection ranging 0-11%, av. 0.6% in 65 fields inspected (W. Popp). Loose smut infection was 5% in a field of Ajax at Woodstock, N.B. (R.S. Colpitts); up to 5% in the few fields examined in Kings Co., N.S.; sl. in a late planting in Queens Co., P.E.I. Polygonum scabrum affected by Ustilago utriculosa occurred at the edge of the same field. A tr. of covered smut was noted in a second field (J.E. Campbell). Infection (tr.-10%) by the oat smuts was observed in about half the fields examined in Madawaska, Victoria, York, Kings and Albert Counties, N.B. (J.L. Howatt).

BLAST (non-parasitic). Damage was 92-tr. 85-sl. 45-mod. 9-sev./297 examined in Alta.; it was scattered through the entire area surveyed, occurring in no apparent pattern (W.P.C., J.S.H.). Blast caused sl. damage in 7/15 fields examined in Sask. (H.W. Mead). Blast caused mod. damage to a late-sown field in Queens Co., P.E.I. (J.E. Campbell).

HEAT INJURY. High temperature following a period of moist, cool weather caused the culms to dry up at the soil level in a field at Portage la Prairie, Man., although of normal appearance above and below the injured area. The culms had fallen over along considerable lengths of the drill rows by 12 June (J.E. Machacek).

GREY SPECK (manganese deficiency) caused sev. damage to a field of oats in an area of manganese deficiency w. of Spalding, Sask. The symptoms were typical and conspicuous in spite of good moisture conditions in the district this season. The plants were spotted and severely stunted and although some areas were better than others, there was little normal growth. See also under Barley (T.C. Vanterpool). Oat plants taken from a reclaimed peat field at Balmoral, Man., on 24 July showed typical symptoms of grey speck. The disorder is now also known from the following widely scattered localities in Man.: Elm Creek, Ethelbert, Erickson, Gilbert Plains, Messer's Oak Bank, Prawda, Swan River, St. Norbert, and Winnipeg (W.A.T. Hagborg).

INTUMESCENCE. Specimens of a variety of Avena ?strigosa submitted by R.O. Lachance in the plots at Notre Dame du Lac, Que., Sept., bore outgrowths on the culms. No other variety was affected. No parasitic fungus could be found and nematodes were not found associated with the outgrowths by Dr. A.D. Baker. These outgrowths resembled closely the intumescences described by Sorauer (Handb. f. Pflanzenkrankh. 6. Aufl., Band 1, Teil 1, pp. 414, 1933) grass stems, particularly on oats. They occur most frequently on the culm, where it is covered by the leaf sheath. Cause of their occurrence is unknown. (I.L. Conners).

BARLEY

ERGOT (Claviceps purpurea). A tr. occurred in a field in Queens Co., P.E.I., and one other sample was brought in for examination (R.R. Hurst). See Ergot Survey.

HEAD BLIGHT (Fusarium spp.). Sl. infection was observed in a field at Winkler, Man.; F. poae was isolated (W.L. Gordon). In a mixed field of 2-rowed barley and oats at New Glasgow, P.E.I., head blight caused sev. damage (J.E. Campbell).

STRIPE (Helminthosporium gramineum). Infection was 55-tr. 39-sl. 26-mod. 14 sev./415 fields examined in Alta. The disease was uncommonly prevalent throughout Alta. (W.P.C., J.S.H.). A sl. infection was seen at Kindersley, Sask., in 1/28 fields examined (H.W. Mead).

SPOT BLOTCH (Helminthosporium sativum). Infection was a tr. in a field at St. Francois Xavier and mod. and general over one at Broomhill (W.L. Gordon).

ROOT ROT (Helminthosporium sativum and Fusarium spp.). Infection was 11-tr. 146-sl. 49-mod. 9-sev./415 fields examined in Alta.; mod.-sev. infections were mostly in an area between St. Paul, Edmonton, Olds and Vermilion (W.P.C., J.S.H.). Infection was 5-sl. 12-mod. 11-sev./28 fields examined in Sask. The average disease rating was 18.8 compared with a rating of 12.2 for wheat (B.J. Sallans).

NET BLOTCH (Helminthosporium teres). Infection was 57-tr. 71-sl. 46-mod. 11-sev./415 fields examined in Alta., the heavier infections being in n. and central Alta. (W.P.C., J.S.H.). Infection mod. in 2 fields in s.e. Sask. out of 28 examined in Sask. (H.W. Mead). All the leaves were killed in a field at Willbrook; H. teres was isolated (W.E.Sackston). Mod. infection at Pradhurme (T.C. Vanterpool). Infection varied from tr. to 75-100% of the plants in the 7 fields in which the disease was observed in Man. In some fields all except the two top leaves were killed. In one field the leaves were severely yellowed; H. teres was isolated (W.L. Gordon). See Rust Nurseries.

TAKE-ALL (Ophiobolus graminis). Damage was sl. in one field in s. Alta. (J.S. Horricks).

BROWN STRIPE (Pseudomonas sp.) occurred in a mixed infection with bacterial blight at Winnipeg and Sidney, Man. Both Xanthomonas translucens and a Pseudomonas were isolated from samples from both places (W.A.F. Hagborg).

STRIPE RUST (Puccinia glumarum). A trace was found in 2 fields in B.C.- in s. B.C. and near Dawson's Creek (W.P.C., J.S.H.).

STEM RUST (Puccinia graminis). Infection was 13-tr. 9-sl. 1-sev./415 fields in Alta. The sev. infected field was near Hanna; all the others were in s. Alta. (W.P.C., J.S.H.). Infection was 5-tr. 9-sl. 5-mod. 3-sev./28 fields surveyed in most crop areas of Sask. (H.W. Mead). Uredinia were found on the palea and lemma but also apparently on the seed coat itself mostly near the apex of the kernel in a head of hybrid barley growing in the plots at Ottawa on 25 Aug. (R.V. Clark, I.L. Conners). The plots of barley were artificially inoculated with rye stem rust at the Station, Fredericton, N.B. The results

were: no rust on Hietter, 25-35% infection on Montcalm and O.A.C. 21 and 50-65% infection on L4752, U.M. 1623 and L5112 (J.L. Howatt). See Rust Nurseries.

LEAF RUST (Puccinia hordei). Infection was a tr. in 3 fields in s. Alta. (J.S. Horricks); mod. in one field at Langbank, Sask. (H.W. Mead). Traces were seen in rod-row plots at Charlottetown and in some late-sown fields in Prince Co., P.E.I. (R.R. Hurst).

SCALD (Rhynchosporium secalis). Infection was 80-tr. 90-sl. 52-mod. 66-sev./415 fields examined in Alta. The disease was uncommonly widespread and sev. in n. and central Alta. In the Edmonton area, it appeared early in June and caused sev. damage to barley in the seedling stage (W.P.C., A.W.H., J.S.H.). Scald and net blotch were heavy in a field at Radville, Sask; material brought to Indian Head by the Station staff revealed spores of R. secalis and on culturing yielded H. teres. (W.B. Sackston). See Rust Nurseries.

SPECKLED LEAF BLOTCH (Septoria avenae f. sp. triticea) was general on barley in the Q.S.B. test plots at Ste Anne de la Pocatiere and St. Charles de Caplan, Que. It was particularly noticeable on the leaf auricles. Specimens already preserved in the Mycological Herbarium at Ottawa include ones on barley from Indian Head, Sask., and Lennoxville, Que., and on Hordeum jubatum from St. Simeon, Que. (D.B.O. Savile, D. Leblond).

SPECKLED LEAF BLOTCH (Septoria passerini). Infection was 50-tr. 93-sl. 75-mod. 49-sev./415 fields in Alta.; very little blotch was observed in s. Alta., but it was common in n. and central Alta., being most sev. on mature crops (W.P.C., J.S.H.). Infection was 1-sl. 2-mod. 4-sev./28 fields in Sask.; the disease was heaviest in e. central Sask. (H.W. Mead). Infection was 4-tr. 3-sl. 7-mod. 6-sev./24 fields examined in Man (G.J. Green). See Rust Nurseries.

COVERED SMUT (Ustilago hordei) was general throughout Alta., affecting 44/415 fields examined; infection was a tr.-20% and averaged 2.0% in the affected fields (W.P.C., J.S.H.). Covered smut appeared slightly less prevalent than usual in Sask.; observed in 11/28 fields, infection was tr.-8%, av. 1% (R.C. Russell). Covered smut reported in Vantage at Prince Albert and slight infection of covered and loose smut at Prud'homme (T.C.V.). Losses due to false loose smut (U. nigra) and covered smut were lower in the 76 fields examined in Man. this year than in the last few years; infection ranged 0.6% and averaged 0.4% (W. Popp). A single head of O.A.C. 21 affected by covered smut was submitted from the Station, Normandin, Que.; the spores were white rather than olive-black (I.L. Conners).

LOOSE SMUT (Ustilago nuda) was general throughout Alta., affecting 148/415 fields inspected; in the affected fields infection was tr.-30%, av. 2.6% (W.P.C., J.S.H.). Loose smut was recorded in 11/28 fields examined in Sask., infection being tr.-6%, av. 1%; in the Kelvington Barley Seed Control Area, loose smut was almost absent from 11 fields sown with seed treated with hot water (R.C. Russell). Loose smut (U. nuda) infection ranged from 0-11% in Montcalm and 0-8% in Vantage; in the 76 fields examined in Man., average infection was 1.5% (W. Popp). Loose smut was reported to be sev. in a field of Montcalm at Espanola, Ont. (C.B. Kelly). A sl. infection was noted in many fields in York, Victoria, and Madawaska counties, N.B. (J.L. Howatt). (Except in Man., the spores do not appear to have been germinated to determine whether U. nuda or U. nigra was present).

BACTERIAL BLIGHT (Xanthomonas translucens). Infection was 16-tr. 8-sl. 3-mod. 1-sev./415 fields examined in Alta.; the disease was most common about Edmonton and east to the Sask. border (W.P.C., J.S.H.). Bacterial blight was more abundant than usual in s. central Man. Its spread was aided by frequent rains in May, June, and July. Every plant was infected in fields at Pigeon Lake, Pipestone, Broomhill, and Boissevain and 20-35% of the leaf area was destroyed. Mod. infections occurred also in fields at St. Francois, Pipestone, Brandon, Sidney, Winnipeg. X. translucens was isolated from every Man. sample and from one collection from Edmonton, Alta. (W.A.F. Hagborg).

FALSE STRIPE (virus) infection (3-tr. 3-mod.) was observed in fields of Compana barley in s. Alta. The mod. infected fields (25% of the plants showing symptoms) were all sown with seed from the same source (J.T.Slykhuis). False stripe was present in several varieties in the plots at Winnipeg and Brandon, Man; severe damage was noted in the progeny of a Vantage x Jet cross (W.A.F. Hagborg).

STREAK MOSAIC (virus) Sl. infections were observed in 4 fields located near wheat fields severely infected with wheat streak mosaic in s. Alta. (J.T.Slykhuis).

GREY SPECK (Manganese deficiency). A barley field w. of Spalding, Sask., across the road from an affected oat field was nearly as sev. affected as the latter (see above under Oats). The symptoms on barley are less conspicuous than on oats, but the plants were similarly stunted and although there was little spotting, long grey streaks were present at the margin of the leaves. Another barley field in the vicinity, which was broken up several years earlier than the field just described, was only mod. affected (T.C. Vanterpool).

WIND INJURY caused partial or complete blighting of the heads of some varieties in the plots at Morden, Man. (J.E. Machacek).

RYE

ERGOT (claviceps purpurea). A tr. was observed at Quill Lake, Sask., and affected heads received from Wynyard, where conidial exudate was reported to be abundant by the agricultural representative on 20 Aug. (T.C.Vanterpool). Infection was sl. in the rod rows at the Station, Fredericton, N.B. (J.L. Howatt), tr. in 3 fields in Annapolis and Kings counties, N.S. (D.W. Creelman) and sev. on rye plants growing in a field of barley at Charlottetown, P.E.I. Some ergot was also found on Agropyron repens (J.E. Campbell).

POWDERY MILDEW (Erysiphe graminis). Infection was 3-tr. 2-sl./8 fields examined in s. Alta.; not observed elsewhere in Alta. (W.P.C., J.S.H.). Mod. infection observed at La Trappe, Que., on winter rye in Nov. 1952 (Fr. M. Claude).

LEAF BLOTCH (Helminthosporium sativum). Infection was general, though usually sl. (tr.-50%), in the several fields of winter rye examined in Kings Co., N.S. (D.W. Creelman).

ROOT ROT (Helminthosporium sativum and Fusarium spp.). Damage was 12-tr. 13-sl./64 fields examined in Alta.; affected fields were scattered (W.P.C.,J.S.H.).

LEAF RUST (Puccinia secaline). Infection was sev. in one field near Creston, B.C., and was tr. in 3 others in s. Alta. (J.S.H.).

SCALD (Rhynchosporium secalis). Infection was 2-tr. 4-sl. 1-mod. /8 fields examined in s. Alta. (H.S.Horricks).

SPECKLED LEAF BLOTCH (Septoria secalis). Infection was 4-tr. 22-sl. 7-mod. 1-sev./64 fields examined in Alta., occurring chiefly in central and n. Alta. (W.P.C., J.S.H.).

STEM SMUT (Urocystis occulta). Infection was a tr. in one field in s. Alta. (J.S. Horricks) and 2% of the stems at Ladywood, Man. (W. Popp).

BACTERIAL BLIGHT (Xanthomonas translucens). A tr. infection observed in one field in s. Alta. (J.S.H.). Sl. infections were found at Douglas and Broomhill, Man. (W.A.F. Hagborg).

RUST NURSERIES IN CANADA IN 1953

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

In Report 5 issued by the Plant Pathology Laboratory, Winnipeg, Man., in November 1953, are recorded the observations on the occurrence of rusts and several other fungus diseases on varieties of wheat, oats, barley, and rye grown at 33 localities in Canada in 1953. The incidence of the various diseases on the different varieties in the nurseries is given in eight tables with a summary of the data in the ninth, which alone is here reproduced (Table 2).

Twelve varieties of wheat, eight of oats, five of barley were grown in the nurseries. The varieties were: Wheat - McMurachie, Lee, Carleton, Little Club, Marquis, Mindum, Thatcher, CT-186 (since named Selkirk), Norka, Redman, Exchange and Fontana; oats - Bond, Trispernia, Ajax, Vanguard, Garry, Clinton, Landhafer, and Canuck; barley - Montcalm, Wisconsin H. 106, Vantage, Peatland, and Univ. Manitoba 43-1020; and rye - Prolific.

Cereal Rusts in the Prairie Provinces in 1953

Wheat stem rust (Puccinia graminis var. tritici) was abundant in northern Mexico during the late winter and early spring of 1953. In the southern part of the Great Central Plains area, Texas and adjoining states, rust development was scanty owing to drouth conditions. However, in the northern part of the winter wheat belt and in the spring wheat region of the United States conditions were favourable for rust development and a heavy stem-rust infection was general on wheat throughout much of this region by mid-June. The northward spread of rust spores into Western Canada began early. A few spores were caught on the slides 25-28 May at Winnipeg, Morden, and Brandon in Man., and at Regina in Sask. Stem-rust spores began to appear in appreciable numbers on slides exposed in Western Canada about 18 June and from then until the end of the crop season rust inoculum wa abundant in the air over Man. and eastern Sask. Not since 1935 has there been so much rust inoculum in the air over this area. On a number of occasions several thousand spores per square inch were caught on slides during 72-hour exposures.

Table 2. The incidence of certain pathogenic fungi on wheat, oats, barley, and rye grown at 33 localities in Canada in 1953.

Locality	Wheat			Oats			Barley					Rye	
	P. graminis tritici	P. triticina	Erysiphe graminis	P. graminis avenae	P. coronata avenae	Septoria avenae	P. graminis	P. hordei	Erysiphe graminis	Septoria passerinii	Rhynchosporium secalis	P. graminis secalis	P. secalina
Saanichton, B.C.	0	0	3	0	0	0	0	2	3	0	0	0	0
Agassiz, B.C.	1	4	3	1	0	3	0	1	3	0	0	1	3
Creston, B.C.	3	4	0	3	0	0	3	0	1	0	0	1	4
Beaverlodge, Alta.	0	0	2	0	0	0	0	0	0	0	4	0	0
Edmonton, Alta.	1	3	0	0	0	0	0	0	0	4	2	0	2
Lacombe, Alta.	1	2	0	0	0	0	0	0	0	0	4	0	1
Lethbridge, Alta.	1	1	-	0	0	0	1	0	0	0	0	0	0
Scott, Sask.	1	0	0	0	0	0	1	0	0	0	1	0	1
Melfort, Sask.	2	2	0	1	0	0	1	0	0	0	4	0	0
Indian Head, Sask.	4	4	0	0	1	0	3	0	0	0	0	1	0
Brandon, Man.	4	4	0	4	3	-	3	0	0	-	0	1	3
Morden, Man.	4	4	0	4	4	0	2	0	0	4	0	1	0
Winnipeg, Man.	4	4	0	3	4	-	3	2	0	2	0	1	3
Ft. William, Ont.	4	2	0	4	2	1	2	0	0	2	0	1	2
Kapuskasing, Ont.	2	4	0	1	0	0	0	0	1	2	0	0	2
Mindemoya, Ont.	3	4	0	3	4	0	1	1	3	0	0	1	4
Guelph, Ont.	3	4	0	2	4	0	1	1	4	0	-	1	3
St. Catharines, Ont.	2	4	1	1	0	0	2	1	3	-	-	0	3
Appleton, Ont.	4	4	0	4	-	2	3	2	0	0	0	1	3
Ottawa, Ont.	3	3	2	2	3	1	1	2	0	0	0	2	3
Merrickville, Ont.	3	3	0	1	4	1	1	0	0	0	0	2	2
Kemptville, Ont.	3	2	0	2	3	0	2	0	3	0	0	2	2
Williamstown, Ont.	1	3	0	1	1	1	1	0	0	0	-	1	1
Macdonald College, Que.	3	2	3	2	2	1	1	2	4	0	0	2	2
L'Assomption, Que.	3	4	2	2	2	0	2	0	3	0	0	1	4
Lennoxville, Que.	3	4	0	3	4	1	1	1	0	0	0	3	4
Normandin, Que.	3	4	0	1	0	4	1	0	0	3	0	0	0
Ste. Anne de la Poc., Que.	3	4	0	4	3	3	3	2	0	0	2	2	1
Fredericton, N.B.	1	1	0	2	1	1	3	0	0	0	0	4	4
Kentville, N.S.	4	3	2	3	0	2	1	0	0	0	0	2	1
Nappan, N.S.	1	3	4	1	1	-	0	0	0	0	0	0	0
Pictou, N.S.	1	1	0	2	4	-	0	0	0	0	0	1	0
Charlottetown, P.E.I.	2	4	0	2	2	3	1	0	0	0	0	0	1

- indicates no observation made; 1 = trace; 2 = light; 3 = moderate; 4 = heavy

Wheat stem rust made its earliest appearance in Western Canada since continuous records were first kept in 1925. A few pustules of this rust were found on Regent wheat at Morden, Man. on 16 June, two weeks earlier than in 1952. A heavy infection developed on wheat in Man. and eastern Sask., and a trace to a light infection in western Sask. and Alta. The northerly and westerly limits of the heavy rust area were roughly definable by a line running northwesterly from a point on the International Boundary directly south of Weyburn to Belle Plaine (east of Moose Jaw) and thence north-easterly to Sturgis and then from there east across eastern Sask. and Man. Within the area just mentioned the average severity of stem rust on Thatcher, Redman, and Lee ranged from 5 to 30% in early-sown fields and from 40 to upwards of 60% in late-sown fields. About 70% of the wheat acreage in Man. and eastern Sask. was sown early (April and early May). The remaining 30% was sown late (late May and early June), owing to heavy rainfall during the last three weeks in May. The amount of rust present was rather closely correlated with the date of seeding. To the west of the above mentioned line, rust diminished rather rapidly in western Sask., and the infection ranged from trace to light. Stem rust was present in trace amounts throughout much of Alberta. So far as could be observed there were about equal amounts of stem rust in comparable stands of Thatcher, Redman and Lee. All appeared to be about equally susceptible. Regent wheat in experimental plots throughout Man. carried appreciably less stem rust than the three previously named varieties. In most localities in the heavy rust area trace amounts of stem rust occurred on CT-186 (Selkirk).

The durum wheats, Carleton, Stewart, and Mindum, carried higher rust infections (up to 80%) particularly in late fields, than the bread wheat varieties. However, in Man. some early sown durum fields were only lightly rusted (10-30%).

Stem rust was much less prevalent on barley varieties than on wheat. In the heavy rust area a trace to 10% infection occurred on early sown barley and 25-40% infection in late sown fields. It was present in negligible amounts on barley in western Sask. and Alta.

The distribution of leaf rust of wheat (Puccinia triticina) was coextensive with that of stem rust. It appeared later than usual and was light (5-25%) in the early-sown crop. It, however, became quite severe in the later stands of Thatcher and Redman in the heavy-rust area where infection averaged upwards of 75%. Leaf rust infection was light on Lee, Selkirk, and on the durums.

Yield losses from rust infection were greater in Man. and eastern Sask. than in any year since 1935. The wheat acreage in the heavy-rust area amounted to about 5,000,000 acres (2,000,000 in Man. and 3,000,000 in Sask.). It is estimated that the yield of late-sown Thatcher, Redman, and Lee (sown in late May and early June) was reduced by about 50% on about 1,500,000 acres and that bushel weight was reduced by about 6 pounds. The early-sown acreage, amounting to about 3,500,000 acres, was much less affected. About half of it suffered no appreciable rust losses but the remainder, perhaps 1,700,000 acres, suffered about a 12% reduction in yield. West and north of the limits of heavy rust infection the damage amounted to only a small fraction of the losses in the heavy-rust area. Generally, durum wheat was damaged more severely than bread wheat.

Stem rust of oats (P. graminis var. avenae) was first observed in Man. at Dominion City on 13 July. Heavy infection developed on wild oats and on late stands of oat varieties susceptible to race 7. Oat varieties resistant to race 7,

such as Vanguard, Ajax, Exeter, and Fortune, remained almost free of infection in early-sown fields and carried only a light infection (about 20%) in late-sown fields. In western Sask. and in Alta., the rust occurred chiefly in trace amounts.

With regard to the other cereal rusts, crown rust of oats (P. coronata var. avenae) was prevalent throughout Man. and extended a third of the way across Sask. in appreciable amounts. It was present in trace amounts in western Sask. but did not extend into Alta. Leaf rust of rye (P. secalina) was present in all three prairie provinces, but infection was generally light. Trace amounts of leaf rust of barley (P. hordei) were observed in a few fields in southern Man. Stripe rust (P. glumarum) was found on winter wheat in the Lacombe area, Alta.

Cereal Rusts in the Rust Nurseries

The incidence of wheat stem rust in the rust nurseries is shown in Table 2. The level of infection on varieties such as Lee and Carleton is a fairly good index of the amount of infection by race 15B. At Creston, B.C., and in some nurseries in Que. and the Maritime Provinces, infection was predominantly by races other than 15B. In the nurseries in Man. and Sask. and in many of those located in Ont., 15B was the prevailing rust race. Despite the intensity of infection by this race in many of the rust nurseries there was little stem rust on McMurachy or the new variety CT-186 (Selkirk). The maximum infection recorded on the latter was 5% (at Indian Head, Sask.).

Infection by leaf rust of wheat was rather severe in most of the nurseries from eastern Sask. to eastern Ont. (Table 2). Of the varieties tested, Frontana displayed the highest degree of resistance. Other bread wheats with a high degree of resistance include Exchange, its derivative CT-186 (Selkirk), and Lee. Redman, as in former years, was rather susceptible in Man. and Sask., but displayed good resistance at many points in Eastern Canada.

When the reaction of oat varieties to oat stem rust is considered (Table 2), the susceptibility of the variety Clinton at most places where the rust was prevalent was evidently due to the presence of race 7, and the resistance of Ajax and Vanguard in many of these places was due to their resistance to this race. Heavy infection of Ajax and Vanguard in some localities was probably the result of the presence there of races 8, 10, or 11. The varieties Garry and Canuck showed a high degree of resistance except at Winnipeg, Man., and Appleton, Ont., where about 5 or 10% infection developed.

Crown rust of oats (Table 2) was not found west of Indian Head, Sask. It was sporadic in its occurrence in the Maritime Provinces but produced heavy infection in the nurseries in Man. and eastern Ont. The heavy infection of Bond and Clinton reflected the presence of race 45 and related races at most of the points where crown rust was prevalent. The varieties Trispernia and Landhafer had only traces of infection in most places.

The occurrence of stem rust on barley is shown in Table 2. There is some evidence that the rust infection on Wis. H.106, Vantage, Peatland, and U.M. 43-1020 at Ste. Anne de la Pocatiere, Que., and Fredericton, N.B. was caused mainly by rye stem rust.

Other Diseases

In addition to the cereal rusts, a summary of the incidence in the rust nurseries of several other diseases is given in Table 2. Powdery mildew (Erysiphe graminis) of wheat and barley was confined largely to the nurseries in B.C., and a few of those in Eastern Canada. Speckled leaf blotch of oats (Septoria avenae) was not found west of Fort William, Ont., except at Agassiz, B.C., where a moderately heavy infection occurred. It was present in various amounts in most of the nurseries in Eastern Canada. Speckled leaf blotch of barley (S. passerinii) occurred in the nurseries in Man. and at Edmonton, Alta., but was rare in the Eastern nurseries. Disease ratings on the varieties in the test revealed that Wis. H.106 was generally more lightly infected than the others. Scald of barley (Rhynchosporium secalis) was found in the nurseries located in the northern areas of Alta. and Sask., but was observed at only one other point (Ste. Anne de la Pocatiere, Que.). Some other diseases on which no systematic notes were taken were widespread such as net blotch (Helminthosporium teres) and spot blotch (H. sativum) of barley and Septoria leaf blotch of wheat caused by Septoria avenae f. sp. triticea. Septoria nodorum, the cause of glume blotch of wheat was less common but was found in slight amounts at Edmonton, Alta., Scott, Sask., Normandin, Que., and Fredericton, N.B. Septoria tritici was found only at Lethbridge and Edmonton, Alta.

PHYSIOLOGIC RACES OF CEREAL RUSTS IN CANADA IN 1953

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

In Report 6 issued by the Plant Pathology Laboratory, Winnipeg, Man., in January 1954, an account is given of cereal rust development in Western Canada in 1953 and the distribution in Canada is recorded of the physiologic races of the rusts: wheat stem rust (Puccinia graminis var. tritici), wheat leaf rust (P. triticina), oat stem rust (P. graminis var. avenae), and oat crown rust (P. coronata var. avenae). Isolations from a few collections of aecia from barberry and buckthorn in Eastern Canada are also recorded.

Cereal rust development in Western Canada has been reported elsewhere (see Rust Nurseries). Accordingly the distribution of the physiologic races of cereal rusts and the results from aecial collections of barberry and buckthorn are summarized below.

Distribution of Physiologic Races

Puccinia graminis var. *tritici*

In 1953, the stem-rust survey comprised 307 isolates. The following races were isolated (the number of isolates of each race in brackets): race 2(3); race 10(1); race 11(1); race 15B-1(246); race 15B-2(6); race 15B-3(1); race 19(1); race 29(7); race 38(2); race 48(1); race 49(1); race 56(28); race 59(1); race 59B(2); race 98(1); race 113(1); and race 139(4). It may be noted that race 15B-1 produces a 2+ or 3- type of infection on Golden Ball and flecks or 1 type on Selkirk, 15B-2 produces a 4 type on Golden Ball and flecks or 1 type on Selkirk, and 15B-3 produces a 2+ or 3- type on Golden Ball and a 4 type on Selkirk. Again, 59 produces a 2 type of infection on Marquis, 0 on Reliance and flecks on Kota, and 59B produces a 2+ type on Marquis, and a 2 type on Reliance

and Kota.

In the study of the 1953 isolates, the differential varieties Spelmar and Acme were not used except in the determination of certain isolates. Four additional varieties were used: Lee (to differentiate isolates of the race 15B type), Golden Ball (to distinguish race 15B-2 from other 15B type isolates), Selkirk (to detect isolates of the race 15B-3 type), and Kenya 338 AC.2.E.2. The latter is not a differential host but was used as an accessory variety to determine whether any of this year's rust collections were capable of attacking it severely. This variety has been resistant, thus far, to all stem-rust collections against which it has been tested.

The number of isolates studied was the same as in 1952 but 17 races, including biotypes, were identified in the 1953 survey as against 10 in 1952. Races found in 1953 but not in the preceding year are races 10, 19, 29, 49, 59, 59B, 98, and 113. Race 15B-3, recorded for the first time in the present survey, evidently was present in 1952 also, though evidence of its existence was not discovered until towards the spring of 1953, when a special study of a number of 1952 collections of race 15B revealed its presence in collection No. 264-52 from Vantage barley obtained at Regina, Sask. Most of that collection was race 15B-1 as was indicated by the fact that it produced mostly necrotic flecks and type 1 pustules on the variety McMurachy. A large pustule, however, developed on one leaf of this variety. This gave rise to a culture identical with race 15B-1 except for its ability to attack McMurachy and its derivative Selkirk rather severely.

The predominant race was 15B-1 which accounted for 80.1% of all isolates. The only other race of frequent occurrence was race 56, the predominant race for many years prior to 1950, which comprised 9.1% of the isolates. As in the preceding 3 years, race 56 was more frequently collected in Alta. than in the other two Prairie Provinces.

Of the other races identified, race 139 is of special interest. This race attacks McMurachy heavily but is not virulent to Thatcher or Lee or Hope - and H44- derivatives. Despite its ability to attack McMurachy it is not virulent to its derivative Selkirk. Evidently the resistance of Selkirk is due to its possessing the H44 type of resistance derived from its other parent Redman. Race 139, however, attacks the durum wheat Golden Ball heavily in the seedling stage. Another race of some interest is race 29 which also attacks Golden Ball heavily. A characteristic of race 29 and of the three isolates of race 139 from Eastern Canada is the light colour of the uredinia, which are decidedly more orange than is usual in stem rust. The Western isolate of race 139 (from Alta.) is an exception; its uredinia have the usual stem-rust colour.

It is again evident, as in former years, that race distribution in B.C. is different from that of the Prairie Provinces. Races 2 and 59B, pathogenically rather similar, appear to predominate in the Creston area, in southeastern B.C.

Puccinia graminis var. secalis on Barley

Stem rust on barley in Canada, in 1953, was predominantly wheat stem rust. Most stem rust collections from barley and Hordeum jubatum were analysed for the presence of wheat and rye stem rust. Of 23 isolates from barley grown in Eastern Canada only 6 were rye stem rust. Of 41 isolates from barley grown in Western

Canada only 5 were rye stem rust. Similarly, wheat stem rust predominated in collections from H. jubatum; of 17 isolates from this host only 2 were rye stem rust.

Puccinia triticina

The physiologic races of leaf rust of wheat were recorded according to the "Unified Numeration" (UN) of the key agreed on, in 1948, by American and Canadian investigators of this rust. In this key the races are grouped in the 24 classes they fall into if the differential hosts consist of only Malakof, Webster, Loros, Mediterranean, and Democrat. Race identification, in 1953, was made by means of these hosts with the addition of the variety Brevit, and the further addition of Renown which makes possible the separation of certain biotypes not otherwise readily distinguishable. The varieties Carina and Hussar were added occasionally when it was judged necessary to test certain isolates on the full assortment of differential hosts. The old race numbers corresponding to the UN groups are also given.

All rust collections were initially increased on the susceptible variety Little Club. Two single-pustule isolates were established from each collection and used for race determination. The remainder of each culture was inoculated to a screening set composed of the resistant varieties Exchange, Gabo, Lee, Frontana, and Selkirk. Any unusually large pustules produced on the screening varieties were used to initiate cultures for the determination of the races involved.

The 195 isolates studied were identified as follows (numbers of isolates in brackets): UN 1 = races 1(3) and 1a(2); UN 2 = races 15 (8) and 15a(48); UN 3 = races 3(1) and 58(71); UN 6 = race 126(6); UN 9 = race 9(4); UN 10 = race 11(10); UN 11 = race 93(2); UN 13 = race 35(5); and UN 14 = race 128a(2). Races with the suffix "a" as 1a and 15a, are virulent to seedlings of Renown and many other derivatives of H44 and Hope.

In most respects the race distribution in 1953 was similar to that of the preceding year. Race 58 was by a wide margin the predominant race in Eastern Canada and races 15a and 5a occurred in the Prairie Provinces almost to the exclusion of other races. It may be noted that of the 74 isolates from the Prairie Provinces 70 were virulent to Renown and presumably also to most other Hope and H44 derivatives. As in the preceding year, races 1, 1a, and 11 occurred in the eastern provinces and were common in collections from B.C. Races 9 and 128a were also found in the Creston area, B.C., as in 1952. It seems evident that there is a greater variety of physiologic races in both Eastern Canada and B.C. than in the Prairie Provinces.

The chief difference between this year's and last year's survey concerns the distribution of race 126. This year it accounted for only 3% of the total isolates. In 1952 and 1951 the figure was 12%; in 1950 and 1949 it was 22% and 25% respectively. The sharp decrease in the prevalence of this race, especially in the Prairie Provinces, represents a trend for which there is no known explanation. Another difference between this year's survey and those of several preceding years is the occurrence this year of race 35 in several rust collections from Eastern Canada.

Puccinia graminis var. avenae

Studies on 144 isolates of oat stem rust resulted in the identification of the following races (number of isolates of each race in brackets): race 1(1); race 2(11); race 3(1); race 4(1); race 5(2); race 6(7); race 7(75); race 7a(2); race 8(21); race 10(10); race 11(6); race 12(5); race 13(2). In 1952 the same races were identified except races 3 and 4 which were not collected.

The trend of increasing prevalence of race 7 was extended. This race constituted 52% of the isolates in 1953, which greatly exceeds the 33.3% of the previous year. The increase in the prevalence of race 7 was made at the expense of races 1 and 2. Race 8 was second in order of prevalence as it was in 1952.

Most of the common races were widely distributed throughout the country. It is of interest that race 6 and the related race 13, which have increased in prevalence in the last two years, have been collected, with very few exceptions, in the Maritimes, Que., and Ont.

The biotype of race 7, designated 7A and first mentioned in these reports in 1952, was collected again this year. This strain is distinguished from other race 7 isolates by means of its ability to attack the variety Rodney, which was used as a differential host in 1952 and 1953. In 1952, two isolates of this biotype were collected in Man.; in 1953, one isolate was collected in Sask. and another in Que. Apparently race 7A is widely distributed, although it is not a common race at present.

Puccinia coronata var. avenae

In 1953, uredinial collections of crown rust were obtained from many localities in Eastern Canada and the Prairie Provinces.

The races present in the cultures established from these collections were identified by means of the following differential hosts: Anthony, Appler, Bond, Bondvic, Saia, Ukraine, Trispernia, Victoria, Santa Fe, and Landhafer.

The races identified are designated in accordance with the "New Method" of crown rust race numeration agreed on, in 1951, by Canadian and American workers carrying out crown rust race identifications and first used in these reports in 1952.

In all, 180 isolates were studied. From these 18 distinct physiologic races were identified, all of which had been found in Canada in previous surveys.

The designation of the races identified, with the former designations of each race, is as follows: 201=34, 202=45 & 57, 203=45a, 209=1948-1, 211=34a, 212=1946-1, 228=2a, 229=2b, 230=4a & 5a, 231=3a, 232=3b, 234=2c, 235=3c, 236=3b, 237=1 & 6, 238=4 & 5, 239=2 & 38, and 240=3.

The number of isolates of each race identified is indicated in brackets after the number of the race: 201(30), 202(61), 203(21), 209(3), 211(7), 212(1), 228(4), 229(1), 230(2), 231(8), 232(5), 234(2), 235(1), 236(2), 237(4), 238(1), 239(11), and 240(16).

Races 201, 202, and 203, all of which are capable of attacking varieties possessing the Bond type of crown rust resistance, were the predominating races in Western Canada and in Ont. and Que. They also occurred in the Maritime Provinces but were relatively less prevalent there. Race 240 was the most prevalent race in the Maritime Provinces.

No races were isolated capable of attacking the varieties Landhafer, Santa Fe, Trispernia, and Victoria. These varieties are the main ones now being used by plant breeders as a source of crown rust resistance.

Isolations from Aecia

In the early summer of 1953 a number of collections of aecia on barberry (Berberis vulgaris) and buckthorn (Rhamus cathartica) were shipped to the Plant Pathology Laboratory, Winnipeg, Man. by cooperators in Eastern Canada. For this assistance acknowledgment is due to the following: A. Payette, Ste Anne de la Pocatiere, Que., J.L. Howatt and S.R. Colpitts, Fredericton, N.B., H.A. Klinck, Macdonald College, Que., J.E. Campbell and R.B. MacLaren, Charlottetown, P.E.I., D.N. Huntley, O.A.C., Guelph, Ont., D.W. Creelman, Kentville, N.S., I.J. Bassett and I.L. Conners, Ottawa, Ont., G.C. Chamberlain, St. Catharines, Ont., T.C. Vanterpool, Saskatoon, Sask.

Aecia on Barberry

On receipt of the collections the aeciospores were inoculated to Little Club wheat, Victory oats, Rosen rye, Agrostis alba, and Poa compressa.

As in other years when similar studies were made var. secalis was the most common. It occurred in 6 of the 9 collections studied. Var. agrostidis occurred in 4 collections, var. tritici in 3 (races 1,15B and 56) and var. avenae in 2 (race 8). Var. poae was not detected in any of the collections. One collection from Fredericton, N.B. contained the 3 varieties tritici, secalis, and agrostidis. Race 15B was from aecia at Ste. Petronille, Isle d'Orleans, Que.

Aecia on Buckthorn

Aecial collections were obtained, in 1953, from both Eastern and Western Canada. The spores from each collection were transferred to oats, rye, Festuca elatior, Lolium perenne, Holcus lanatus, Alopecurus pratensis, and Calamagrostis epigeios.

Three different varieties of crown rust, Puccinia coronata var. avenae, P.c. var. secalis, and P.c. var. festucae were isolated.

The variety avenae was the most prevalent one and comprised about two thirds of all the isolates identified; the variety secalis comprised almost one third of the isolates; and the variety festucae was represented in only two of the collections.

Nine physiologic races of crown rust were isolated from the 22 cultures of the variety avenae established from the aecial collections. These were as follows: 202, 212, 228, 231, 235, 236, 237, 239, and 240.

ERGOT IN CEREALS IN WESTERN CANADA IN 1953

I. L. Conners

There has been some concern in the last few years over the prevalence of ergot in cereals, particularly wheat, in Western Canada. In order to obtain some basic data, the four Plant Pathology Laboratories, of the Botany and Plant Pathology Division, located in the Prairie Provinces undertook to conduct special field surveys for ergot or give the disease special attention when cereal crops were being observed for other diseases. The data thus obtained have been made available for summary.

Table 3. Fields of Wheat inspected for Ergot by Province and Crop District, 1953

	Manitoba		Saskatchewan		Alberta	
C.D.	Total	Ergot	Total	Ergot	Total	Ergot
1	7		16	2	56	
2	26	2	18		89	1
3	37	1	27	4	17	
4	4	1	14	2	27	
5	2		25	2	40	10
6	4	1	48	4	57	17
7	15	3	24	6	77	22
8	18	1	22	2	53	17
9	8		18		2	
10	8				48	11
11	8	1			18	2
12	3				-	
13	3				11	
14	-				25	2
15					23	
16					102	4
Total	143	10	212	22	645	86
% Ergot		7.0		10.4		13.3

Table 4. Fields of Barley inspected for Ergot by Province and Crop District, 1953

	Manitoba		Saskatchewan		Alberta	
C.D.	Total	Ergot	Total	Ergot	Total	Ergot
1	2		3		15	
2	23	2	4		22	1
3	21		4		9	
4	5	1	1		6	
5	-		2	1	6	1
6	2		2		21	5
7	3		5	4	12	4
8	7		6		46	1
9	2		2	1	4	1
10	8	2			25	5
11	2				34	3
12	5	1			-	
13	4				10	1
14	1				56	4
15					17	
16					93	1
Total	85	6	29	6	376	27
% Ergot		7.1		20.7		7.2

Table 5. Fields of Rye inspected for Ergot by Province and Crop District, 1953

	Manitoba		Saskatchewan		Alberta	
C.D.	Total	Ergot	Total	Ergot	Total	Ergot
1	3	3	-		2	2
2	7	7	-		4	
3	10	10	-		1	
4	1	1	-		-	
5	-		-		2	2
6	2	2	-		5	3
7	4	4	1	1	9	7
8	7	7	-		2	1
9	1	1	2	1	-	
10	1	1			3	
11	4	4			-	
12	1	1			-	
13	2	2			-	
14	-				7	7
15					-	
16					23	9
Total	43	43	3	2	58	31
%Ergot		100.0		66.7		53.4

The results of the surveys for ergot in wheat, barley and rye are shown in Tables 3-5. It is evident from Table 3 that ergot in wheat was heaviest in Alta., where in Crop Districts 5-8 over 25% of the fields examined were affected. A similar concentration occurred in Crop District 7 of Sask. A map (Fig.2) perhaps shows the distribution more graphically. Each field found affected in Sask. is represented by a large dot. In the other two provinces, each dot, large or small, represents a place where one or more affected fields were encountered. The large dots in Man. and Alta., along with those in Sask., denote the relative prevalence of ergot in wheat across the Prairies. In Man., the varieties affected were: Lee, 5 fields; Redman, 4; and Garnet, 1; but the clean fields were not identified to variety.

The surveys for ergot in barley (Table 4 and Fig.2) reveal that the level of infection and distribution pattern in the crop is similar to that of wheat. The number of fields observed in Sask. was limited. However, in Crop District 7 of both Alta. and Sask., over 25% of the fields were affected by ergot.

In rye (Table 5 and Fig. 2), the level of infection was much higher, ergot being present in all 43 fields examined in Man. Although the observations in Sask. were used to estimate the level of infection, they were far too few on which to base a reliable estimate.

Table 6. Estimated Percentage of the Cereal Acreage affected by Ergot in 1953

Crop	Province			Mean	Weighted Mean
	Man.	Sask.	Alta.		
Wheat	7.0	10.4	13.3	10.2	10.8
Barley	7.1	20.7	7.2	8.3	11.5
Rye	100	66.7	53.4	73.0	64.7

MAPS OF WESTERN CANADA

showing

Distribution of Ergot in Grain Crops

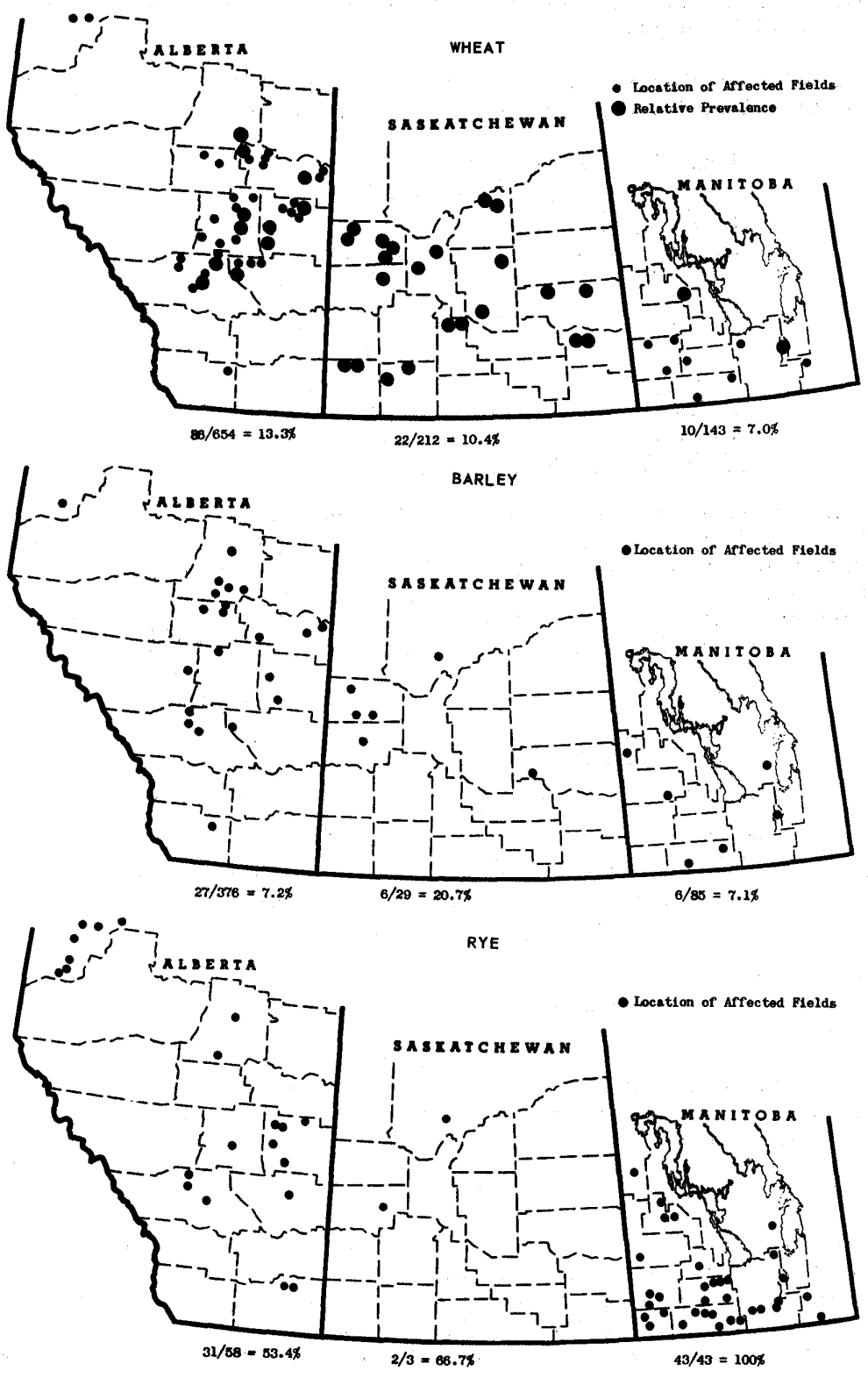


FIGURE 2

To summarize the field observations for 1953 (Table 6), it is estimated that slightly over 10% of the wheat and barley crops and about 65% of the rye crop were affected by ergot.

It may also be observed that the level of ergot infection in individual fields of wheat and barley was much less than in those of rye. Table 7 shows that

Table 7. Level of Ergot Infection in Cereal Fields in Alberta

Infection (%)	Wheat	Barley	Rye
0	559	349	27
tr.	69	22	18
1-3	12	3	3
4-10	4	2	6
15-25	1	-	1
50-75	-	-	3
Average (affected fields)	0.7	0.9	9.0

about ten times as much ergot developed in affected rye fields than in those of wheat or barley in Alta. The same general relationship held true in the other two provinces, although in areas where few fields of wheat and barley became infected there was less ergot in the rye. In Man., the infection in the affected rye fields averages 0.2%, but often the infection was quite heavy about the margins of the field (first 20 feet), up to 50% of the heads carrying ergot.

Table 8. Volunteer Rye as a source of Ergot in other Cereal Crops in Saskatchewan

Crop	Number of Fields		Source	
	Clean	Affected	Crop	Vol. Rye
Wheat	190	22	12*	12
Barley	23	6	5	1
Oats	14	1	0	1

*Two of the 12 fields also contained volunteer rye affected by ergot

Probably the most significant observation this year was the importance of 'volunteer' rye as a source of ergot in crops of wheat and other cereals (Table 8). Only a trace of ergot was present in the wheat itself, whereas the infection in the rye was mod. to sev. (5 to 15 or more ergot bodies per head) in 7 fields and tr. to sl. in the other five. In some fields the rye plants arose from seed occurring as an impurity in the crop being sown and in others they were volunteers from a previous crop. Similar observations were made in Alta., but no rye was observed in wheat fields in Man. Ergot was found in the oat crop in only one field near Colinton, Alta.

The presence of ergot was observed repeatedly in grasses growing about the headlands and at the edges of fields in all three provinces. Dr. W.P. Campbell, of the Edmonton laboratory, recorded ergot in 11 grass species in northern and central Alta., Bromus inermis and Agropyron repens being most frequently infected. Dr. W.L. Gordon noted ergot in several grasses, particularly A. trachycaulum and B. inermis.

It is almost certain that the level of ergot infection in the various cereals differs considerably from year to year. Only by continuing the observations over a period of years will it be possible to determine how serious the problem really is. There is some indication that the level of ergot does fluctuate greatly in different years. From the Grain Trade in Canada were collected figures on the production of rye in Western Canada, the amount inspected, the amount graded ergoty, and the percentage graded ergoty from the present back to 1932, the first year apparently when rye graded ergoty was separately recorded in the published reports (Table 9). It will be noticed that the percentages of rye graded ergoty (Fig. 3) in 1942 and 1943 exceed by a considerable margin the rather high levels of recent years.

Table 9. Production of Rye in Western Canada and Percentage of Crop Graded Ergoty upon Inspection

Crop Year	Production	Inspected		Percentage Ergoty
		Total	Ergoty	
	'000 bu.	'000 bu.	bu.	%
1953 (Aug.-Oct.)	26,230	4,620	354,293	7.7
1952-53	22,924	14,353	1,455,997	10.1
1951-52	15,980	9,217	18,806	0.2
1950-51	11,200	7,710	590,383	7.7
1949-50	7,550	9,355	119,681	1.3
1948-49	22,350	15,817	411,468	2.6
1947-48	11,630	9,623	80,179	0.8
1946-47	7,278	5,495	9,498	0.2
1945-46	4,476	2,823	117,875	4.2
1944-45	7,109	4,319	256,460	6.1
1943-44	5,870	8,338	1,064,500	12.8
1942-43	23,000	5,414	830,000	15.3
1941-42	9,989	4,982	46,835	0.9
1940-41	12,250	4,844	6,460	0.1
1939-40	13,700	5,030	10,955	0.2
1938-39	9,340	2,026	7,150	0.4
1937-38	4,280	1,410	1,370	0.1
1936-37	3,201	2,256	25,080	1.1
1935-36	8,379	1,959	56,990	2.9
1934-35	3.664	1,022	34,500	3.4
1933-34	3,104	1,307	53,400	4.1
1932-33	7,270	2,693	80,830	3.0

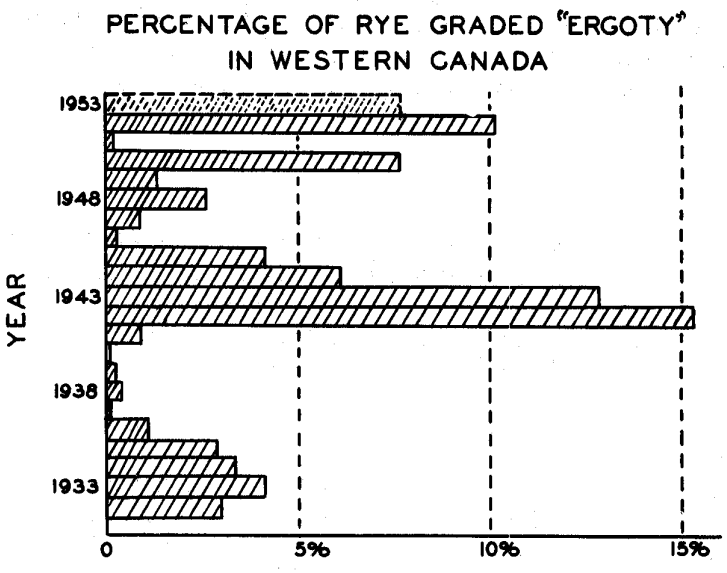

PERCENTAGE OF RYE GRADED "ERGOTY"
IN WESTERN CANADA
YEAR
1953
1948
1943
1938
1933
0
5%
10%
15%

FIGURE 3

II. DISEASES OF FORAGE AND OTHER FIELD CROPS

A. FORAGE LEGUMES

A joint report on the "Diseases of Forage Legumes in Eastern Canada" has been prepared by Mr. R.J.Baylis, Dr. W.G. Benedict and Dr. R.O. Lachance. Because these officers are located at Ottawa and Harrow, Ont., and Ste Anne de la Pocatiere, Que., respectively, the report covers observations on these crops as they occur in southwestern Ont., eastern Ont., and in the lower St. Lawrence valley of Que.

Although many of the observations in each area were made by the officer working alone in his respective area, it was possible in 1953 for the three investigators to meet together and carry out a special survey visiting each area in turn. This report covers more particularly observations made in the current year, but it includes pertinent data recorded in previous years.

Besides the pronounced climatic differences between the three areas, the type of farming practised in each is quite dissimilar. In southwestern Ont. forage legumes are grown on a large scale in pure stands and are often used as soil conditioners. Sweet clover is the principal legume used for the latter purpose. In the central and eastern parts of the province, hay mixtures and shorter rotations more generally adapted to mixed farming are to be found. In the St. Lawrence valley of Que., however, conditions for the extensive growing of legumes are considerably more limited on account of the shorter growing season and the variable nature of the soils.

Winter Conditions in 1953.- The winter of 1952-53 was unusually mild in Ont., with a light snowfall. The average mean temperature from November 1952 to February 1953 inclusive for 12 points in Eastern Canada was 5.5°F. above normal. Snowfall for this four-month period was below normal and at Ottawa only 27.3 inches were recorded for the entire winter compared with a normal annual snowfall of 87 inches. At Ste. Anne de la Pocatiere, however, snowfall amounted to 109.3 inches, a figure slightly above the normal total of 106 inches.

At many points in Eastern Canada, especially in Ont., the ground was bare or nearly bare most of the winter and soil remained unfrozen until late December. Later, frequent rains and melting snow resulted in standing water, which froze to form extensive ice sheets on fields during January and February. Although the spring weather was favourable for renewed growth, icing conditions, as anticipated, had killed extensive areas in many fields in eastern Ont. and southern Que.

Winter Injury. - A survey of the eastern counties of Ont. in May 1953 revealed severe winter injury to stands of red clover and alfalfa on most soils. Stands on well-drained and sloping land survived relatively well, but when they were examined later in the summer after exposure to a period of hot dry weather, older stands of alfalfa showed additional injury. In general, new seedlings of alfalfa survived well, whereas older stands were often greatly reduced. In legume-grass mixtures, grasses appeared to have suffered little injury from icing and the resulting hay crops, while light in legumes, were still fair in quality and yield.

Injury from icing was also general in southwestern Que., where adequate drainage is an important problem in the rich meadows of the Richelieu valley. Icing with consequent injury to forage legumes is a recurrent problem in the area, which is alternately cooled and warmed by reason of the close proximity of Lake Champlain.

In southwestern Ont., despite icing conditions occurring occasionally during the winter, no damage of any great consequence resulted.

Common Clover

Because of its hardiness under average winter conditions, red clover is of first importance as a hay and pasture crop in Eastern Canada. Most of the observations have therefore been made on red clover, but similar notes were collected on the other clovers whenever they were of common occurrence.

Crown Rot (Sclerotinia trifoliorum). - The almost complete absence of injury by crown rot was notable in 1953 after a winter and spring that were expected to favour severe outbreaks of the disease. Crown rot has occasionally been destructive, as in 1949 (P.D.S.29: 23-24) and 1950, to pure stands of red clover, Ladino and birdsfoot trefoil in eastern Ont. It also occurs to a lesser extent on alfalfa. Damage by the fungus is difficult to estimate in grass and clover mixtures and is frequently attributed to winter killing.

Root Rot. - An insect-fungus complex exists in red clover as a result of tunnellings made by the clover root borer, Hylastinus obscurus (Marsham), which appeared to be more active than usual in 1953 in soutwestern Ont. Infestations are somewhat sporadic throughout the province. Sufficient injury occurs each year to permit secondary organisms. predominantly species of Fusarium, to cause some rotting and premature killing.

Anthracnose. - Kabatiella caulivora is an organism of minor importance although it causes mostly trace infections each year. Much commoner in Eastern Canada are Colletotrichum graminicola and C. destructivum, the latter fungus being the more destructive to red clover.

Powdery Mildew (Erysiphe polygoni) was conspicuous this year on the current year and year-old stands of red clover. Infection became severe in southwestern Ont. in the late summer. The fungus was present to a lesser extent in eastern Ont. and was of no consequence in Que. The disease may be of considerable importance during hot dry summers.

Sooty Blotch (Cymadothea trifolii) is virtually absent on red clover but is prevalent on Ladino and White Dutch clovers late in the season. It is of no economic importance.

Leaf Spot (Stemphyllium sarcinaeforme) is very common but seldom causes appreciable injury to "double-cut" clovers.

Rust (Uromyces fallens) infection varied from a trace to quite severe on red clover according to the district. In general, rust is rather severe in southwestern Ont., but it causes only slight damage. Rust (U. trifolii) has been present each year on alsike, causing severe damage. In 1953, leafhoppers also caused severe burning of the foliage, probably resulting in more damage than that caused by rust.

Alfalfa

Alfalfa is used as a hay and pasture legume in areas suited to its production. These areas are found principally in southwestern and central Ont. and to a lesser extent further east.

Bacterial Wilt (Corynebacterium insidiosum). - The continued advance of bacterial wilt in Ont. was readily discernable in 1953, following the weakened condition of some overwintered stands. Typical symptoms of wilt and yellowing were unusually prominent in eastern Ont. in July; damage was estimated to be rather severe. Obvious symptoms of wilt are generally lacking under conditions highly favourable for the growth of alfalfa. The disease is more commonly detected, in fields two or three years old, by a progressive die-back in unproductive appearing plants.

Based on the percentage of wilt-infected plants, damage was variously estimated as slight to severe in southwestern Ont., where 14-92% of the plants in the infected fields were either dead or severely infected in May, moderate in eastern Ont., and a trace only in southwestern Que.

Recently both Verticillium ?albo-atrum and Fusarium spp. have been isolated from wilted alfalfa plants collected at Ste Anne de la Pocatiere, Que. These plants had already given a negative smear for Corynebacterium insidiosum.

Bacterial wilt is not a major disease of alfalfa in most parts of Eastern Canada as it apparently is in the West, probably because alfalfa is grown in relative short rotations and hay mixtures in the East.

Boron Deficiency. - Yellowing of alfalfa due to the lack of boron is quite common on light soils everywhere in Que. Surveys during the last 3 years have shown that it was present in 61% of the fields surveyed. The disorder has also been observed on heavy soils with an alkaline reaction and alkaline subsoil. The trouble has also been seen in red clover.

Black Stem (Ascochyta imperfecta) is seldom important in Eastern Canada. Trace to moderate, and occasionally severe, infections were observed in the areas surveyed this year. The last severe outbreak of the disease was reported in 1948 (P.D.S. 28:16).

Common Leaf Spot (Pseudopeziza medicaginis) is undoubtedly the most prevalent leaf spot of alfalfa in Eastern Canada. However, it apparently has little economic importance, the plants suffering some loss of foliage only if the second cutting is delayed. It is generally present in moderate to severe amounts on the lower half of the plant.

Yellow Leaf Blotch (Pseudopeziza jonesii) is not commonly observed in eastern Ont. and in Que. However, it appeared to be more abundant this year than usual and was present in trace to slight amounts in most sections. In southwestern Ont., the disease was very prevalent especially in alfalfa growing on sandy soils in 1953.

Other Leaf Spots (Stemphyllium botryosum, Leptosphaeria pratensis) appear only occasionally and are of no economic importance. Rust (Uromyces medicaginis) also occurs occasionally.

Yellows (boron deficiency). Observations indicated that red clover growing about Ste. Anne de la Pocatiere, Que., is suffering from boron deficiency. This finding was confirmed experimentally; it was found that boron deficiency symptoms were visible on plants of both red and alsike clover receiving 0.25 p.p.m. of boron or less, whereas plants receiving 0.50 p.p.m. or more were healthy (R.O. Lachance).

Sweet Clover

As already mentioned, sweet clover is grown extensively in southwestern Ont. where it is important as a seed crop and a soil conditioner.

Phytophthora Root Rot (P. cactorum). which causes a soft rot of the root and crown, was prevalent again this spring in Essex County, affecting up to 60% of the plants in some stands in early May. However, the damage was light because by mid-June the thinned stands showed promise of producing a good crop. Later observations showed that seed yields were very good. Since 1947, when this disease appeared to be a distinct menace to sweet clover in the area (cf. J.T. Slykhuis. Sci. Agr. 32(1):1-18. 1952), epidemic outbreaks have occurred less frequently and damage to crop less pronounced.

Black Stem (Ascochyta meliloti) is very prevalent in second-year growth of sweet clover, especially in stands that are grazed. The disease becomes conspicuous on seed crops as they near maturity, but the damage is slight. Often the whole plant including the seed pods becomes infected.

Leaf Spot (Stagonospora meliloti). - The circular gray to tan spots bearing brown pycnidia of the fungus are found on the leaves of sweet clover throughout southwestern Ont. Loss of foliage is slight as the disease is found on maturing second season stands.

Mosaic (several viruses). - The foliage of a small percentage of plants in most sweet clover stands show symptoms of virus infection especially early in the second season. The damage caused to the plants depends on the particular virus present. Probably of more importance is the fact that sweet clover may act as an overwintering host for a number of viruses affecting annual crops.

ALFALFA

BLACK STEM (Ascochyta imperfecta) was found in all 55 fields examined in Sask. The disease was well established on June 9 in all fields at Hudson Bay. Infection was mod. in all fields in the Nipawin area by mid-July and in most fields in the Big River, Meadow Lake, and Pierceland areas by the end of the month (H.W. Mead). Infection ranged from trace to heavy in half the fields of Ontario Variegated examined in Essex Co.; damage was severe due to defoliation in one 3-year-old field left to mature seed after the first cutting (W.G. Benedict).

Foliage diseases of alfalfa caused considerable damage this year in Man., being favoured by the heavy rainfall in the spring and early summer. The following organisms, in order of their importance, were observed on alfalfa: Ascochyta imperfecta, Pseudopeziza medicaginis, Pseudopeziza jonesii, Leptosphaeria pratensis, Peronospora aestivalis and Pseudoplea trifolii (W.C. Donald).

WINTER CROWN ROT (low-temperature basidiomycete). Infection was 2-tr. 3-sl. 4-mod./12 fields examined w. of Lacombe and w. and n.w. of Edmonton, Alta. (G.B. Sanford). Infection ranged from tr. to mod. in the 25 out of 55 fields examined in Sask. In most fields it was confined to single plants or to small groups (H.W. Mead). In a recent note (Phytopath. 43(10):571-572. 1953) J.B. Lebeau and J.G. Dickson report the production of hydrogen cyanide by the pathogen. They conclude: "The greenhouse and laboratory experiments strongly suggest that disease development is directly dependent upon the production of HCN by the fungus and the confinement of the lethal agent in the close proximity of the plant parts until specific tissues or the entire crown is killed".

ANTHRACNOSE (Colletotrichum destructivum). Odd plants of Grimm alfalfa were found affected at two places in Kamouraska County, Que.; affected plants showed a girdling of the stem and reddening of the foliage (R.O. Lachance).

BACTERIAL WILT (Corynebacterium insidiosum) was general in a neglected field at Savona in the Thompson valley, B.C. (V.C. Brink, E.J. Hawn). Infection ranged from tr. to mod. in 1-3-year-old fields (in 28 out of 35 examined) in s. Alta. (E.J. Hawn). Bacterial wilt was found affecting 10-15% of the plants in a single old field in Sask.; it was the first case in the Meadow Lake area (H.W. Mead). As mentioned in the special report above, bacterial wilt was usually severe in all fields 3-4-years old of Ontario Variegated examined in Huron County. Alfalfa seed imported from France was sown extensively in 1952 and 1953 in the southern part of the county; no wilt has yet been found in these stands (W.G. Benedict). The disease affected 15% and 20% of the plants in 2 fields of Ontario Variegated in Wellington Co. Diseased specimens from which the pathogen was isolated were received from a field in Frontenac Co. (J.A. Carpenter).

STEM NEMATODE (Ditylenchus dipsaci). Localized infections found in 2 fields in the Lethbridge district, Alta. (E.J. Hawn).

DOWNY MILDEW (Peronospora aestivalis) was severe in May on trial rows of Buffalo and Ranger varieties at the Station, Saanichton, B.C. Downy mildew was general on plants of Trifolium dubium growing in the headlands adjacent to the alfalfa, but it is still to be demonstrated that only one organism is responsible (W. Jones). Although only a trace of downy mildew was reported in one of the 35 fields examined in Alta., infection in the plots was recorded as follows: Severe on scattered plants at Lethbridge (E.J. Hawn); severe and general on Grimm, Ladak and Rhizoma at Lacombe (W.P. Campbell); and severe on some Iranian varieties at Edmonton (A.W. Henry).

YELLOW LEAF BLOTCH (Pseudopeziza jonesii) appeared to be heaviest in Sask. around Loon Lake, where the infection was 12-mod. 6-sev./18 fields. Further east, infection was 8-sl. 4 mod./12 fields (H.W. Mead).

COMMON LEAF SPOT (Pseudopeziza medicaginis). Infection was 3-tr. 5-sl./35 fields examined in Alta. and sl.-mod. in the plots at Lethbridge (E.J. Hawn) and sev. in the plots at Lacombe and Vermilion (W.P. Campbell). Infection was 10-tr. 10-sl. 5-mod./30 fields examined in Sask.; along with yellow leaf blotch, the disease causes mod. defoliation in alfalfa grown as a seed crop (H.W. Mead). A sev. infection was recorded in one field in Queens Co., N.S. (D.W. Creelman). A sl. infection was observed in Queens Co., P.E.I. (J.E. Campbell).

LEAF SPOT (Stemphylium botryosum). Infection was tr. to heavy in 14 out of 23 fields examined chiefly in Essex and Huron counties, Ont., in Sept. For fuller account see U.S.D.A. Pl. Dis. Reptr. 38(1):27-29. 1954. (W.G. Benedict).

CROWN BUD ROT (Rhizoctonia solani, Fusarium spp., etc.) was observed in 34 out of 35 fields examined in s. Alta. Field and plot studies showed that the disease develops most rapidly during May to July with little increase later in the season. In irrigated fields, most plants become infected in the second year (E.J. Hawn).

RUST (Uromyces medicaginis) mod. infected a one-year-old field of Ontario Variegated at the Substation, Woodslee, Ont., in Sept. (W.G. Benedict).

WITCHES' BROOM (virus), first noticed in the Kamloops area, B.C., in 1936, is now reported from Chilcotin, Kamloops and Nicola valley areas. It also occurs as far north as Fort Fraser, but it has yet to be observed in B.C.'s Peace River area. The proliferation of the stems shows up well after second cutting and on ranches, where only partial irrigation is practised. With more data available, it appears that the disease is spreading in Interior B.C., in some fields in the Kamloops area, 80% of the plants are infected (V.C. Brink).

YELLOWING (boron deficiency) was present in 52 of the 77 fields examined on light soils in August in the lower St. Lawrence valley, Que.; some fields were mod.-sev. affected (R.O. Lachance). Yellowing was sev. in a small field in Digby Co., N.S. (K.A. Harrison) and sl. in one field in Queens Co., P.E.I. (J.E. Campbell).

PHOSPHORUS DEFICIENCY. An examination was made in May of extensive fertilizer experiments being carried out on the Walker Farms, Windsor, Ont. In one-year-old stands the average stand of plants per sq. yard was 17, the plants being weak and stunted, where little or no phosphate was applied but N and K were adequate; 42 where no N was supplied, but P and K adequate; and 25 where complete fertilizer was added. The yield of hay and pasture followed the same pattern (W.G. Benedict).

WHITE SPOT. A white spotting of the leaves of alfalfa was very prevalent in June in Man.; it is thought that the disorder was caused by the excessive rainfall at that time (W.C. McDonald).

WINTER INJURY caused tr.-sl. damage in 2 fields west of Edmonton, Alta. (G.B. Sanford). Damage was 5-tr. 17-sl./55 fields examined in Sask.; mostly individual plants were affected (H.W. Mead).

COMMON CLOVER

SOOTY BLOTCH (Cymadothea trifolii). Infection was tr.-sl. in 2 out of 3 fields examined in the Brooks area, Alta. (E.J. Hawn). The disease was general on alsike throughout N.S.; it caused mod. damage to a field at Broad River (D.W. Creelman).

POWDERY MILDEW (Erysiphe polygoni). Infection was sl. on red clover in the plots at Brooks, Hays, and Lethbridge, Alta., and tr. on alsike at Lethbridge (M.W. Cormack). The disease was general throughout southwestern

Que. (L. Cinq-Mars, R. Crete). Powdery mildew was widespread on red clover in N.S., but caused little apparent damage (D.W. Creelman).

ANTHRACNOSE (Kabatiella caulivora). Infection was sl. on Lasalle at Hays, Alta. (M.W. Cormack) and mod.-sev. in the red clover plots at Lacombe (W.P.C.).

LEAF SPOT (Pseudopezia trifolii) was general on the lower leaves of red clover in the plots at the Station, Saanichton, B.C. (W. Jones). Sl. infection noted at La Trappe, Que., in 1952 (Fr. M. Claude).

CROWN ROT (Sclerotinia trifoliorum) caused considerable damage to the wild Trifolium dubium in one area in North Saanich, B.C. (W. Jones).

LEAF SPOT (Stemphylium sarcinaeforme) lightly infected a field of red clover in Queens Co., P.E.I. (J.E. Campbell).

RUST (Uromyces fallens) was light in a field of red clover in Queens Co., P.E.I., on 31 Aug. (J.E. Campbell). Traces were noted at La Trappe, Que., in 1952 (Fr. M. Claude). U. minor was prevalent on Trifolium dubium in some areas along roadsides in N. Saanich, B.C. (W. Jones).

WITCHES' BROOM (virus). Up to 25% of the plants were infected in a 3-year-old planting of alsike clover at the Substation, Prince George, B.C. (H.N.W. Toms). About 30% of the plants were affected in a plot of Ladino white clover in a plot at the Farm, Agassiz; affected plants show much stem proliferation and the complete lack of stolons (H.N.W. Toms).

BORON DEFICIENCY. Affected plants were received from the Substation, Whitehorse, Yukon (G.B. Sanford).

WINTER INJURY affected 50-75% of the plants of Lasalle red clover in a planting at Grand Forks, B.C. They had been grown in rows that were ridged for furrow irrigation. No injury was present in two other plantings; the plants were grown in rows and under irrigation, but they had not been ridged (G.E. Woolliams). Winter injury caused severe damage to Lasalle and Lethbridge, but not to this variety at Hays, Alta. (M.W. Cormack).

SWEET CLOVER

BLACK STEM (Ascochyta meliloti). Infection was mod. in a roadside stand near Medicine Hat, Alta. (M.W. Cormack) and sl. in the plots at Lacombe (W.P.C.). Black stem caused sl. damage in 10 out of 18 fields examined in Sask. It was causing distortion of stems and spotting of leaves in heavy stands of yellow sweet clover in the Tisdale area early in July (H.W. Mead).

ROOT ROT (Phytophthora cactorum) was usually prevalent and destructive in s. Alta. Infection was 1-tr. 3-sl. and 2-mod. to sev./6 fields examined(E.J.H., M.W.C.).

LEAF SPOT (Stagonospora meliloti). Tr.-sl. infections in the plots at Lethbridge, Alta. (M.W. Cormack). Foliage diseases of sweet clover caused considerable damage this year in Man,; the chief pathogen was S. meliloti (W.C. McDonald).

MOSAIC (virus) was common on sweet clover in all parts of the Okanagan Valley, B.C. (G.E. Woolliams). Mosaic was noted on sweet clover at the Farm, Brandon, Man.; the leaves were typically mottled and the size of the plant reduced. (J.E. Machacek).

B. OIL-SEED CROPS

FLAX

Dr. W.E. Sackston has prepared a special account on "Flax Diseases" in Manitoba in 1953".

Flax was sown late in most areas in Man. in 1953 because of drought in April and May followed by rains, which continued past the middle of June. Above-normal rainfall in July, warm weather in July and August, and a long frost-free season allowed all but the latest sown fields to mature. The average yield for the province was estimated at 9.4 bu. per acre. Altogether 74 fields of flax were examined, 66 during a survey made in Man. and eastern Sask. 17-21 August, and 8 in the area south of Winnipeg 11 August. Most of the fields seen during the survey were in the green boll stage or turning colour although some were still in bloom and a few were ripe. Loss from disease was of no importance in most fields.

RUST (Melampsora lini). There was no rust found in 59 fields, while traces were seen in 7 fields, and from 5 to 10% in 8 fields. The decline in the occurrence of rust is largely attributable to the increasing use of rust-resistant varieties of flax. The growing of such varieties seems also to have reduced the amount of rust inoculum in the area. Several fields of the susceptible variety Dakota had only trace to light infections of rust.

PASMO (Septoria linicola). Traces of pasmo infection were seen in 13 fields (1 in s.e. Sask.), 5 to 10% in 9, 15% in 1 (in s.e.Sask.), 50% in 1, and 75% in 1. Pasmo infections were erratic in 1953. Infection was patchy and light in inoculated plots at Winnipeg, while relatively heavy natural infection occurred on some of the same varieties in uninoculated plots in the same field. Pasmo was scarce in a field of Viking, and extremely susceptible variety, in southwestern Man., although another field of a less susceptible variety a mile away, had 5% of the stem area lesioned.

YELLOWS (?aster yellows virus). A floral deformity, first observed in the University plots at Winnipeg in July, 1952, was found in the experimental plots at Crookston, Morris, and St. Paul, Minn., Brookings, S.D., and Fargo, N.D., early in July, and in 71 of 74 farm fields examined in August. Flax was ripe in the 3 fields where the deformity was not found. The symptoms are difficult to recognize on ripe plants, so failure to find the condition is no proof of its absence. About 5% of the plants were affected in a field of certified Marine flax early in August; fewer plants were diseased in certified Redwood flax on the same farm. In most of the other farm fields only a few diseased plants were found.

The symptoms were most striking on the flowers, (Plate 1(2)) although there was also some yellowing of the apical leaves which progressed downward along the stem of affected plants. The petals were greenish yellow to purple

PLATE I

(1) Flax inflorescence with some flowers affected supposedly by aster yellows virus.

(2) Flax flowers showing effects of infection supposedly by aster yellows virus.

(3) Yellows on stinkweed (Thlaspi arvense) from a flax field lightly infected with yellows. All shoots diseased except one on the right. Oct. 1953, Saskatoon, Sask.

(4) Sunflower head showing florets on a sector of the head affected supposedly by aster yellows virus.

(5) Sunflower head and stem showing sector of stem affected supposedly by aster yellows virus.

(6) Sunflower head with almost all the florets affected by aster yellows virus.

and were not shed normally. They were reduced in size, often markedly resembling sepals. The sepals were also greenish yellow, often with a purplish tinge. Affected flowers remained sterile and the sepals spread to expose the undeveloped ovary. On some plants only one or two branches of the inflorescence showed the symptoms (Palte 1 (1)), while in others the whole inflorescence was involved. The pedicels remained short, causing affected inflorescences to be fairly compact and making many of the diseased plants several inches shorter than adjacent normal plants. Diseased plants were readily identified by the colour of the inflorescence when normal plants were in bloom or in the green boll stage. As the affected tissues dried and turned brown in later stages of the disease, they were more difficult to distinguish from normal plants, which were by then turning colour or were ripe.

The symptoms observed resemble those described for flax plants experimentally infected with aster yellows virus in California (Phytopathology 35: 602-606. 1945). The probability that the condition was caused by aster yellows or a similar virus is supported by the widespread occurrence of aster yellows on known hosts in 1953, and by the unusually heavy populations of leafhoppers observed on various crops.

MISCELLANEOUS. Traces of Wilt (Fusarium oxysporum f. lini) were found in 3 fields, and pure cultures of the pathogen were isolated from specimens submitted from Altona. Root Rot was found in patches in one field, and specimens were submitted from several points. Fusarium acuminatum, Rhizoctonia solani, Alternaria tenuis, miscellaneous fungi, bacteria, and nematodes were isolated from many of the affected roots. Heat Canker (physiological) killed about 10% of the plants in a field southeast of Winnipeg in June. Specimens were submitted from other points following a hot spell in mid-June, and damage to 10% or more of the plants in a number of fields was reported from southwestern Man. Boll Blight (cause unknown) affected a few plants in 8 fields, 5 to 10% in 12, and 20 to 30% of the bolls in 23. The flax was not sufficiently mature in many of the fields examined for boll blight to be apparent. Traces of Top Discoloration (cause unknown) were seen in 4 fields, 5 to 10% in 2 fields (where there was considerable telial rust infection on the stems), and 35% in 2 fields that were damaged by drought. Severe hail damage was seen in 1 field, patches were killed by flooding in 3 fields, and alkali damage was found in 1 field.

Prof. T.C. Vanterpool, University of Saskatchewan, Saskatoon, also contributed a special report on "Flax Diseases in Saskatchewan in 1953".

The growing season was favourable for flax and cereals with yields well above average though slighly below those of 1952. The average yield of flax was 10.5 bu. per acre, or 3,600,000 bu. on 342,000 acres. The crops were able to make optimum use of an average rainfall because of low evaporation throughout the summer, and below average sunshine and temperature during the first half of the growing season.

The common flax diseases were not conspicuous. Here and there, fields were encountered with a moderate or occasionally with a heavy rust infection but these fields were sown with susceptible varieties. Rust-resistant varieties free from rust comprised by far the majority of fields. The notable disease development this season was the finding of flax yellows, a potentially serious disease, in fields about 100 miles east of Saskatoon with 10% of the plants

infected in one field and 20% in another. Around Saskatoon, several fields were found with trace to slight infections but none above 0.5%. None was found in the large flax area southwest of Rosetown. Field observations pointed strongly to a correlation between weed infestation and the amount of flax yellows.

RUST (Melampsora lini) was virtually absent on rust-resistant varieties across central Sask., but it was generally moderate, or occasionally severe, on susceptible varieties. As there were 4-5 fields in resistant varieties to one susceptible, the overall reduction in yield from rust was slight. In general, the season was favourable to rust development, especially during the latter part. It is highly probable, therefore, that had rust-resistant varieties not been grown so extensively, 1953 would have been another rust year. Last year's recommendations of the Cereal Variety Committee were fully justified.

In co-operation with Dr. Peturson, an experiment to test the effect of Ceresan treatment on the germination of flax rust on bits of rusted straw contained in a seed sample, was carried out under controlled conditions in the greehhouse. Dr. Peturson had found last year that this fungicide was effective in preventing the germination of the telia on treated material. He obtained similar results this year. My experiments corroborated his.

SEEDLING BLIGHT (Rhizoctonia solani). No general spring survey was made. In fields at Saskatoon, seedling blight was again troublesome on flax following fallow, with up to 5% of the plants destroyed in many scattered areas throughout fallow fields. When the crop sequence was checked it was found that the pre-fallow crop, whether a cereal or flax, made no difference on the blight on the flax crop following the fallow. Many of the Rhizoctonia strains from flax have proven pathogenic to cereals, and vice versa. Blight of affected flax plants continued to develop until well into mid-season. Isolations show that this fungus causes more than a seedling blight and is actually one of the contributing causes of late root rot, which shows up as prematurely ripened plants with shrivelled seed.

WILT (Fusarium oxysporum f. lini). An isolation test on blighted plants from the wilt nursery gave predominantly F. oxysporum f. lini, with traces of Pythium ultimum, Rhizoctonia solani, etc. At the same date, isolations from blighted flax seedlings of recommended wilt-resistant varieties from the fallow crop gave R. solani, with traces of F. equiseti.

A sample of Royal flax was brought in by a grower from Elrose from a field showing scattered areas of wilted plants. This field had not been in flax for several years. Isolations gave eight isolates of F. oxysporum f. lini, one of P. ultimum and one of R. solani. The Elrose district is one of the old flax areas in the province and evidence on hand indicates that many fields became heavily infested with the wilt fungus when susceptible varieties, such as Crown, from which Royal was selected, were grown. A case such as the foregoing has not been encountered in a farmer's field for many years.

HEAT CANKER. Five samples of heat canker were received from widely separated areas, which fact suggests that it was commoner than the below-normal temperature and sunshine of early summer would indicate. It is possible that the damage occurred on late-sown seedlings during the moderately hot spell of 11-13 June when the afternoon temperatures ranged from 82 to 91°F., and the sunshine varied from 13.9 to 15.3 hours per day. The seedlings were probably tender because of the preceding cool, dull weather.

PHOSPHATE-FERTILIZER INJURY. In a test in the Field Husbandry Department plots on varietal response to phosphate fertilizer, injury was conspicuous in the rows treated at 60 lb. per acre of 11-48-0. The injury first showed up about mid-June as a dwarfing of the central shoot and a spreading and slightly enhanced growth of the side shoots, compared with the unfertilized rows. Fertilized rows of all varieties could readily be detected, with no apparent varietal differences. Towards maturity the difference between fertilized and unfertilized rows diminished and final yields were not affected one way or the other.

YELLOWS (aster-yellows virus). In late July scattered flax plants affected with a disease, later identified as yellows, began to appear in the experimental and 'increase' plots at the University. By harvest, the amount in one increase plot of Victory was about 0.5 per cent. In fields around Saskatoon only traces were seen. On 12-13 August a survey trip was made east of Saskatoon around the Quill Lakes.

From information supplied by Mr. L.M. Stalwick, Agricultural Representative at Watson, it seemed advisable to visit a certain field at Dafoe on this trip. This 110-acre field of Rocket showed 20% of the plants affected by yellows and not over 5% boll damage by hail. The field was heavily poluted with wild buckwheat. In the same district a 1/10 acre plot of flax contained about 5% of yellows. On the same day a large field of Victory with 10% yellows was seen east of Lanigan also in the park belt. The field was weedy. During a trip on 1 Sept. southeast of Saskatoon to the Elrose and Plato districts, no yellows was found. The fields are on the open prairie and were virtually free of weeds. As many of the common weeds in the Prairie Provinces are potential carriers of yellows, a look-out was kept for the disease in weeds in affected flax fields. Yellows was found to be present on wild buckwheat (Polygonum convolvulus) and stink weed (Thlaspi arvense)(Plate 1 (3)) in such fields. N.W. Frazier and H.H.P. Severn (Hilgardia 16:629. 1945) have reported Polygonum convolvulus to be a host of the California aster yellows virus.

It should be mentioned that an unknown flax trouble reported as Bunchy Top in 1947 (P.D.S.27:29) appears now to have been a late infection of the aster yellows virus. It, also, was collected near Lanigan and at other widely scattered points.

MISCELLANEOUS. No fall survey was made in the park belt of northeastern Sask. where Browning and Stem Break (Polyspora lini) are usually prevalent. Neither is complete information available on Pasmo (Septoria linicola) in the extreme southeast of the province. One sample showing severe pasmo, collected in the late Sept. probably near Carnduff, was received from a former student. Black Mould was again conspicuous in some districts in fields where cutting was delayed.

Other Observations

RUST (Melampsora lini). Infection was 4-tr. 2-sl. 3-mod. 1-sev./20 fields in s. Alta. and 15-tr. 4-sl. 2-mod. 1-sev./46 fields mostly in the Peace River area (J.S.H., W.P.C.). A light infection was recorded in 5 fields in w.-central and s.w.Sask. (H.W. Mead).

BROWNING and STEM BREAK (Polyspora lini). Infection was 1-tr. 2-sl. 1-mod, 3 sev./20 fields in s. Alta.(E.J. Hawn); the disease was also sev. in 2 fields near Fairview (A.W. Henry).

LATE ROOT ROT (Rhizoctonia solani) was a trace in 3 fields at Hays, Alta. (E.J. Hawn).

YELLOWS (?aster yellows virus). About 50% of the Rocket plants were affected in the variety test rows of the Central Division, Central Experimental Farm, Ottawa, Ont., according to Dr. W.G. MacGregor. It was also present in Linum monogynum, but no other varieties were affected. A trace was present in other blocks of Rocket and yellows also occurred in buckwheat. As noted above, Severin and Houston report California aster yellows experimentally induced in flax. First symptoms are a yellowing experimentally induced in flax. First symptoms are a yellowing of the stems. Secondary shoots arise from the axils. Viridescence or greening and proliferation of the flowers occur. Petals often reduced or absent. The formation of secondary shoots and greening and proliferation of the flowers were evident in the affected specimens of the Rocket that were submitted (I.L. Conners).

HEAT CANKER (non-parasitic). Damage was 2-tr. 5-sl. 1-mod./20 fields in s. Alta., mostly near Hays (E.J.H.).

RAPE

STERILITY (?aster yellows virus). Some abnormal plants of Argentine rape were submitted to Winnipeg from Gunton, Man., and similar plants were found in the plots at Altona. Affected plants are taller than average. The inflorescence was completely sterile on some plants, whereas only the upper portion was sterile in others. Individual florets were distorted. Some seed pods were swollen, distorted, and empty. The older affected pods varied from pole buff to purple in colour. Some of the apparently normal lower pods on affected inflorescences were also purplish. No oospores were found in the tissue. Infection by the aster yellows virus may possibly be the cause of the trouble (W.E. Sackston).

SAFFLOWER

RUST (Puccinia carthami) was first noted at Lethbridge, Alta., on 7 July, but it did not become severe until mid-Sept. Infection was nil on W-014, sl.-mod. on Perkell, N-6 and N-10 and mod.-sev. on Indian, N-8 and N-10. Several lines supplied by B.C. Jenkins, University of Saskatchewan, showed sl. resistance. Infection was sl.-mod. at Brooks and Taber (F.R. Harper, M.W. Cormack). Rust infection was sev. at Altona, Man., where safflowers were grown on the same plots in 1952. Rust infection, apparently attributable to rust spores in the soil, killed most of the plants in several plots (see U.S.D.A. Pl. Dis. Reptr. 37(10): 522-523. 1953). Rust appeared late in the season in plots at Winnipeg. Some rust was present in all the plots of the Cereal Breeding Laboratory, but none was found in the University plots, 1½-2 miles away. No rust was found in a 2-acre planting near Holland. Uredinia and traces of pycnia were seen on safflower seedlings in the University plots, Saskatoon, Sask., on 25 June (W.E. Sackston).

ROOT ROT (Pythium sp.). Damage was 0-100% in the irrigated variety plots at Lethbridge, Alta. The varieties N-8, W-014, 520 and Indian appeared highly resistant. No damage was observed in the dryland plots at Lethbridge or in the plantings at Brooks and Taber (F.R. Harper, M.W. Cormack).

HEAD BLIGHT (Sclerotinia sclerotiorum) was present in the University plots, Winnipeg, and in a field near Holland, Man. Only a few plants were affected at each location (W.E. Sackston).

LEAF SPOT. Extensive spotting was present in the plots of the Cereal Breeding Laboratory, Winnipeg. Alternaria tenuis was the only organism that was isolated (W.E. Sackston).

SOYBEAN

"Diseases of Soybeans in southwestern Ontario in 1953" is the subject of a special report by Dr. A.A. Hildebrand.

The more important diseases of soybeans in southwestern Ontario in 1953 appeared to have been greatly influenced in their incidence and severity by the kind of weather prevailing during the growing season. Temperature and moisture are believed to have been the two most important limiting factors. In Tables 10 and 11 are summarized rainfall and temperature data for the last four years.

Table 10. Amount and distribution of summer rainfall in inches, 1950-1953

Year	June	July	Aug. 1-15	Total	Aug. 15-31 Daily Amounts						Total
1950	3.02	2.17	.68	5.87	Dates	17	18	28	29	31	
					Am't.	.18	.42	.75	.04	1.01	2.40
1951	3.83	1.71	.31	5.85	Dates	15	18	21	30		
					Am't.	.41	.78	.22	1.47		2.88
1952	1.19	1.79	1.08	4.06	Dates	15	16	20	21	30	31
					Am't.	.32	.18	.18	.05	.03	.07 .83
1953	2.16	.87	2.17*	5.20	Dates	30					
					Am't.	.06					.06

*2.10 inches of this amount fell during the first week in August

Table 11. Temperatures during August and the first week of September, 1950-53

	August					September (1-7)				
	No. of days in excess of				Mean max.	No. of days in excess of				Mean max.
Year	60°	70°	80°	90°	temp.	60°	70°	80°	90°	temp.
1950	2	11	15	3	80.9	2	5			73.3
1951		14	14	3	79.8	2	5			72.3
1952		9	21	1	82.1	2	3	1	1	76.3
1953		9	16	6	84.4		3		4	89.0

The role of the weather on the development of Manganese Deficiency and Stem Canker will be discussed at some length, two diseases that seriously threaten the successful growing of soybeans in southwestern Ontario.

MANGANESE DEFICIENCY was scarcely apparent in 1951 and 1952 and yet this disorder became exceedingly prevalent over most of Essex County and in parts of Kent in 1953. By 6 July, manganese deficiency was widespread in the two counties. The affected plants showed not only the typical foliar symptoms, but also a pruning and discoloration of the roots suggestive of a root rot. It is known that the soils of Essex County are quite deficient in manganese. Besides it is now recognized that the soybean is extremely sensitive to a lack of this element. As might be expected under these circumstances, the disorder was accentuated this year for the availability of manganese must have been seriously curtailed by the lack of rain, which, as Table 10 shows, totalled only .87 inch in July.

Official estimates place the yield of soybeans in southwestern Ont. in 1953 at 20.4 bu. per acre as against 20.0 and 24.8 bu. per acre respectively in 1952 and 1951. The reduction in yield of about 4 bu. per acre in 1953 is considered to have been due to the lack of available manganese. This conclusion is supported by reports from growers who stated that on portions of affected fields sprayed with manganese sulphate yields were increased up to 4 bu. per acre.

A survey of Kent and Essex counties revealed that with few exceptions evidence of manganese deficiency in soybeans was confined to crops being grown on clay soils of the Brookston, Napanee and Caister series.

STEM CANKER (Diaporthe sp.). In the study of stem canker it has been noted that the disease passes through two more or less clearly defined stages of development. For this reason, the rainfall during the summer for the last four years is recorded for two separate periods, the first extending from 1 June to 15 Aug. and the second from 16 to 31 Aug. Usually by the third week in August, infection by the stem canker organism is widespread, although up to this time the infection is confined mostly to leaf petioles and the smaller spurs on the lower part of the stem. The presence of fruit bodies on a high percentage of these organs suggests that there has been a significant build-up of inoculum potential. After this earlier or "spur-blight" stage, stem canker takes on a more serious form. The fungus then enters chiefly through leaf scars higher on the plant and causes lesions that girdle the stem and bring about the death of the plant.

The disease followed in general the two-phase pattern indicated above and was severe in 1949, 1950, and 1951, and somewhat less so in 1952. In 1953, however, although the inoculum potential judged by the number and size of the spur and petiole infections were as great by mid-August as in the previous four years, the subsequent development of the disease was almost negligible. Moreover, when some thousands of plants in outdoor plots were artificially inoculated in late August and early September with stem canker isolates known to be pathogenic, infection was so slight that it was apparent in only a few instances.

The weather, more than any other factor, is regarded as responsible for the non-appearance of the more serious stage of stem canker in 1953. As Table 10 shows, there was virtually no rain during the last 3 weeks of August. Although 2.10 inches fell during the first week of the month, this fell on a soil so parched and dry, having received only .87 inch of rain in the previous 32 days,

that most of it immediately and rapidly evaporated. Then as Table 11 shows, August was extremely warm, the maximum daily temperature never falling below 70°F. and with 16 days about 80° and six over 90°F. These conditions of extreme drought and high temperature were apparently not conducive to effective leaf-scar infection, which in large measure initiates the more serious late-season stage of the disease.

That adverse weather conditions do not, however, prevent considerable carry-over of the organism until next season is indicated by the following experiment. When stems of several susceptible varieties collected at random in the field in late fall were cut off at a point a little below ground level and placed in water in containers in the greenhouse, typical perithecia of the stem-canker organism soon appeared on the lower part of the stem where water had been absorbed. From the standpoint of disease control, these observations clearly indicate that soybeans should not follow soybeans in the rotation.

POD and STEM BLIGHT (Diaporthe phaseolorum var. sojae). For the reasons given above under stem canker, pod and stem canker attracted little attention in 1953. Almost 1,000 mature stems were carefully examined for perithecia of the organism and where a likely-appearing growth was observed cultures were made. As in previous attempts the study failed to find the ascosporic phase of the causal organism.

LEAF SPOT (Phyllosticta sojaecola). During casual examination, on 26 June, of the laboratory plots at Harrow, where soybeans have been grown for the third successive year, it was observed that the Phyllosticta leaf spot was unsually prevalent on Lincoln. In nearby plots, where soybeans were being grown for the first time, it was difficult to find the leaf spot except on Lincoln. Careful counts were made. It is evident from the data in Table 12, that Lincoln is more susceptible to the leaf spot than the other three varieties with which Lincoln was compared and that continuous cropping to soybeans is likely to increase the incidence of the disease. Infected leaves are easily tattered by the wind; the economic importance of the disease is unknown.

BROWN STEM ROT (Cephalosporium gregatum). Not only from the amount of disease seen during the survey but also from the increased number of affected plants sent in for diagnosis by growers and inspectors, it was evident that brown stem rot was becoming gradually more widespread in southwestern Ont. No serious outbreaks of the disease were encountered this year.

BACTERIAL PUSTULE (Xanthomonas phaseoli (E.F. Sm.) Dawson var. sojensis (Hedges) Starr. & Burhh.). A severe leaf spot was noted on 20 July on plants of Pagoda 17, which with other selections from the Forage Crops Division, Ottawa, had been included in the variety trials at Harrow in 1953. At first the leaf spot was thought to be bacterial blight, but the true cause of the disease was recognized when pronounced and unmistakable bacterial pustules were noted in the centre of the lesions particularly on the under side of the leaf. The presence of these pustules, the appearance of the disease only after the onset of warmer weather in July and the resulting severe defoliation of the affected plants are all characteristic of bacterial pustule. (This appears to be the first report of this bacterial disease to the Survey).

Other diseases noted this year included: Pythium Stalk and Root Rot (P. ultimum), Downy Mildew (Peronospora manshurica), Sclerotinia Stem Rot

(S. sclerotiorum), Brown Spot (Septoria glycines), Bacterial Blight (Pseudomonas glycinea, Soybean Mosaic (Soja virus 1), Yellow Mosaic (Phaseolus virus 2), and Bud Blight (virus of tobacco ring-spot group).

Other Observations

BACTERIAL BLIGHT (Pseudomonas glycinea) was prevalent in the plots at the Farm, Brandon, Man. (W.C. McDonald). A sl. infection occurred in the University plots, Winnipeg. The causal organism was isolated (W.A.F. Hagborg).

WILT and ROOT ROT (Sclerotinia sclerotiorum, etc.). Sclerotia of S. sclerotiorum were found in the stems of several dead soybean plants collected in the University plots, Winnipeg. Other dead plants showing root-rot symptoms yielded Fusarium poae, F. acuminatum, Alternaria, bacteria and other organisms when the affected tissues were plated. F. acuminatum sporulated profusely on the surface of dead stems (W.E. Sackston).

Table 12. Incidence of Phyllosticta leaf spot on four varieties grown for the first and for the third successive year on soil of similar type.

Years on same site	Variety							
	Lincoln		Harman		A.K. Harrow		Blackhawk	
	Plants counted	Diseased plants	Plants counted	Diseased plants	Plants counted	Diseased plants	Plants counted	Diseased plants
		%		%		%		%
1	622	5.3	1047	Trace*	1183	Trace	969	Trace
3	1404	26.2	1192	7.8	1255	3.8	872	8.8

*less than .5%

SUNFLOWER

A special report on "Sunflower Diseases in Manitoba in 1953" has been contributed by Dr. W.E. Sackston.

Sunflowers were sown mostly early in the season on about 5,000 acres in 1953. The growers who might have sowed late were prevented from doing so by the rains which continued from mid-May to mid-June. Favourable growing conditions and a frost-free period extending into October resulted in the highest average seed yields since the crop was introduced into Man., with estimates ranging from over 700 to about 1,000 pounds per acre. In all, 36 sunflower fields were examined for disease, 29 of them in a disease survey made from 8-10 September, when most of the plants were still about 7-14 days from maturity. Dr. E.D. Putt, Experimental Station, Morden, Man., assisted in the survey.

RUST (Puccinia helianthi). Pycnia of rust were numerous on 12 June on volunteer seedlings in plots at Winnipeg. Traces of rust were found in experimental plots at Morden and Altona by 16 July, although no rust was seen in a

farm field examined on that date. Traces of rust were seen in 3 fields on 11 Aug., and on plants in gardens at Killarney, Man., and Oxbow, Sask., 18 Aug. Traces of rust were found in 10 fields examined during the survey. There was from 1 to 10% rust on the upper leaves in 15 fields, 20% in 2 fields, and 40% in 1 field at Altona, adjacent to the 1952 sunflower plot area. Relative freedom from sunflower rust in 1953, as in 1952, may be attributed largely to the scarcity of inoculu because of small acreages and good isolation of fields. Weather conditions were apparently not very favourable for rust development; infections in plots at Winnipeg, Morden, and Altona were considerably lighter than in previous years.

WILT (Sclerotinia sclerotiorum). Wilt infections seen in 1953 originated at or near the soil line in all but 2 plants. Wilted plants were conspicuous by the end of August in plots at Winnipeg which were inoculated in 1952. Traces of wilt were found in 17 fields during the survey, 1% in 1 field, and 25% in one part and 3% in another part of one 10-acre field of Foundation Sunrise. The foundation planting was immediately adjacent to a sunflower field in which 50% and 2% respectively of the plants were wilted in 1952. (P.D.S. 32:38).

DOWNY MILDEW (Plasmopara halstedii) infections were the highest yet seen in Manitoba since systematic surveys of sunflower fields were started in 1948. All the infections observed were systemic, with moderate to severe stunting of the plants, rugosity and chlorosis of the leaves, and erect, mostly sterile heads. No secondary infections were seen. More than 1% of the plants in a plot at Winnipeg where sunflowers have been grown for several years were stunted by mildew. The disease had not previously been found in this nursery. Traces of mildew were found in 8 farm fields, 1% in 1 field, and 60% in 1 field. In the field with 1% infection, up to 20% of the plants in low patches in the field were mildewed. In the higher parts of the field the plants were taller, more vigorous than those in the low spots, and only traces of mildew were present. The field with 60% of the plants mildewed was low and wet. Mildewed plants were numerous even on the higher ground, and in some of the lower areas from 90 to 95% of the plants in patches up to 15 yards in diameter were killed by the disease. Soil samples taken from the worst areas were put in pots in the greenhouse. Some of the seedlings grown in the pots were systemically infected by mildew.

POWDERY MILDEW (Erysiphe cichoracearum). Traces of powdery mildew were found in 3 fields. Heavy infections developed in the greenhouse on adult plants transplanted from field plots early in October and spread to plants which were started in the greenhouse in August. Powdery mildew infections killed many leaves on plants grown in the University Plant Science greenhouses in 1952-53, but the disease had not appeared previously in the Laboratory houses.

LEAF MOTTLE (cause unknown). Traces of leaf mottle (P.D.S. 28:32) were seen in 4 fields, and 5%, 10%, and 15% in 1 field each. Up to 75% of the plants showed mottling in patches in both of the last two fields. The vascular tissues of some of the plants in the patches had a greenish colour, similar to the "stalk rot" associated with premature ripening and mottle in 1949 (P.D.S. 29:35).

STALK ROT (cause unknown). Traces of stalk rot were seen in 4 fields, and 1% in 1 field. Symptoms varied from a greenish-black discoloration of the vascular ring to blackening and breakdown of the pith. Stalk rot was associated with leaf mottle in 3 of the 5 fields. Pith discoloration and breakdown were not associated with borer tunnels as it was in 1949; there were traces of stalk borer

injury in only a few stems.

BLACK STEM (cause unknown). Plants in a nursery at Altona, sown to sunflowers for the fifth consecutive year, were affected by a disorder not previously observed, although the symptoms were reminiscent of those associated with "black jelly rot" mentioned under Stalk Rot in 1951 (P.D.S. 31:38). The affected plants occurred in a patch extending about 40 feet along a field road and 20 feet into the plot. A few plants on the other side of the road, in a plot sown to sunflowers for the first time in 1953, were also diseased. When the trouble was first seen on 2 Aug. (by Dr. E.D. Putt), many of the plants had broken over and their stems were brown, but the leaves were still green. The area involved had enlarged appreciably when it was examined 7 Aug., but did not seem to have extended any further by September.

The earliest symptoms were found on plants outside the most severely diseased patch. An oily-looking area appeared along the margin of one or more of the upper leaves, which tended to curl unevenly. The pith was discoloured in many of the plants showing the leaf symptoms. Pith discoloration started as a slight greenish darkening which changed to a dirty grayish colour and finally became almost black. In some plants the pith discoloration was more pronounced near the base of the stem than just below the affected leaf. Vascular discoloration was seen in the petioles of affected leaves even on plants with no discoloration of the pith. The leaf symptom was apparently followed by a slight flattening and twisting of the "neck", or upper portion of the stem. Flattening and twisting involved the whole stem of some plants. External discoloration of the stem started in the neck area. The black discoloration extended to involve the entire stem in some plants, but was confined to relatively small areas of the stem in others. Most of the affected plants bent or broke over about half way up the stem. Plants which were affected early and were dead when examined 7 Aug., were completely flattened, twisted, and discoloured. When the area was reexamined in September, some plants which were badly twisted and discoloured were still alive.

FLORAL DEFORMITY (?aster yellows virus). A floral deformity, which was seen on one or two plants in 1952 and was assumed to be the result of a genetic disturbance, was conspicuous in plots at Winnipeg and Morden in 1953. It was also found in 17 fields surveyed in September. The characteristic symptoms are first seen when the plants come into bloom. The florets in a sector of the head are green, hypertrophied and sterile (Plate 1 (4)). The head sector is usually atrophied. Ray florets rarely develop on the diseased sectors. As the disease progresses, it usually involves a sector extending downward along the stem. Droplets of clear exudate often appear on the upper portion of affected stems. The stem and head sectors gradually become discoloured, (Plate 1 (5)) finally turning dark brown to black. The discoloration is superficial at first, but extends deeper into the tissues as it progresses, and is frequently associated with a longitudinal cracking of the stem and breakdown of the stem and head sectors, accompanied by the appearance of dark exudate. Affected stems have a characteristic odour suggesting fermentation. Some of the affected plants are stunted, others break over, but a few survive and set seed on the apparently normal portion of the head. A few plants showed virescence, hypertrophy, and sterility of the florets on the whole head, (Plate 1 (6)) and discoloration of the whole stem, but in most plants only a sector was involved. Sectors appeared in secondary buds which developed late in the season on some apparently normal plants. (H.H.P. Severin and J.F. Freitag, Hilgardia 16:603-4. 1945), state that sunflowers were proved to be naturally infected in California with California

aster yellows virus, which caused marked dwarfing of the plants and distortion of the leaves. The symptoms described by Sackston are not unlike those of ordinary aster yellows as it occurs in China aster. (I.L.C.).

MISCELLANEOUS. Hail and wind damage were severe in some fields in the area around Winkler. Head Drop (cause unknown) was seen in four fields, as well as in the plots at Winnipeg and Morden. Head and Neck Rot was found in five fields. In one field Sclerotinia sclerotiorum was isolated, in another, Sclerotinia, Botrytis cinerea, and bacteria were present, and in three fields only Botrytis was found on rotted heads. Damage caused by 2,4-D was striking in the plots at Winnipeg.

Other Observations

WILT (Sclerotinia sclerotiorum) affected about 25% of the plants in an acre of silage sunflowers in the Ladner area, B.C. Heads and stems were decayed with lesions on the leaf blades or rot of the petioles. Sclerotia were present on a few plants (H.N.W. Toms). Wilt was quite prevalent in the University plots, Edmonton, Alta., as a result of accidental infection (A.W. Henry).

C. ROOT CROPS

MANGEL

LEAF SPOT (Cercospora beticola). Infection was mod. to heavy on a planting of Frontenac in Queens Co., P.E.I. The disease was probably favoured by the heavy rainfall during August (R.R. Hurst).

ROOT ROT (Phoma betae) was causing considerable damage to roots in storage on 1 Feb. at Courtenay, B.C. (W. Jones).

STRANGLE (cause unknown) caused considerable damage to a planting of Frontenac mangels in Queens,Co., P.E.I. (R.R. Hurst).

SUGAR BEET

BLACK ROOT (various fungi) was found in all 42 fields examined during a pre-thinning survey in s. Alta. Samples indicated that 72% of the seedlings were infected and 2% were sev. damaged or killed. Rhizoctonia solani and Pythium spp. predominated among the fungi isolated from diseased seedlings. Phoma betae and Aphanomyces cochlioides were less prevalent this year than in 1952 (F.R. Harper).

ROOT ROT (various fungi). Infection was patchy in fields examined in early September in Alta., and varied from sl. to mod. In some fields the damage was associated with a weakening of the plants by wind or by sev. infestations of root aphids. A tr. of root rot was found in storage piles examined in November. Phoma betae, Pythium ultimum, and Rhizoctonia solani were isolated from diseased roots (F.R.Harper, M.W. Cormack).

D. MISCELLANEOUS CROPS

CORN

NORTHERN LEAF BLIGHT (Helminthosporium turcicum) caused sl. damage to a field of White Cap in Elgin Co., Ont. The disease was also present in Essex Co., but infection was very sl. (N.J. Whitney).

BACTERIAL SPOT (Pseudomonas syringae) was observed at the Station, Melfort, Sask.; damage was sl. on one plant. (H.W. Mead, W.A.F. Hagborg).

RUST (Puccinia sorghi). Infection was 25% on Falconer and 5% on a Morden hybrid in demonstration plots at Portage la Prairie, Man.; tr. in one field at Altamont and nil at St. Adolphe (W.E. Sackston et al.). In the official hybrid test plot at Malden, Ont., all hybrids, field and sweet, were infected with rust. Infection was heavy on the sweet corn, causing mod. damage (N.J. Whitney). A sl. infection was observed in Queens Co., P.E.I. in Sept. (R.R. Hurst).

ROOT ROT (chiefly Pythium and Fusarium spp.) was general sometimes causing severe damage, throughout southwestern Ont. on hybrid field corn and many inbreds (N.J. Whitney).

STALK ROT (chiefly Pythium and Fusarium spp.) was general in Essex, Kent, Lambton and Middlesex counties, Ont. In some fields, as high as 75% of the plants were affected. In the plots at the Station, Harrow, Ont., some inbred lines were completely affected (N.J. Whitney).

SMUT (Ustilago maydis) infected up to 10% of the plants in fields of hybrid corn in southwestern Ont. (N.J. Whitney). A sl. infection was recorded in one field of fodder corn in Queens Co., P.E.I. (R.R. Hurst).

EAR ROTS (various fungi) affected up to 20% of the ears in some hybrids in the plots at Malden, Ont., causing some damage. The following fungi were observed: Fusarium moniliforme, F. graminearum, Diplodia zeae, Nigrospora oryzae, and Penicillium spp. (N.J. Whitney).

MUSTARD

WHITE RUST (Cystopus candidus). Sl. infection in 2/3 fields examined in the Milk River area, Alta. (M.W. Cormack).

SUDAN GRASS

LEAF SPOT (Pseudomonas syringae). Mod. infection in the plots, Lacombe, Alta. (W.P. Campbell).

CULTIVATED and OTHER GRASSES

AGROPYRON - Wheat Grass

Ergot (Claviceps purpurea). Collections of ergot were made in central and n. Alta. as follows: 36 on A. repens, 4 on A subsecundum and 2 on A cristatum

(W.P. Campbell). A 25% infection was observed on A. repens at Kentville and Berwick, N.S. (D.W. Creelman, C.O. Gourley). A few heads of A. repens were infected, where the grass was growing adjacent to a severely infected rye field, at Charlottetown, P.E.I. (J.E. Campbell).

Powdery Mildew (Erysiphe graminis). Oidia only heavy in patches on A. repens about Kentville, N.S. (D.W. Creelman).

Tar Spot (Phyllachora graminis) was heavy on A. repens at Upper Ohio, Shelburne Co., N.S. (D.W. Creelman).

Stripe Rust (Puccinia glumarum). Sl. infections in the plots of A. cristatum and A. trachycaulum at Lethbridge, Alta. (M.W. Cormack).

Smut (Ustilago bullata) infected 5% of the heads of A. trachycaulum in the plots at Lethbridge, Alta. (M.W. Cormack), and 3% of the heads in the University plots, Winnipeg, Man. (W. Popp).

Stem Smut (Ustilago hypodytes) was observed over quite a wide area in the Trout Creek district, B.C., where it appears to be gradually spreading (P.D.S. 32:39). Affected plants produce no seed (G.E. Woolliams).

AGROSTIS

Stem Rust (Puccinia graminis). A 25% infection on A. tenuis at Summerville, Queens Co., N.S. (D.W. Creelman).

Leaf Rust (Puccinia rubigo-vera) was heavy on A. tenuis at Milton, Queens Co., N.S. (D.W.C.).

ALOPECURUS

Leaf Spot (Mastigosporum album Riess) caused mod.-sev. damage in a field of A. pratensis at Kentville, N.S. Although Sprague (Diseases of Cereals and Grasses in North America pp. 402-404. 1950) does not record this species from North America the fungus in this collection agrees well with descriptions of M. album (D.W. Creelman).

Stem Rust (Puccinia graminis). A single plant of A. pratensis was sev. infected near Elnora, Alta. (W.P. Campbell).

AMMOPHILA

Ergot (Claviceps purpurea). A few sclerotia present in the heads of A. breviligulata collected at Cape Traverse, Prince Co., P.E.I. (R.R. Hurst).

BROMUS INERMIS - Awnless Brome Grass

Ergot (Claviceps purpurea). 50 separate collections were made in n. and central Alta. (W.P. Campbell). A tr. infection was recorded at La Trappe, Que.,

in 1952 (Fr. M. Claude).

Browning Root Rot (Pythium spp.). A severe outbreak was reported from Grandview, Man. The infected field was later plowed down as a complete failure. Isolations from the infected roots yielded P. arrhenomanes and P. ultimum. Wheat sown in soil collected from diseased areas was severely damaged by browning root rot. (W.C. McDonald, T.C. Vanterpool).

CALAMAGROSTIS CANADENSIS

Ergot (Claviceps purpurea). 8 collections made in n. and central Alta. (W.P. Campbell).

Crown Rust (Puccinia coronota). Tr. infection collected at Liverpool, N.S. (D.W. Creelman).

CALAMOVILFA LONGIFOLIA

Ergot (Claviceps purpurea). One collection near Penhold, Alta. (W.P. Campbell).

DACTYLIS GLOMERATA - Orchard Grass

Ergot (Claviceps purpurea). Diseased material received from Sumas, B.C. (H.N.W. Toms).

Brown Stripe (Scolecotrichum graminis) was common on Vancouver Island in April (W. Jones). Infection heavy in one field at Kentville, N.S., in September (D.W. Creelman).

Stripe Smut (Ustilago striiformis). Odd plant found infected at Sidney, B.C. (W. Jones).

ELYMUS

Ergot (Claviceps purpurea). One collection was made on E. canadensis near Coronation and 7 collections on E. innovatus in central and n. Alta. (W.P. Campbell).

GLYCERIA STRIATA

Choke (Epichloe typhina) was noted on the grass along a trail by edge of Ahmic L., Parry Sound District, Ont. (C.B. Kelly).

HORDEUM JUBATUM

Stripe Rust (Puccinia glumarum). Collections made at Grande Prairie and at Olds and Elnora, Alta. (W.P. Campbell).

Stem Rust (Puccinia graminis). A small collection was obtained near Trochu, Alta. (T.R. Davidson).

Head Smut (Ustilago bullata). Tr. found along roadside at Castor, Alta. (W.P.C.), and at Union Point, Man. (W. Popp).

PHALARIS

Crown Rust (Puccinia coronata) was heavy on P. arundinacea at Broad River, Queens Co., N.S. (D.W. Creelman).

PHLEUM PRATENSE - Timothy

Ergot (Claviceps purpurea). 6 collections made in n. and central Alta. (W.P.C.) and trace seen at Kentville, N.S. (D.W.C.).

Rust (Puccinia graminis var. phlei-pratensis). Traces seen at La Trappe, Que., in 1952 (Fr. M. Claude).

POA

Ergot (Claviceps purpurea). 12 collections made on P. pratensis in n. and central Alta. (W.P.C.).

Powdery Mildew (Erysiphe graminis). Tr. infection noted on P. ampla at the Station, Lacombe, Alta. (W.P.C.), and sev. infections on P. pratensis at Cayley and Lethbridge (M.W.C.).

SPARTINA PECTINATA

Rust (Uromyces acuminatus). Sl. infection at Cape Traverse, Prince Co., P.E.I. (J.E. Campbell).

STIPA VIRIDULA

Ergot (Claviceps purpurea). One collection near Alix, Alta. (W.P.C.).

LAWNS

Fairy Rings (Marasmius oreades). Several rings appear each year on one lawn on the U.B.C. campus, Vancouver, B.C. (H.N.W. Toms).

III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

RUST (Puccinia asparagi) occurred in some commercial plantings in the Armstrong district, B.C., but it was not as prevalent nor severe as in 1952 (G.E. Woolliams). Rust was heavy on plants at the Laboratory, Winnipeg, Man., causing premature death of branches; infection more than usual (W.L. Gordon). Infection mod. on plants in a small garden at St. Ambroise, Joliette Co., Que. (A. Payette).

BEAN

GREY MOULD (Botrytis cinerea). Both this disease and Stem Rot (Sclerotinia sclerotiorum) were found commonly on the stems of Blue Lake beans at ground line in the Fraser River valley, B.C.; they were quite widespread but caused little economic loss (I.C. MacSwan). A sl. infection developed at Canaan, N.S., following wind damage caused by the hurricane on 16 Aug. (K.A. Harrison). Grey mould was severe in a small garden at Charlottetown, P.E.I., in the late season following wet weather (R.R. Hurst).

ANTHRACNOSE (Colletotrichum lindemuthianum) was mod. in a garden in Edmonton, Alta. (L.E. Tyner). Specimens received from Foam Lake, Sask.; anthracnose is relatively uncommon in the province (T.C. Vanterpool). The disease sev. affected 25% of the plants in a Red Kidney planting in Lambton Co., Ont. (N.J. Whitney). A 25% infection was observed in a small garden planting at St. Jean, Que. (L. Cinq-Mars, R. Crete). Anthracnose was causing sev. damage to beans at Gagetown, N.B., on 30 July (S.R. Colpitts). It was sev. in a small garden plot of Black Seeded Pencil Pod in Kings Co., N.S., but no damage was seen in commercial fields (K.A. Harrison). Seed of Round Pod Kidney Wax and Pencil Pod Black Wax purchased from separate seed houses but of local origin produced a sev. infected crop at Charlottetown, P.E.I., but seed from an outside source showed no infection in August. Losses were also generally heavy in market gardens and canning crops (R.R. Hurst). Infection was sl. in 5 garden plots of Improved Golden Wax at St. John's, Holyrood and Harbour Grace, Nfld., and somewhat heavier in a garden at Topsail (G.C. Morgan).

ROOT-LESION NEMATODE (Cricanemoides curvatum Raski) was found in soil from a nursery at Victoria, B.C. The nematodes fed on young roots of beans var. Masterpiece, red clover, and sweet peas when these plants were grown in the soil in a greenhouse. Foliage of the bean plants turned a bright yellow as the affected ones matured 2 weeks before the checks (J.E. Bosher).

DRY ROOT ROT (Fusarium solani f. phaseoli) caused mod. damage in a field of registered Clipper white beans in Middlesex Co., Ont., and was sev. in one field in Kent Co. Elsewhere it caused sl. damage in scattered fields in all the bean-growing districts of s.w. Ont. (N.J. Whitney). Specimens affected by root rot and heat canker were received from Leoville, Sask.; F. spp. isolated (T.C. Vanterpool).

HALO BLIGHT (Pseudomonas phaseolicola) was found in numerous varieties of bush beans in the B.C. Interior; commonly affected were Round Pod Kidney Wax and Black Pencil Pod. According to the Plant Products inspectors the disease

was present, usually in sl. amounts, in many fields inspected under the Health Approval scheme (G.E. Woolliams). Infection was 2-tr. 3-sl. 1-sev./12 fields in Alta. Tr.-sl. infections were observed in several gardens in the Lethbridge-Taber area, but less damage than usual was reported in the canning crop. Sev. damaged patches occurred in one field at Medicine Hat and pods were infected on 60% of the plants in a field of Burbank at Cranford (M.W. Cormack, F.R. Harper). One sev. outbreak was observed at Edmonton (L.E. Tyner). Sev. infected specimens from several fields in the Winnipeg area, Man., were brought in by Canada Packers representatives. A sl. infection was observed on Tendergreen in a plot at the Farm, Brandon (W.A.F. Hagborg, J.E. Machacek). Halo blight caused sl. damage to the white bean crop in s.w. Ont. (N.J. Whitney). One grower at Canaan, N.S., produced an excellent crop of beans, showing only a tr. of halo blight; he had been able to secure good disease-free seed and little spread took place this year. The previous year's crop was a total loss (K.A. Harrison).

Both halo blight and common blight (q.v.) were noted in some 6 fields in York and Carleton counties, N.B., affecting a tr. to 65% of the plants. Common blight was also severe in several large plantings about Debec in Carleton Co. (P.N.Grainger).

BACTERIAL SPOT (Pseudomonas syringae) infected all lima bean plants in a field in Kent Co., Ont., but damage was sl. (N.J. Whitney).

STEM ROT (Rhizoctonia solani) caused sev. damage to a second planting of Bountiful in July at Charlottetown, P.E.I.; a first planting of beans was similarly killed off (R.R. Hurst).

SCLEROTINIA ROT (S. sclerotiorum) caused mod.-sev. infections in many gardens about Edmonton, Alta. (L.E. Tyner, G.B. Sanford). A 5-10% infection was found in a few fields in Kent Co., Ont. (N.J. Whitney). One hamper of bush beans out of 50 developed the rot in Kings Co., N.S. as a result of being held over the week-end after picking (K.A. Harrison).

RUST (Uromyces appendiculatus). Sl. infection observed at Summerside, P.E.I. (R.R. Hurst).

BACTERIAL BLIGHT (Xanthomonas phaseoli) caused sev. damage to a few fields of white beans in Dover Twp., Kent Co., Ont.; elsewhere the damage was sl. in s.w. Ont. The disease caused sev. damage to Red Kidney beans in a field in Lambton Co. (N.J. Whitney). Bacterial blight was heavy on beans at La Trappe, Que. (Fr. M. Claude). Damage was mod. in a planting at Gagetown, N.B. (S.R. Colpitts). Bacterial blight, chiefly due to X. phaseoli, caused sl. damage in Sask.; fewer specimens than usual of these diseases were received in 1953 (R.J. Ledingham).

BALD HEAD (seed injury and bacteria) sev. injured 15% of the plants in several white and lima bean fields in Middlesex and Huron counties, Ont. (N.J. Whitney).

MOSAIC (Phaseolus virus 2). Yellow mosaic was found in pole beans in 3 gardens in Fredericton,N.B. affecting 3-7% of the plants. In 2 gardens the beans were growing near gladioli showing a faint mottle (D.J. MacLeod). Mosaic affected about 15% of the plants in several plantings of yellow eye bush beans at Kentville, N.S.; vigour of the plants was reduced. Mosaic also killed 25% of the pole bean plants in a small garden at Kentville; gladioli showing mosaic symptoms were growing in the same garden (K.A. Harrison).

ROOT ROT (cause unknown). Cold weather during the spring resulted in a severe root rot of many fields of Blue Lake beans on Lulu Island and at Surrey and Burnaby, B.C.; several fields had to be replanted (I.C. MacSwan).

BEET

LEAF SPOT (Cercospora beticola). Trace infections were noted in one garden at Kentville, N.S. (D.W. Creelman), and in several gardens at Charlottetown, P.E.I. (R.R. Hurst).

DAMPING-OFF (Rhizoctonia solani) destroyed up to 60% of the plants at Harrow, Ont., in gardens where the seed was sown in early July (C.D. McKeen).

SCAB (Streptomyces scabies). A tr. infection was noted at Charlottetown, P.E.I. (R.R. Hurst). Scab was very heavy on 3 small plantings at Topsail, Nfld.; sl. infections were noted in many gardens at Conception Bay and Bonavista Bay (G.C. Morgan).

SEEDLING BLIGHT (various organisms) was noticeable in the University plots, Saskatoon, Sask.; Rhizoctonia solani, Pythium ultimum and Fusarium sp. were isolated from diseased plants. (T.C. Vanterpool).

BROAD BEAN

FUSARIUM WILT (F. oxysporum f. fabae) infected half the plants at Ste. Anne de la Pocatiere, Que., in plots where the soil was artificially inoculated with a liquid culture of the organism (L.J. Coulombe).

POD DISCOLORATION (cause unknown) mod. affected a planting at Winnipeg, Man. The blackening was first observed at the tips of the pods but later it extended to the peduncles (J.E. Machacek).

BROCCOLI

DOWNY MILDEW (Peronospora brassicae) was general in June on young plants in beds at the Station, Saanichton, B.C., and caused considerable damage. The fungus was sporulating freely on the foliage of plants in the field in early December. Broccoli appears to be more susceptible than cauliflower (W. Jones).

CLUB ROOT (Plasmodiophora brassicae). A trace was found in an acre patch at Matsqui, B.C.; the present report is the first for club root in a commercial planting in this district (I.C. MacSwan).

CABBAGE

GREY MOULD (Botrytis cinerea) caused sev. rot of 1% of the heads in a small field at Barton, N.S. (K.A. Harrison).

SOFT ROT (Erwinia carotovora) was destructive to cabbage in 2 common storage places at St. John's and a root cellar at Topsail, Nfld. (G.C. Morgan).

YELLOWS (Fusarium conglutinans) was sev. on 10% of Golden Acre and Wisconsin #8 in a planting at Aylmer, Que. (K.M. Graham).

BLACK LEG (Phoma lingam). What appeared to be black leg was found infecting 20-25% of the plants in 2 seed beds at Mount Pearl, Nfld. The symptoms were typical of black leg and minute fruiting bodies were visible on the stems, but the organism has not been examined microscopically. Some growers have kept this disease in check by mixing virgin soil from wooded lands with peat into their seed beds each year (G.C. Morgan).

CLUB ROOT (Plasmodiophora brassicae) infected 25% of the plants and caused 10% loss in a ¼ acre field of Danish Ballhead at Ladner, B.C. (I.C. MacSwan). The disease caused mod. damage in a market garden at Windsor, Ont., and was present in the seed bed as well as in the field. According to the grower, his crucifer crops have been affected several years (C.D. McKeen). Club root affected 25% of the plants, most of them quite severely at the Station, Ste. Clothilde, Chateauguay Co., Que.; it was also present to a lesser degree on cauliflower, brussels sprouts and broccoli. This is the first time the disease was observed at the Station (K.M. Graham).

A few light outbreaks were observed in Kings Co., N.S., usually because of too short a rotation or faulty sanitation (K.A. Harrison). An occasional plant was diseased in a planting of Copenhagen Market at Charlottetown, P.E.I. (R.R. Hurst). Infection was mod. at Trinity Bay and Bonavista Bay and sl. in a few fields seen at Conception Bay, Nfld. Many farmers in the St. John's and Conception Bay areas are clearing new land under the Nfld. Land Clearance Act for the production of cabbage and root crops. With sufficient land cleared it is hoped to establish a proper crop rotation and thus decrease club-root infection and spread (G.C. Morgan).

BACTERIAL LEAF SPOT (Pseudomonas maculicola) affected about 25% of the heads in a ton of cabbage in storage at Harbour Grace, Nfld.; the disease was identified at the Plant Pathology Laboratory, Ottawa (G.C. Morgan).

DAMPING-OFF (?Pythium sp.) affected about 10% of the seedlings in greenhouse seed beds at Fredericton, N.B.; loss was negligible (S.R. Colpitts).

WIRE STEM (Rhizoctonia solani) was less prevalent than usual on seedlings in greenhouses about Leamington, Ont. More growers each year practise soil sterilization in the early vegetable growing area in southern Essex Co. (C.D. McKeen). Wire stem was sev. on a few plants of several early varieties in the Horticulture plots, Ottawa, in June 1952 (K.M. Graham).

SCLEROTINIA ROT (S. sclerotiorum). A single head was found affected in a small field at Barton, N.S. (K.A. Harrison). This rot virtually wiped out a lot of Hollandia held under poor storage conditions at Charlottetown, P.E.I. (R.R. Hurst).

STERILITY (virus of yellows type). A single infected plant was seen in a garden in York Co., N.B. (D.J. MacLeod).

PHOSPHORUS DEFICIENCY affected 30% of the plants and caused 15% loss in a field at Waterville, N.S.; plants on one side of the field showed the typical symptoms of P deficiency and retarded growth (K.A. Harrison).

CARROT

DRY ROT (Chalaropsis thielavioides Peyr.) caused considerable loss in carrots imported from Texas for repackaging at Toronto; even small lesions were quite noticeable after washing (J.K. Richardson, R.G. Atkinson).

SOFT ROT (Erwinia carotovora) caused sev. damage on poorly drained areas of a commercial field at Medicine Hat, Alta. (M.W. Cormack). Severe rotting was observed in a low area in a 4-acre field in Lincoln Co., Ont. (J.K. Richardson). Soft rot caused complete breakdown of carrots in a root cellar at Topsail, Nfld., and some damage in 2 warehouses at St. John's (G.C. Morgan).

VIOLET ROOT ROT (Rhizoctonia crocorum) sev. affected 10% of the carrots grown in the Thedford Marsh area in Ont.; the disease was more severe than usual and most damage occurred on newly broken muck (N.J. Whitney).

RHIZOCTONIA (R. solani). Infection was sev. on some plants in plots at Edmonton, Alta. (W.P. Campbell).

SCLEROTINIA ROT (S. sclerotiorum) was found affecting roots received from Kamloops and from the sanatorium, Tranquille, B.C. (G.E. Woolliams). This rot caused mod.-sev. damage in plots and gardens and in storage about Edmonton, Alta. (W.P. Campbell). A farmer from Sangudo reported losses in field and storage for the last 4 years (A.W. Henry). Diseased specimens were received from Wynyard and Saskatoon, Sask. (T.C. Vanterpool). The disease affected $\frac{1}{4}$-acre field at Stanstead, Que.; few plants showed infection in the field, but every carrot became affected in storage (L. Cinq-Mars, R. Crete). This rot appeared in carrots lifted in wet weather and brought in for topping at Tupperville, N.S.; loss may be heavy (K.A. Harrison).

BLACK ROT (Stemphylium radicinum). Diseased specimens were received from La Rochelle, Man.; young plants had turned red and wilted; bases of leaves were black (J.E. Machacek).

YELLOWS (Callistephus virus 1) was found in all gardens and fields examined in the Lethbridge-Taber area, Alta.; infection was usually tr.-sl. but 20-25% of the plants were sev. infected in 2 fields at Taber (F.R. Harper). The disease was unusually prevalent about Edmonton, with 15-20% of the plants affected in most plots. Infection was 40% in a field at Oliver. Yellows was also seen on parsnip and spinach (T.R. Davidson). A sl. infection occurred in several city gardens at Saskatoon, Sask. (T.C. Vanterpool). Infection was 15-20% in Chantenay and Nantes in plantings in the Thedford Marsh, Ont.; and 2-10% on 9 carrot varieties in the Laboratory plots, Harrow (N.J. Whitney). Infection was a tr. at the Station, Ste. Clothilde (H.N. Racicot); 2% at Ste. Anne de la Pocatiere, Que. (R.O. Lachance); and 16%, causing severe damage, in a planting at Charlottetown, P.E.I. (R.R. Hurst). Infection ranged from a tr. to 17% in fields examined in Carleton, Sunbury and York counties, N.B. (D.J. MacLeod).

CAULIFLOWER

YELLOWS (Fusarium conglutinans) caused mod. damage to 5% of a late crop at Aylmer, Que. (K.M. Graham).

CLUB ROOT (Plasmodiophora brassicae) caused about 30% loss in $\frac{1}{4}$ acre of

cauliflowers at Burnaby, B.C.; this Chinese grower has a 9-acre market garden on muck soil thoroughly contaminated with the organism (I.C. MacSwan).

WIRE STEM (Rhizoctonia solani) caused about 25% loss at St. John's, Nfld., in a greenhouse, where it has been present for the last 3 years (G.C. Morgan).

BROWNING (boron deficiency) affected 2% of the plants in varying degrees in a planting near Charlottetown, P.E.I. (R.R. Hurst).

WHIPTAIL (molybdenum deficiency) caused sev. damage in 2 market garden plantings totalling $\frac{1}{4}$ acre in Queens Co., P.E.I.; the disorder has already been reported in a different area in the same district (D.B. Robinson).

CELERY

VIOLET ROOT ROT (Rhizoctonia crocorum) mod. infected 1-2% of the Epicure plants in the Thedford Marsh, Ont. (N.J. Whitney).

LATE BLIGHT (Septoria apii-graveolentis) became sev. in some plantings in the Cloverdale area, B. C., in October; one grower reported 9 acres unsaleable on account of the disease. Intermittent rains reduced the effectiveness of the fungicidal sprays and dusts that had been applied (I.C. MacSwan). Mod. infection in a garden at Lethbridge, Alta. (F.R. Harper), and in plots at La Trappe, Que. (Fr. M. Claude). Sl. affected specimens brought in from Queens Co., P.E.I. (R.R. Hurst).

YELLOWS (virus). Affected plants were received from the Thedford Marsh, Ont.; a small percentage of plants were reported to be infected in most fields (C.D. McKeen). Yellows affected 3% of the plants in the yellows garden at Ottawa, Ont. The plants were not sprayed and leaf hoppers were numerous. China aster and potato were also affected. (D.S. MacLachlan). Yellows affected 3 plants in a field in Sunbury Co., N.B. (D.J. MacLeod).

STEM CRACKING (boron deficiency). A few plants were affected in a lot of celery on the market at Charlottetown, P.E.I. (R.R. Hurst).

CHINESE CABBAGE

CLUB ROOT (Plasmodiophora brassicae) heavily infected this crop at the Station, Saanichton, B.C. (W. Jones).

CUCUMBER

LEAF SPOT (Alternaria ?tenuissima) was fairly heavy on Snow Pickling cucumbers in the University trial plots, Vancouver, B.C. (H.N.W. Toms, J.W. Groves).

GREY MOULD (Botrytis cinerea) caused losses of a few plants in some greenhouses at Leamington, Ont. In recent years, protecting the plants by spraying with ferbam has proved effective (C.D. McKeen).

SCAB (Cladosporium cucumerinum) was present in most greenhouse crops in Essex Co., Ont., but it caused little damage (C.D. McKeen). Scab completely destroyed 3 acres of pickling cucumbers at La Trappe, Que., in 1952 (Fr. M. Claude). The disease caused sev. damage in the late season in some areas in N.B. In one field, in plots sprayed with Orthocide and Dithane, 80% control was achieved whereas plots sprayed with Basicop or left unsprayed were severely affected (S.R. Colpitts). Garden patches in Annapolis and Kings counties, N.S., were severely infected by scab. In the fields planted for the pickling factory the resistant Maine #2 was used and no outbreaks were recorded (K.A. Harrison). Scab caused mod. damage in a garden planting at Freetown, P.E.I. (J.E. Campbell).

BACTERIAL WILT (Erwinia tracheiphila) destroyed up to 2% of the plants in many fields in Essex Co., Ont. (C.D. McKeen). Sl. infections were noted in several locations in Lincoln Co. (J.K. Richardson).

POWDERY MILDEW (Erysiphe cichoracearum) caused sl.-mod. losses in many greenhouses and field crops in Essex Co., Ont. The fungus survived the winter on a few greenhouse crops that suffered the most severe damage and then spread in the spring to crops in adjacent fields (C.D. McKeen). A mod. infection was observed at La Trappe, Que., in July 1952 (Fr. M. Claude).

ANGULAR LEAF SPOT (Pseudomonas lachrymans). Infection was tr.-mod. in 3 commercial plantings at Medicine Hat, Alta. (F.R. Harper). Infection was sl. on Early Fortune, New Prolific, Tokyo, Colorado, Ohio, and Minvine and tr. on Hybrid PH, Niagara, Early Mineu and Snow Pickling in the University plots, Winnipeg, Man. Tr.-mod. infections were seen at St. Eustache, Brandon, and West Kildonan (W.A.F. Hagborg). A 40% infection was observed on Straight 8 in Queens Co., N.B. (S.R. Colpitts).

DAMPING-OFF (Pythium ultimum) caused the death of a small percentage of seedlings and young plants in beds in several greenhouses in Essex Co., Ont. as a result of incomplete sterilization of the soil (C.D. McKeen). A tr. occurred in the Horticulture greenhouse, Ottawa, Ont., in 1952 (K.M. Graham).

MOSAIC (Cucumis virus 1). Two strains of the virus has been found in several greenhouses in s.w. Ont.; the mild strain causes little damage whereas the severe strain causes marked leaf distortion, necrotic spotting and pronounced stunting of growth (C.D. McKeen). Mosaic was severe on the fruits received from one garden near Quebec, P.Q. (D. Leblond). Infection was tr.-2% in 4 plantings in N.B. (D.J. MacLeod). Mosaic was reported to have sev. affected 20% of the plants in a small garden in Kings Co., N.S. (K.A. Harrison).

DDT INJURY. Two applications of DDT to control cucumber beetle caused sev. stunting and injury to $\frac{1}{4}$ acre of pickling cucumbers in Kings Co., N.S. (K.A. Harrison).

FOOT ROOT ROT (cause unknown). Several plants were killed in many greenhouses around Leamington, Ont.; several different organisms appear to be active (C.D. McKeen).

WILT (cause unknown). For several years the occasional greenhouse crop of Burpee hybrid around Leamington, Ont., has developed mod.-sev. wilting; symptoms have always appeared after harvesting has started. No vascular pathogen or root necrosis has been found. The condition has been attributed to an inadequate root system formed under winter conditions (C.D. McKeen).

EGGPLANT

EARLY BLIGHT (*Alternaria solani*). A 40% infection was observed on leaves and fruits in a small planting at Rougemont, Que. (L. Cinq-Mars, R. Crete).

GREY MOULD (*Botrytis cinerea*) killed most of the plants in the Horticulture greenhouses at the University, Edmonton, Alta. (G.B. Sanford, W.P. Campbell).

DAMPING-OFF (*Rhizoctonia solani*) caused only tr. damage in a few seed beds in s.w. Ont. Seed and soil treatment with Arasan as well as soil sterilization, practised by the growers, have greatly reduced losses in recent years (C.D. McKeen).

WILT (*Verticillium albo-atrum*) affected 30% of the plants in 4 irrigated fields near Harrow, Ont. (C.D. McKeen).

GARLIC

DRY ROT (*Penicillium* sp.). A small consignment of bulbs received at Kentville, N.S., from an Ont. seed house was infected; loss of "buds" was high (D.W. Creelman).

HOP

DOWNY MILDEW (*Pseudoperonospora humuli*) was prevalent on "escaped" plants in N. Saanich, B.C. (W. Jones).

WILT (*Verticillium dahliae*). Three or four years ago at Lillooet, B.C., Early Cluster hop plants were set out in a field cropped for several years previously to tomatoes. Growing of tomatoes was discontinued on account of poor yields due to lowered soil fertility and Verticillium wilt, which had become prevalent. According to Dr. W.G. Keyworth, who identified the pathogen, the organism is quite distinct from that causing the destructive wilt of hops in England. (G.E. Woolliams).

LETTUCE

GREY MOULD (*Botrytis cinerea*), as a bottom rot, was reported to have caused sev. damage in the Thedford Marsh, Ont.; 90% of the crop was destroyed in one field (C.D. McKeen). Grey mould, probably aggrevated by frost, caused up to 30% loss in some fields of head lettuce at Berwick, N.S. In one planting, the disease apparently began in the seed bed (K.A. Harrison).

DOWNY MILDEW (*Bremia lactucoe*)was general on leaves of seed plants in September at the Station, Saanichton, B.C.; on 4 Dec. the fungus was sporulating heavily on young plants, which after overwintering in the open will form the seed plants next year. Diseased plants usually fall prey to *Botrytis* in the spring (W.Jones). Plants showing infection on the lowest leaves were received from Thedford Marsh, Ont. (C.D. McKeen).

RUST (*Puccinia extensicola*)affected tr.-5% of the plants in 3 fields of head lettuce in Kings Co., N.S. (D.W. Creelman, K.A. Harrison).

BOTTOM ROT (*Rhizoctonia solani*). A trace was noted in 2 fields near

Leamington, Ont. (C.D. McKeen). This disease was destructive to about 10% of the plants at Ste. Therese, Que.; it is common on sandy muck soils north of Montreal and is responsible for most of the reduction in yield (K.M. Graham).

Specimens affected with soft rot in the lower part of head were brought in from St. Vital, Man.; R. solani and Pythium sp. were isolated (J.E. Machacek).

DROP (Sclerotinia sclerotiorum). A few affected plants were seen in the Berwick area, N.S. (K.A. Harrison). The disease caused mod. damage in 2 small garden plots at St. John's, Nfld.; soil was poorly drained (G.C. Morgan).

BIG VEIN (virus). Tr. infection seen on several varieties of head lettuce at Ste. Clothilde, Chateauguay Co., Que. (H.N. Racicot).

YELLOWS (Callistephus virus 1). Diseased specimens were received from Thedford Marsh, Ont. (C.D. McKeen). The disease affected 5-17% of the plants in 3 gardens at Fredericton, N.B. (D.J. MacLeod). Yellows affected 5% of the plants in a field of head lettuce in Kings Co., N.S. (K.A. Harrison).

MELON

LEAF SPOT (Alternaria cucumerina) was reported on melons in the University trial plots, Vancouver, B.C. (H.N. Toms). Infection was relatively sl. in the Laboratory plots, Harrow, Ont. (C.D. McKeen).

ANTHRACNOSE (Colletotrichum lagenarium) caused numerous lesions on vines and fruits in a 2-acre field at Harrow, Ont., destroying 20% of the crop (C.D. McKeen).

POWDERY MILDEW (Erysiphe cichoracearum) appeared in August in most fields about Harrow and Leamington, Ont. Spraying reduced losses below those of recent years. Fungicides used were copper sulphate, 12 oz. in 100 gallons of water and Iscothan, 8 oz./100 gal. applied at weekly intervals (C.D. McKeen). A sl. infection was noted at La Trappe, Que., in 1952 (Fr. M. Claude).

WILT (Fusarium bulbigenum var. niveum) developed wherever susceptible varieties were grown on infested soil in the Harrow-Leamington area, Ont. (C.D. McKeen).

WILT (Verticillium albo-atrum) affected 25% of the plants in a field at Osoyoos; in 1952 the disease affected all the plants of Earliana tomatoes in the same field (G.E. Woolliams).

MOSAIC (virus) was present in varying amounts in most plantings in s. Essex Co., Ont. (C.D. McKeen).

ONION

BLACK MOULD (Aspergillus niger) was found affecting all onions in a peck sample received from a carload of yellow onions from Leamington, Ont., inspected in Montreal, Que.; no estimate of damage was reported (H.N. Racicot, K.M. Graham).

NECK ROT (Botrytis allii). A tr. observed in a seed plot of White Portugal at Saanichton, B.C. (W.R. Orchard). Neck rot was much more prevalent than usual in the B.C. Interior on account of the cool rainy weather at harvest. It was most

prevalent in hybrid onions with Sweet Spanish as one parent but it also caused some damage to Yellow Globe Danvers (G.E. Woolliams). Infection was sl. in onions in storage at Altona, Man. (J.E. Machacek). Infection was sl. in a small lot of onions at Kentville, N.S. and was reported quite heavy on onions from Antigonish (K.A. Harrison, C.O. Gourley). Neck rot affected 1% of the onions from a garden at Charlottetown, P.E.I. (R.R. Hurst).

DOWNY MILDEW (Peronospora destructor) was general in many gardens in N. Saanich, B.C., causing considerable damage (W. Jones). Infection ranged from sl. in some localities to 100% in others in the B. C. Interior. Downy mildew occurred on Yellow Globe Danvers and other varieties in both the fall-/and the spring-planted crop. The disease first appeared on fall planted onions shortly before the bulbs matured and then later in the season on the spring crop as it also approached maturity. Thus yields were not seriously affected (G.E. Woolliams). Downy mildew caused sev. blighting of set onions in a garden at Harrow, Ont. (C.D. McKeen). A tr. was seen at Ste. Clothilde, Que. (H.N. Racicot).

ROOT ROT (Pythium irregulare) destroyed 25% of the bed area sown to Spanish onions in a greenhouse at Leamington, Ont.; the disease did not recur when the bed was reseeded after the soil was treated with Arasan (C.D. McKeen).

PINK ROT (Pythium, Fusarium and Pyrenocheata terrestris) severely affected one field in the Jeannette's Creek Marsh, near Tilbury, Ont. Addition of manganese salts to the fertilizer, that is applied at seeding time, has greatly reduced the amount of damage caused by this disease in the Leamington Marsh (C.D. McKeen).

SMUT (Urocystis cepulae) was found in spring-planted Yellow Globe Danvers at Kelowna, B.C., in the same field where the disease was first observed in 1951. (P.D.S. 31:53). Infection was also higher, being 25% of the plants; although onions were grown on the field in 1952 and no smut was then seen. Cool weather this spring may have favoured its reappearance (G.E. Woolliams). Smut affected up to 3% of the onion seedlings in the formaldehyde treated soils in the Leamington Marsh, Ont. (C.D. McKeen).

YELLOWS (Callistephus virus 1). Sl. infection seen in a planting at Altona, Man. (J.E. Machacek).

PARSNIP

SCAB (Streptomyces scabies). Sl. infection in 2 fields at Manuels, Nfld. (G.C. Morgan).

YELLOWS (Callistephus virus 1). Affected 2 plants in a garden in York Co., N.B. (D.J. MacLeod).

PEA

Mr. V.R. Wallen and Dr. A.J. Skolko submitted a special report on "Pea Diseases in Ontario in 1953".

Peas were seriously affected by LEAF and POD SPOT (Ascochyta pisi) in some areas in Ont. this year. Of 40 fields of canning peas examined, 17 were infected by A. pisi. Disease intensity ranged from trace infection to the extreme condition in one field of Pride peas in the Clinton area, where a disease-free pod could not be found in the field.

Fields of canning peas examined were located principally about Clinton, already mentioned, near Collingwood, near Lindsay and in Prince Edward Co. and field peas were seen about Renfrew and Ottawa. Leaf and Pod Spot was most severe in the Clinton area and near Lindsay; its high incidence in these areas is attributed to very high precipitation there during the early spring and summer months.

BACTERIAL BLIGHT (Pseudomonas pisi) affected 10% of the leaves in a field of Canner King near Collingwood and was present in trace amounts in 4 fields of field peas in the Ottawa area.

Trace infections of BLOTCH (Septoria pisi) were noted in 2 fields, one near Lindsay and the other near Goderich. A severe outbreak of FUSARIUM WILT (F. oxysporum f. pisi) was observed near Goderich.

Other Observations

ROOT ROT (?Aphanomyces euteiches) caused an estimated 80% reduction in crop on 3 fields of about 10 acres each at St. Edouard, Napierville, Co., Que. It appears that many fields in this county and in Laprairie are now so heavily infested that pea culture is no longer possible (L. Cinq-Mars, R. Crete).

LEAF and POD SPOT (Ascochyta pisi). Leaf infection was tr.-sl. in 2 fields examined in s. Alta. (F.R. Harper). Infection was mod. in the garden at the Station, Melfort, Sask., and sl. in a few gardens at Saskatoon. Few inquiries or samples were received (H.W. Mead). Infection was tr. on Stratagem, but it was sev. on American Wonder, destroying the crop, on the Upton farm, near Charlottetown, P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe polygoni). Mod. infection was seen in some gardens in the Edmonton area, Alta. (T.R. Davidson). Many garden patches were affected about Fredericton and Woodstock, N.B., but commercial fields escaped damage (S.R. Colpitts). A mod. infection was seen on Waldo in the horticultural plots at the Station, Charlottetown, P.E.I. (J.E. Campbell).

ROOT ROT (Fusarium sp.) caused mod. damage to 10% of the plants in a garden at Kentville, N.S. The pathogen was identified as F. oxysporum by W.L. Gordon (D.W. Creelman). Root rot destroyed 50% of the plants in a planting of Little Marvel at the Upton farm, near Charlottetown, P.E.I. (R.R. Hurst).

MYCOSPHAERELLA BLIGHT (M. pinodes). A sl. infection was found by the Plant Products inspectors in peas at Creston, B.C. The pathogen was identified by J.W. Groves (G.E. Woolliams).

DOWNY MILDEW (Peronospora pisi) caused a 3% infection of Stratagem and Giant Stride at Saanichton, B.C. (W.R. Orchard).

BACTERIAL BLIGHT (Pseudomonas pisi). Infection was 3-tr. 2-sl./11 fields

examined in s. Alta. (F.R. Harper). Sl. infection was seen in a plot of Homsteader x Marvel at Fort Garry, Man. (W.A.F. Hagborg).

LEAF BLOTCH (Septoria pisi). Sl. infection seen in the garden at the Station, Melfort, Sask. (H.W. Mead).

RUST (Uromyces fabae) was noted in several garden patches at Woodstock and Fredericton, N.B. (S.R. Colpitts). Infection was a tr. in a small garden at Kentville, N.S. (K.A. Harrison) and sl. in the Station plots, Charlottetown, P.E.I. (J.E. Campbell).

ROOT ROT (several fungi) caused mod.-sev. damage in several fields of canning peas at Magrath and Taber, Alta. Fusarium spp. and Rhizoctonia solani were isolated (F.R. Harper).

BLIGHTING. Blighted plants in the field plots at the University, Saskatoon, Sask., showed symptoms resembling heat canker. Pythium ultimum was obtained from 2 plants, with no growth from 2 others (T.C. Vanterpool).

MOSAIC (Pisum virus 1). Infection was tr.-5% in 3 gardens in York Co., N.B. (D.J. MacLeod).

PEPPER

ANTHRACNOSE (Colletotrichum sp.). A tr. was found in a few fruits in a field at Harrow, Ont. (C.D. McKeen).

SOFT ROT (Erwinia carotovora) caused only sl. damage to pepper crops in Essex Co. in 1953. Corn-borer infestations were low and thus the bacteria were provided with few infection courts (C.D. McKeen).

DAMPING-OFF (Pythium sp. and Rhizoctonia solani). Losses under 2% were observed in a few beds of seedlings in the Harrow area, Ont. Soil treatment with Arasan or soil sterilization with steam, Dowfume or MC-2 has reduced the disease to a low level (C.D. McKeen).

BACTERIAL SPOT (Xanthomonas vesicatoria). Only a tr. was observed in Essex Co., Ont. (C.D. McKeen).

ETCH (tobacco etch virus). Only a few plants became affected in a few fields in Essex Co., Ont. The vector, Myzus persicae, was absent from many fields this year (C.D. McKeen).

MOSAIC (virus). Tobacco mosaic virus caused sev. losses in one field near Harrow, Ont. Cucumber mosaic virus affected 1-2% of the plants in several fields at Harrow (C.D. McKeen).

MILD MOSAIC (Solanum virus 2, medium strain) was found in 2 plants in an experimental plot at Fredericton, N.B. Nearby potato plants were also infected with Solanum virus 2 (D.J. MacLeod).

STREAK (Solanum virus 2, L strain). Two plants showing streak were found in a garden in Fredericton, N.B. (D.J. MacLeod).

BLOSSOM-END ROT (non-parasitic). As a result of the hot dry summer, the disorder was more prevalent and destructive than usual in Essex Co., Ont. (C.D.McKeen).

SUN-SCALD (non-parasitic). A high percentage of the green and ripe fruits were damaged in Essex Co., Ont., during a hot spell in late August and early September (C.D. McKeen).

POTATO

The Plant Protection Division, Science Service, has supplied the data contained in Tables 13-16 on Seed Potato Certification. All fields entered for certification were planted with Foundation or Foundation A seed.

The acreage entered for Seed Potato Certification increased considerably in 1953, but it was still well below the peak of 1950. The acreage that passed inspection rose less sharply as the percentage of crop meeting the certification standards was less than in 1952. The most notable increase in fields rejected for disease was on account of mosaic in P.E.I. and bacterial ring rot in N.B. The Sebago grown in P.E.I. and the Katahdin in N.B. accounted for over half the acreage of seed potatoes produced.

EARLY BLIGHT (Alternaria solani) was reported as follows: Infection 57-sl. 14-mod. 3-sev./844 fields in B.C., causing some premature death of plants in the Kootenay area (H.S. MacLeod); infection 1-sev./96 fields inspected in s. Alta. (R.P. Stogryn); present in 54 (51%) of the fields inspected in central and n. Alta, being most prevalent in the early varieties especially when planted early; tubers of Warba found affected by Alternaria rot (J.W. Marrit, D.S. MacLachlan); infection 2-tr. 8-sl. 2-mod. 1-sev./13 fields about Edmonton (W.P. Campbell); sev. about Prince Albert, with sl. infections elsewhere in Sask. (A. Charlebois); sl. in Man. (D.J. Petty), but mod. at Souris (J.E. Machacek); present in a few fields in the London district, Ont. (F.J. Hudson); sl. infections only in district 2 (W.L.S. Kemp); mostly from Orillia to Cochrane and about North Bay in district 3, particularly in the early varieties (H.W. Whiteside); infection 55-sl. 10-mod. 1-sev./82 fields in e. Ont., the latter in an early-planted field of Irish Cobbler (E.H. Peters); 218-sl. 137-mod. 4-sev./1341 fields in Que., mostly in the Lake St. John district, where it was first reported on 14 July (B.Baribeau); also sev. in 96 acres of Katahdin, etc., at Ste Brigitte, Nicolet Co. (H. Genereux); infection usually sl. in N.B. but sev. in a few fields of Keswick (C.H. Goodwin); first reported in N.S. on 24 July, infection usually mod. except for one field each of Irish Cobbler and Warba in Kings Co.; Alternaria rot affected 0.5% of the tubers of Early Rose grown at the Station, Kentville, (R.C. Leyton); again very light in P.E.I. (H.L. McLaren), but heavy in some fields of Irish Cobbler and Katahdin (R.R. Hurst); infection usual sl. in Nfld. (G.C. Morgan). In general early blight was less prevalent than usual.

LEAF SPOT (Ascochyta lycopersici Brun.) was found August 1949 at Saanichton on an unnamed seedling from Nebraska. The leaves showed more or less circular light brown spots with dark brown margins, 2-10 mm. in diam., often zonate like early blight but lighter coloured; necrotic area brittle, often dropping out to give a shot-hole appearance. The fungus was recently identified as A. lycopersici, which is reported by Weiss and O'Brien (Index Pl. Dis. in U.S., pt. 4, 1952) on S. tuberosum from Ore. and Alaska and on other species elsewhere (W. Jones, D.B.O. Savile).

GREY MOULD (Botrytis cinerea) caused a sl. infection in a field of Katahdin at Fredericton, N.B. (S.R. Colpitts).

Table 13. Seed Potato Certification Fields and Acres Inspected and Passed in 1953

Province	Number of Fields Entered	Number of Fields Passed	Fields Passed %	Number of Acres Entered	Number of Acres Passed	Acres Passed %
P.E.I.	7,085	5,734	80.9	28,803	23,293	80.9
N.S.	391	333	85.2	696	535	76.9
N.B.	3,572	3,018	84.5	20,837	15,766	75.7
Que.	1,341	1,021	76.1	3,624	2,710	74.8
Ont.	770	663	86.1	2,137	1,785	83.5
Man.	153	138	90.2	585	509	87.0
Sask.	55	45	81.8	114	80	70.2
Alta.	200	168	84.0	944	850	90.0
B.C.	844	755	89.5	2,433	2,178	89.5
Total	14,411	11,875	82.4	60,173	47,706	79.3
Previous Yearly Totals						
1952	12,169	10,985	90.3	45,988	41,315	89.8
1951	12,093	10,580	87.5	46,176	40,402	87.5
1950	16,203	13,292	82.0	75,352	61,933	82.2
1949	15,476	13,739	88.8	72,706	65,051	89.5

Acres Entered		Acres Passed	
1953	60,171	1953	47,706
1952	45,988	1952	41,315
Increase of 14,183 or 30.8%		Increase of 6,391 or 15.5%	

Table 14. Seed Potato Certification Acreage Passed by Varieties

Variety	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.-Alta.	B.C.	Total
Sebago	13,524	51	433	23	44	1	5	14,085
Katahdin	1,814	132	10,024	166	924	8	25	13,093
Irish Cobbler	4,910	59	733	149	161	119	2	6,133
Green Mountain	1,165	40	672	1,920	50	19	131	3,997
Canso	1,111	26	1,302	70	218	20	5	2,752
Netted Gem	20	35	57		4	742	1,523	2,381
Pontiac	318	8	634			135	20	1,115
Keswick	191	14	471	126	85	6	11	904
Bliss Triumph	13	49	687			20		769
Kennebec	44	48	327	178	3	47	16	663
Warba	143	22	8		10	114	131	428
White Rose			143			3	234	380
Chippewa	19	30	11		212		2	274
Russet Rural			196		20			216
Ontario		1	46		39			86
Others	17	20	22	78	15	205	73	430
Total	23,293	535	15,766	2,710	1,785	1,439	2,178	47,706

Table 15. Seed Potato Certification: Fields Rejected on Field Inspection, 1953

Province	Leaf Roll	Mosaic	Ring Rot in field	Ring Rot on farm	Black Leg	Wilts	Adjacent Diseased Fields	Foreign var.	Misc.	Total
P.E.I.	78	303			249	55	84	269	313	1,351
N.S.	5	15			3	11	9	11	4	58
N.B.	6	83	203	126	30		8	45	53	554
Que.	5	70	87	25	45		42	18	28	320
Ont.	14	18	21	12	11	5		8	18	107
Man.	1	3	4	2	3			1	1	15
Sask.	1	1		7					1	10
Alta.					22				10	32
B.C.	6	6			13	1		3	60	89
Total	116	499	315	172	376	72	143	355	488	2,536
Rejection as a percentage of fields:										
Entered	0.8	3.4	2.2	1.2	2.6	0.5	1.0	2.5	3.4	17.6%
Rejected	4.6	19.7	12.4	6.8	14.8	2.8	5.6	14.0	19.3	100%

Table 16. Seed Potato Certification: Average Percentages of Diseases found in fields, 1953

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	.35	.07	.14	.18	.10	.03	-	.25	.08
Leaf Roll	.09	.12	.04	.02	.06	.02	.31	.03	.04
Mosaic	.21	.21	.13	.20	.09	.03	.16	.02	.05
Fields passed (final inspection)									
Black Leg	.19	.04	.10	.07	.04	.02	-	.17	.04
Leaf Roll	.04	.04	.03	.01	.04	.01	.07	.03	.02
Mosaic	.04	.09	.06	.06	.01	.01	.02	.01	.01

BLACK DOT (Colletotrichum atramentarium) was found affecting a few plants of Warba at Calgary, Alta. (A.W. Henry). Traces were seen on Irish Cobbler and Sebago in the plots at Charlottetown, P.E.I. (R.R. Hurst).

BACTERIAL RING ROT (Corynebacterium sepedonicum) was not observed on any crop grown for certification in B.C. (H.S. MacLeod), but it was found on 10 farms in White Rose table stock. Two separate lots of affected seed accounted for its occurrence on 5 farms in one district and on 2 farms in another. In neither case was it possible to determine the original source of the infection.

No recurrence of the disease was found on the one farm where it was detected last year. Only one shipment of potatoes arriving at Vancouver was found affected by ring rot. It was from Washington State (I.C. MacSwan).

Bacterial ring rot was found in one field entered for certification in Alta.; the farm had a previous record of ring rot (J.W. Marritt). The 1953 ring rot survey covered 603 farms (7,530 acres) in Alta.; the disease was found on 75 farms (12.4%) comprising 1,379 acres (18.3%). The increased acreage affected this year resulted from a number of new growers appearing in the Lethbridge area. The growers planted large acreages and apparently in ignorance of the regulations governing commercial production of potatoes in the area used seed from unsatisfactory sources. It should be pointed out that, despite the incidence of ring rot at the present time, in over 90% of the affected fields only a few plants were affected in each field. Some 10-12 years ago it was not uncommon to find 10% of the plants affected. Potatoes imported into Alta. during the year were checked for ring rot in many instances. No infested stocks were found. Present regulations respecting the inspection of potatoes entering the province appear to have made the shippers more careful about the stock that they buy (W. Lobay). Seven fields all on the same farm were rejected for ring rot in Sask. (A. Charlebois). Although the percentage of affected tubers was low, several cases of ring rot were brought to the attention of the laboratory (R.J. Ledingham). Four fields from 2 seed stocks were rejected in Man. (D.J. Petty).

In Ont., ring rot caused the rejection of: 2 fields of Katahdin and 6 other fields on the same farm in the London district (F.J. Hudson); crops of 2 growers comprising 30 acres in district 2 (W.L.S. Kemp); 18 fields of Netted Gem and Katahdin and a bin of Irish Cobbler in district 3 (H.W. Whiteside); and one field of Canso and 6 other fields on the same farm in e. Ont. (E.H. Peters). As a result of the 1953 survey in Ont., ring rot was found in 700 acres of potatoes on 186 farms. The results of these surveys were recently summarized in a paper "Eleven years of bacterial ring rot in Ontario" by D.S. MacLachlan and R.E.Goodin and read before the Ont. Soil and Crop Improvement Association. In the eleven years, 1943-1953, 3,643 positive identifications of the ring rot organism has been made from tubers taken from some 16,000 acres of potatoes grown on 2,631 farms. The records show that ring rot was found but once on 1,873 farms (71.2%), for 2 years on 570 (21.7%), for 3 years on 144 (5.5%), for 4 years on 28 (1.1%), for 5 years on 10 (0.4%) and for 6 years on 6 (0.2%). Thus nearly 93% of the growers got rid of the disease at least the second year after they were shown the disease on their farm. Some 7%, however, through carelessness or non-compliance with the regulations continued to grow diseased potatoes. When one considers how quickly ring rot may spread through the crop, it is quite probable that serious reductions in marketable yields have compelled these growers to clean up their premises or cease growing potatoes commercially. There has been considerable fluctuation in the number of new cases found each year. Study of the weather records has indicated that years of high incidence were years of open falls with no killing frost to interfere with the full development of disease symptoms. The value of the survey to the individual grower has been amply demonstrated by the marked reduction of ring rot incidence that has been brought about in many counties and districts. Because traces of ring rot are virtually impossible to detect, a program of complete elimination is hardly feasible. The present annual survey insures that growers are protected against serious losses from the disease (D.S. MacLachlan).

Ring rot, still the main cause of rejection in Que., was found in 87 or 6.4% of the fields inspected, a sl. increase over last year. Nearly half the affected fields were in the Lake St. John district. The disease was not detected in any fields of Teton entered for certification. (B. Baribeau). Ring rot was found in N.B. in 203 fields and caused the rejection of 126 other fields because it was present in table stock on the same farm. The figures represent a considerable increase over previous years. Absence of early killing frosts permitted the detection of the disease in some fields which ordinarily might have been missed (C.H. Godwin). No organized survey for ring rot was made in N.S., but no case of the disease was found in certified potatoes or in the few fields of table stock examined (R.C. Leyton). Ring rot was found in P.E.I. in 5 fields during field inspection and in 7 others at harvest. A further 20 fields were rejected because the crop had been exposed to contamination.

These figures are not included in Table 15. In a survey conducted 26 April to 16 June 1954, when 6,380 or 90% of the farms in P.E.I. were visited, 126 tuber samples suspected of carrying ring rot were collected; 24 samples proved positive upon laboratory examination (H.L. McLaren).

Ring rot infection was mod. in 2 fields in w. Nfld. and sl. in one at Torbay. The diagnosis was confirmed by D.S. MacLachlan from smears sent to Ottawa. Steps are being taken to prevent its further spread. This report is the first for Nfld. (G.C. Morgan).

SOFT ROT (?Erwinia carotovora) caused sev. losses around Edmonton, Alta., where the fields were flooded by a 5-inch rain on 31 July-1 Aug. Tubers formed at that time were destroyed by a soft rot (W.P.C.). Soft rot was more prevalent than usual in district 3, Ont., probably because the crop was frequently immature when dug. The disease was present in bins of Chippewa, Sebago, and Canso (H.W.Whiteside). Soft rot had affected about 60% of the tubers in a crop of Warba at Gagetown, N.B., on 12 Aug. (S.R. Colpitts). A black rot was found in a few lots of Green Mountain and Keswick in Que.; the tubers showed slight bruises on the surface with extensive rot within (B. Baribeau).

BLACK LEG (Erwinia phytophthora), less prevalent than in 1952, was found in 114 (17%) of the fields inspected in B.C. and caused the rejection of 13 (H.S. MacLeod). Black leg was found in 71 (75%) of the fields in s. Alta. and caused 5 to be rejected. As noted last year, it is very prevalent on irrigated land and at least 6 growers suffered sev. losses (G. Stogryn). The disease was prevalent about Edmonton and in one field 75% of the plants were affected (W.P.C.). In central and n. Alta., black leg was seen in 69 (65%) of the fields inspected and caused 17 to be rejected. It was found in trace amounts in the Peace River District for the first time in recent years(J.W. Marritt). A sl. infection was noted in only one field in Sask. (A. Charlebois). Black leg was present in 41 (25%) of the fields inspected in Man. and caused 3 fields, in the Winnipeg area, to be rejected (D.J. Petty). A sl. infection was also noted at Souris (J.E. Machacek).

In Ont., black leg was found in small amounts in several fields in the London district (F.J. Hudson). It affected 21 fields and caused the rejection of 3 in district 2. Growers who avoided planting their seed potatoes beside stands of corn experienced little or no trouble from black leg in their crops (W.L.S. Kemp). Black leg was found in several parts of district 3 and caused 4 fields to be rejected (H.W. Whiteside). It was observed in 19 of the 82 fields inspected in e. Ont. (E.H. Peters). Black leg was present in 533 (59.7%)

of the fields inspected in Que. and caused the rejection of 45 fields, 25 of which were in the Lake St. John district (B.Baribeau). The disease was more prevalent than in 1952 in all varieties in N.B. and caused 30 fields to be rejected. The weather was rather cold and unseasonable after the crop was planted (C.H. Godwin). Black leg was reported in 60 out of 391 inspected in N.S. and caused 3 to be rejected. The highest infection reported was 4.6% (R.C. Leyton). Black leg was unusually prevalent in P.E.I.; 249 fields were rejected on account of the disease in 1953 compared to 27 in 1952 (H.L. McLaren). A survey of table stock revealed an average infection of 1% in 7 fields of Irish Cobbler, 0.5% in 10 of Sebago and tr. in 15 of Green Mountain. A few fields showed 3% of the plants affected (R.R. Hurst). Weather conditions were ideal for the development of black leg in Nfld.; the tubers were not treated before planting. The disease was noted in Conception Bay and in Trinity Bay, infections being 15-sl. 5-mod. 20-sev. Mod. infections were also reported from the Cormack land settlement, w. Nlfd. (G.C. Morgan).

WILT (Fusarium oxysporum, Verticillium albo-atrum) was found in 23 (2.9%) of the fields inspected in B.C. (H.S. MacLeod); in 22 (23%) of the fields usually in trace amounts in s. Alta. (R.P. Stogryn); and in 6 (5%) of the fields in central and n. Alta. (J.W. Marritt). Wilt was less prevalent than usual in Sask., being seen in only 5 (11%) of the fields inspected (A. Charlebois). The disease was present in few fields in Man. (D.J. Petty).

In Ont., wilt was found in practically all fields examined during the second inspection in the London district; it was most prevalent in Canso (F.J. Hudson). Wilt was present in several fields in district 2. Some growers reported misses or weak plants which became wilted and often died prematurely, as a result of the set being attacked by a jelly rot (W.L.S. Kemp). Wilt was present in small amounts in many fields in district 3. A 11.5% infection developed in one field of Katahdin, causing its rejection. Some stem-end browning was observed in Canso at bin inspection and in one lot of Irish Cobbler; 8% of the tubers showed internal discoloration (H.W. Whiteside). Wilt was found in most varieties grown in e. Ont. and caused 4 fields to be rejected. A rejected field of Kennebec was probably affected by V. albo-atrum (E.H. Peters). Wilt was found in 52 (38%) of the fields inspected in Que. and caused 8 to be rejected. It was most prevalent in Teton. One field of table-stock Kennebec was observed where Verticillium wilt was severe; by 3 Sept., over 20% of the plants were wilted, yellowed, or dead. Symptoms on the tubers were slight, but the yield was estimated to have been reduced 20-25% (B. Baribeau). Wilt was recorded in a few fields throughout N.B., but it appeared to be less prevalent than in 1952. Three fields were rejected on account of the disease (C.H. Godwin).

DRY ROT (Fusarium spp.) was evident at harvest in a 30-acre field of Katahdin in Wentworth Co., Ont., affecting up to 10% of the tubers. Infection appeared confined to the lenticels on the tubers and to the stolons. Lesions were dark, about 3-10 mm. across and 5-10 mm. deep, sometimes coalescing. The more severely affected areas were scattered throughout the field, apparently unrelated to soil type or contour. Isolations consistently yielded a Fusarium (J.K. Richardson). Dry rot was observed in a few bins of the 1952 crop; it caused some loss in shipments (B. Baribeau). The disease was reported in a few bins in N.B., but losses were negligible (C.H. Godwin).

RHIZOCTONIA (Pellicularia filamentosa). Infection was 373-sl. 194-mod. 42-sev./844 fields in B.C. Some crops, especially those of Warba, were quite sev.

infected. It is apparent the disease is generally more sev. in fields where the crop rotation is short (H.S. MacLeod). The disease was present in most fields inspected in s. Alta., but the infection was sl. (R.P. Stogryn). Besides the infection being sl. in s. Alta., the tubers were particularly free of scurf (J.W. Marritt). Although Rhizoctonia was present in most fields it caused little damage (A. Charlebois). However, specimens received from 3 gardens indicated that sev. damage occurred occasionally (R.J. Ledingham). Two potato plantings w. of Wynyard were found on 13 Aug. where the white fruiting mats of the fungus were growing luxuriantly up the stem for about 1½ inches on a 'trace +' of the plants; moisture conditions were favourable. Repeated search in the drier area about Saskatoon yielded one plant in a city garden with meagre development of basidia (T.C. Vanterpool). Infection was sl. in most areas of Man., but was mod. about Winnipeg (D.J. Petty).

Little rhizoctonia was observed in the London district, Ont. (F.J. Hudson). If the soil is light and the crop is left in the ground after it matures, the tubers may become badly scurfed. These conditions occur quite commonly in district 2, in Durham and Ontario counties (W.L.S. Kemp). Rhizoctonia is commonly encountered in the northern part of district 3, but it was less prevalent than last year (H.W. Whiteside). Several fields about Englehart were rather sev. infected. Its prevalence seemed to be influenced by the acidity of the soils. The disease was materially reduced in one field where ground limestone was applied (J.K. Richardson). Tuber infection was sev. in one lot of Keswick, mod. in 2 of Keswick and sl. in 17 other lots grown in e. Ont. (E.H. Peters). Rhizoctonia was 112-sl. 6-mod/1341 fields in Que. Scurf was heavy on tubers from 6 fields (B. Baribeau). Field infection was sl. in nearly all fields in N.B.; scurf was sl. on the tubers (C.H. Godwin). A crop of Katahdin grown at Scotts Bay, Kings Co., was the only one with sev. scurfed tubers in N.S. (R.C. Leyton). Rhizoctonia caused negligible injury in P.E.I. (H.L. McLaren). A sl. infection was observed in 4 fields about Clarke's Beach, Nfld. (G.C. Morgan).

PINK ROT (Phytophthora erythroseptica) affected about 30% of the tubers of Warba in a home garden on Vancouver Island, B.C.; found previously at Summerland (W. Jones).

LATE BLIGHT (Phytophthora infestans) was first reported in B.C. on 27 June, although temperature and moisture conditions believed critical for its development were reached several times before this date. Its first occurrence was on plants growing on a cull pile on Lulu Island. Growers were advised at once through a press release of the appearance of late blight and cautioned to watch for the disease and begin spraying. The disease was reported on Lulu Island and about Ladner and Cloverdale in July but it did not become general until October, when it was quite widespread in the Fraser Valley on the mainland and in the Comox Valley on Vancouver Island. In the certified seed crops, most of which were sprayed or dusted several times, weather permitting, late blight is estimated to have caused loss of 2% of the crop through tuber rot. In the crops grown as table stock the loss in Fraser Valley was estimated to reach 20% in many of the early varieties and 10% in Netted Gem. Yields were probably cut also by the early death of the vines from late blight or top-killers used to prevent further tuber decay. This year's epidemic was the worst since 1948 (I.C. MacSwan, H.S. MacLeod).

Late blight was first seen in Alta. on 28 Aug. as sl. general infection in 2 fields s.e. of Edmonton. By 9 Sept. tr.-sl. infection was present in

all fields about Edmonton. Cool weather checked the further advance of the disease, but some tuber rot developed (T.R. Davidson). A sl. infection was seen in 8 (7%) of the fields inspected in n. Alta., but they were all in the Edmonton area (J.W. Marritt). Sl. infections were seen in several fields inspected at Norquay and Verigin, Sask., in late August (A. Charlebois). From the number of specimens received, it is evident that late blight tuber rot caused sl.-mod. damage in n.e. and e. central Sask. in 1953. Absence of killing frosts until after the normal harvest date probably increased the damage from tuber rot, which was found for the first time at Saskatoon (R.J. Ledingham, T.C. Vanterpool). Late blight was first reported in Man. on 3 Aug. from Dauphin and was seen in several fields about Winnipeg on 14 Aug. Tr.-mod. infections developed at Portage la Prairie, Carman, and Winnipeg, but the weather became unfavourable for blight and tuber rot was negligible (J.E. Machacek, D.J. Petty).

Late blight was first reported in Ont. on 14 July when a sl. infection was found near Renfrew in e. Ont. By the end of July it had been observed in 2 areas in Simcoe Co. Later it was reported from other counties on Georgian Bay, then in more southerly counties, and by 21 Aug. it had appeared in n. Ont. On account of hot dry weather in late Aug. and early September foliage infection was sl.-mod. and reported losses from tuber rot were tr.-sl. Growers were urged early in the season to keep the foliage covered with a suitable fungicide as long as the tops were green (C.B. Kelly et al.). No late blight was found on Canso, Keswick or Kennebec in e. Ont. in 1953, although it was observed on Canso in 1952 (E.H. Peters).

Late blight was first observed in Que. in 1953 n. of Montreal at Mont Laurier and L'Annonciation, on 12 July. By 31 July sl. infections were reported in counties s. and e. of Montreal and by mid-August scattered cases occurred throughout the province. Spread was very slow on account of hot dry weather throughout the summer. However, conditions became more favourable for late blight in September. Potatoes grown in n.e. Que. and along the lower St. Lawrence and dug in early October when the tops were still green developed 5-20% tuber rot in storage. Some sev. cases of tuber rot were found in Kennebec although late blight was not detected on the foliage (B. Baribeau, H. Genereux). Late blight was general and sometimes heavy in small unsprayed plantings in St. Hyacinthe and Rouville counties (L. Cinq-Mars, R. Crete).

Late blight was first reported in N.B. on 17 July in Carleton Co. Although the disease was reported from other sections of the province, infection generally occurred late and it rarely reached epidemic proportions. However late blight was mod.-sev. in several fields in York Co., where the rainfall was somewhat heavier than elsewhere. In consequence a few bins in this county developed a sl. amount of tuber rot (C.H. Godwin, P.N. Grainger).

Late blight appeared in a commercial crop on 29 July at Scotts Bay, Kings Co., N.S. By 12 Aug. scattered infections were present in most districts. A tropical hurricane with 3 inches of rain on 15 Aug. initiated a period of damp weather which lasted into the first week of September. The rest of September was fine. Sprayed fields were little affected and top-killing was required to destroy the vines and permit harvesting. Blight was common in unsprayed fields and losses were sev. in some of these fields. The average loss from late blight was estimated to be 10%, and in a few lots 50-60% of the tubers were destroyed by rot. Although few fields of the blight resistant varieties were sprayed only a trace of tuber rot was reported in these varieties (K.A. Harrison, R.C. Leyton).

Although the late blight epidemic was as severe in P.E.I. this year as in 1951, losses from tuber rot were not high. The crop escaped injury apparently because in fields that were not sprayed the death of the vines was so rapid that the tubers were exposed to infection for only 5 days. In addition growers increased the number of spray applications and used vine killers more extensively. Harvesting was accomplished during a 10-day interval of sunny weather after the tops were already dead from maturity, disease, frost or the use of a vine killer. Almost all losses from tuber rot occurred during the growing period. Late blight was first noticed on 10 July. The average loss in the seed potato crop was placed at 10 bu. per acre (L.C. Callbeck, H.L. McLaren). Late blight infection was heavy on the foliage in Trinity Bay, Conception Bay, and the St. John's areas, but light on the Bonavista peninsula, Nfld. Losses at harvest time were light in late varieties as an early frost in September killed the foliage. Losses were noticeably heavier in the early potato crop (G.C. Morgan).

LEAK or PYTHIUM ROT (P. ultimum) caused misses in a few fields on Vancouver Island, B.C., on account of rotting of the cut sets. Leak was common in early harvested White Rose, Katahdin, and Warba where the skin of the immature tubers was rubbed (W. Jones). Leak was found in tr. amounts in 1953 crop about Grand Forks and Pemberton when inspected in November, but later reports indicate some bins suffered more heavily. Seed piece decay, attributed to Pythium spp., caused losses ranging up to 10% of the crop in some sections of the B.C. Interior and about 12% of the crop in the Grand Forks area had to be replanted. On account of the dry winter and early spring the soil was hot and dry at planting time. On the other hand, in the Fraser River valley, up to 25% misses occurred in fields because the soil was wet and cold. In this region it was noted that in both stand and vigour of growth those crops that were planted with whole seed were in general superior to those planted with cut seed. However, cut seed was just as good as whole seed when the cut seed was calloused properly before planting and when the seed was taken out of cold storage and held a few days at warmer temperatures and then cut and planted immediately (H.S. MacLeod). Two samples of tuber rot were brought to the laboratory, Edmonton; the Alta. Dept. of Agriculture report many cases of this rot (G.B. Sanford). About 1% of the tubers were found affected in 2 lots of Kennebec and one of Green Mountain in Que. (B. Baribeau, H. Genereux).

VIOLET ROOT ROT (Rhizoctonia crocorum) caused sl. damage to a planting of Sebago in the Thedford Marsh, Ont. (N.J. Whitney).

SCLEROTINIA ROT (S. sclerotiorum) caused decay of the stem of the odd plant in a field that had been heavily manured at Courtenay, B.C. (W. Jones). A tr. of rot developed in material being indexed at Charlottetown, P.E.I. The organism entered the tuber at the stem end and caused a slowly advancing dry rot with sclerotia imbedded in the rotted tissue (D.B. Robinson).

SILVER SCURF (Spondylocladium atrovirens) was heavy in a lot of Irish Cobbler grown in the Cochrane area, Ont.; the tubers were treated with Semesan Bel before planting in 1953 and no recurrence was noted on the tubers at bin inspection (H.W. Whiteside). A very slight infection was noted in 10 lots of Green Mountain this fall (B. Baribeau). Light infections were noted in 2 lots of Kennebec at Centreville, N.S. (D.W. Creelman, G.E.O. Fuller). About 20% of the tubers in a lot of Irish Cobbler were affected, some severely, in the Charlottetown area, P.E.I. in April (R.R. Hurst).

POWDERY SCAB (Spongospora subterranea). A sl. infection was reported in a tuber lot in Temiscouata Co., Que. (B. Baribeau). Powdery scab was found in 4

lots of tubers in Kings Co., N.S., infection being tr.-2% (R.C. Leyton).

COMMON SCAB (Streptomyces scabies) was prevalent in the Grand Forks and Kootenay areas, B.C. Some crops were also affected in the Okanagan Valley, around Soda Creek and in the Pemberton district. One crop of Irish Cobbler was ungradable and several lots of Warba were unfit for the ordinary seed grade (H.S. MacLeod). Warba and Carter's Early Favorite were sl. to mod. infected in most parts of n. Alta., whereas Netted Gem was free of scab (J.W. Marritt). Scab, more prevalent than in 1952, sev. affected the crop of several large fields in the London district, Ont. (F.J. Hudson). Scab was quite sev. in some parts of district 2, 25-50% of the tubers having to be graded out in lots of Irish Cobbler and Chippewa. A clean crop of Ontario was produced by one grower in Ontario Co., where 75% of the tubers in his Katahdin crop developed mod. to sev. scab (W.L.S. Kemp). Despite the hot dry season scab was less prevalent in district 3 than in 1952. Ontario again showed high resistance, but when scab occurred it was of the deep type (H.W. Whiteside). A few sl. infections were noted in e. Ont. (E.H. Peters). Scab was more prevalent than usual in Que.; infection was generally sl., except for a few sev. cases (B.Baribeau). Common scab was again somewhat more prevalent than formerly in N.B., although losses are still comparatively small. The loss was quite heavy in a few bins in the Florenceville area. A small lot of Cherokee, a variety reputed to be scab resistant, is being tested next year on a farm in the Woodstock district, where scab has always been a problem (C.H. Godwin). Scab infection was sl. in N.S. this year (R.C. Leyton) and mod. in P.E.I. (H.L.McLaren). Common scab was less sev. and widespread in Nfld. than in the previous 3 years. Infection was sev. in one field at Topsail and in another of Canso at St. John's; elsewhere the infection was sl.-mod. (G.C. Morgan).

WART (Synchytrium endobioticum). Losses from wart were heavy in Nfld. particularly in the Trinity Bay and Bonavista Bay areas. Weather conditions were ideal for the spread and increase of the disease. All 40 fields visited in Trinity Bay were infected, infection ranging from 20% to 80%, average 50%. Most fields visited in Bonavista Bay were diseased, but infection was less than last year. Few of the growers in these areas appear aware of the seriousness of the disease; they are being urged to plant certified Sebago. Infection was also heavy in Conception Bay in fields where Arran Victory, Arran Comrade, Kerr's Pink, Irish Cobbler, Warba, President and Green Mountain were planted. Sebago continues to show high resistance to wart and is increasing in popularity among potato growers in Conception Bay (G.C. Morgan).

WILT (Verticillium albo-atrum) was found affecting 25% of the plants in a field of Warba at Osoyoos, B.C.; Earliana tomatoes on the same field in 1952 were all affected with the diseases (G.E. Woolliams). In 1952, Verticillium wilt affected 5% of the Kennebec plants in a plot following tomatoes at the Horticulture Sub-Station, Smithfield, Ont. (K.M. Graham); it was also found affecting specimens from Picton (C.B. Kelly). Wilt was reported in 65 (19%) of the fields inspected in N.S. It caused the rejection of 12 fields; 9 of Kennebec, 2 of Irish Cobbler, and one of Canso; infection in the rejected fields averaged 13.9%, highest being 36%. Several growers treated the seed for the control of the wilt as recommended by G.W. Ayers in a paper read locally. None of the treated crops were rejected for wilt and highest infection in these crops was 2%. If the growing of Kennebec is to be continued, it will be essential to treat the seed before planting (R.C. Leyton). A small garden planting of Kennebec at Kentville was almost a complete loss from wilt (D.W. Creelman). Wilt appeared to be more prevalent in P.E.I. than in 1952;

55 fields were rejected this year against 32 in 1932. Seed treatment is little practised in P.E.I. (H.L. McLaren). Kennebec has proved definitely more susceptible to this disease than Irish Cobbler or Sebago (G.W. Ayers).

CALICO (virus) was reported in tr. amounts in several fields about Grand Forks and in some parts of the Kootenays, B.C. (H.S. MacLeod). Several affected plants were seen in a field of Canso in the Walford area, Ont. (H.W. Whiteside).

LEAF ROLL (virus) was found in 157 (18.6%) of the fields inspected in B.C. and caused 6 to be rejected. The disease is most prevalent about Grand Forks, but its severity was less than in 1952 when a program of more rigorous seed selction was begun. Aphids were found in the Fraser Valley in late June, about a month earlier than usual; current season infection of leaf roll was also observed much earlier than usual. Lesser amounts were found in other districts and again none was reported about Pemberton (H.S. MacLeod). Leaf roll was found in 36(38%) of the fields in s. Alta. (R. P. Strogyn) and in 30 (26%) in central and n. Alta. One or two fields rejected for black leg contained more leaf roll than the standards permit. Leaf roll continues to abound in garden plots at Edmonton and a demonstration plot was planted this year to convince allotment holders of the value of planting certified seed (J.W. Marritt). Leaf roll was seen in 32 (58%) of the fields inspected in Sask., and in 26 (16%) in Man; it caused one rejection in each province (A. Charlebois, D.J. Petty).

In Ont., leaf roll was found in several potato fields in the London district (F.J.Hudson). It was present in 13 fields inspected in district 2 and caused one rejection (W.L.S. Kemp). Leaf roll was recorded in 12 fields in district 3. The program of bringing seed of the commonly grown varieties from the Cochrane district to central Ont. each year has reduced its incidence (H.W. Whiteside). The disease was present in 3 fields in e. Ont. (E.H. Peters). Leaf roll was found in 260 (19.3%) of the fields inspected in Que. and caused 5 rejections (B. Baribeau). A 20-acre field of Cherokee, one year from certification, contained about 1% of leaf-roll plants at Ste. Clothilde, Chateauguay Co., Que. (H.N.Racicot). Leaf roll is no longer the problem in N.B. that it was a few years ago. Only 6 fields were rejected in 1953 (C.H. Godwin). Leaf roll was reported in 80 (20%) of the fields inspected in N.S. and 5 fields were rejected (R.C. Leyton). Leaf roll was somewhat less prevalent in P.E.I. than in 1952, causing 78 fields to be rejected (H.L. McLaren). Average infection in table stock fields examined were Irish Cobbler 2%, Sebago 1%, and Green Mountain tr. (R.R. Hurst). Sl. infections were seen in several fields in Bonavista, Trinity, and Conception Bays, Nfld. The disease was less prevalent than in 1952 (G.C.Morgan),

MOSAIC (virus) was found in 95 (11%) of the fields inspected in B.C. and caused 6 to be rejected. It was not recorded in the Cariboo and in only one field in the Kootenays (H.S. MacLeod). Mosaic was observed in 9 (4.5%) of the fields inspected in Alta. (R.P. Stogryn, H.W. Marritt). Mosaic was present in 18 (32%) of the fields inspected in Sask., and caused one to be rejected (A. Charlebois) while in Man. it occurred in 7 (4.5%) of the fields and 3 were rejected (D.J.Petty).

In Ont., traces of mosaic were seen in several fields in the London district (F.J. Hudson) and district 2 (W.L.S. Kemp). Mild mosaic caused 14 fields, mostly Katahdin, to be rejected in district 3 (H.W. Whiteside). Three fields were rejected in e. Ont. (E.H. Peters). Mosaic was found in 453 (33.7%) of the fields inspected in Que. and caused 70 to be rejected. It is thought that the increase of mosaic resulted from the absence of frost in September 1952

permitting aphids to feed longer than usual (B. Baribeau). Mosaic was more prevalent than last year in N.B. causing 83 fields to be rejected. Most of the fields were of the Green Mountain variety which is grown extensively in Victoria and Madawaska counties in n. N.B. Elsewhere the disease was of minor importance (C.H. Godwin). Mosaic was more prevalent than last year in N.S.; it was present in 119 (30%) of the fields inspected and 15, mostly Green Mountain, were rejected, apparently as a result of late infection in 1952 (R.C. Leyton). Mosaic was unusually prevalent in P.E.I.; 303 fields were rejected for mosaic compared to 108 fields in 1952 (H.L. McLaren). The average infection during a survey of table stock was 4% in Irish Cobbler, 1% in Sebago, and 3% in Green Mountain (R.R. Hurst). Infection was high in many fields in Trinity Bay and Bonavista Bay, Nfld., although mild mosaic was less widespread than in 1952. Mod. infections of rugose mosaic were seen in Arran Victory and President and traces in Green Mountain, Arran Pilot and Kerr's Pink (G.C. Morgan).

FOLIAR NECROSIS (Solanum virus 1, D strain). Two plants were found in a variety test plot in N.B. The same virus was found in an unnamed seedling that showed interveinal mottling (D.J. MacLeod).

SIMPLE MOSAIC (Solanum virus 1, S strain) was evident in fields of Canso, Keswick, Katahdin, Pontiac and Sebago in York and Sunbury counties, N.B.; infection was tr.-2% (D.J. MacLeod).

RUGOSE MOSAIC (Solanum viruses 1 and 2) affected 2% of the plants in a table stock field of Green Mountain in York Co., N.B. (D.J. MacLeod).

MILD MOSAIC (Solanum viruses 1 and 3) in commercial fields of Bliss Triumph, Green Mountain, Kennebec, White Rose and Netted Gem in York and Carleton counties, N.B.; infection was tr.-3% (D.J.MacLeod).

CRINKLE MOSAIC (Solanum viruses 1, 2 and 3). Two Green Mountain plants showing sev. crinkle were seen in a variety test plot at the Station, Fredericton, N.B. (D.J. MacLeod).

FAINT MOSAIC (Solanum virus 3). A fleeting type of mottling was observed in Arran Victory, Kennebec, Pontiac and Keswick in a test plot at Fredericton, N.B. This virus produces only a faint mottle in some varieties when they are free of Solanum viruses 1 and 2 (D.J. MacLeod).

MOSAIC (Solanum virus 11) of an interveinal type was found affecting 4% of the tubers of a lot of Irish Cobbler sent in for tuber indexing. The virus was also found producing a leaf-rolling mosaic in Green Mountain. It is transmissible by sap inoculation to Datura tatula, in which it produces circular local necrotic lesions on the leaves (D.J. MacLeod).

PURPLE or BUNCH TOP (virus). A tr. of haywire was found in 3 fields in s. Alta. (R.P. Stogryn). Haywire was observed in 14 fields and purple top in 90 in central and n. Alta. Purple top was more prevalent and widespread than in 1952, plants continuing to develop symptoms until freeze-up (J.W. Marritt). Tr. infections were seen in gardens in Edmonton (T.R. Davidson). Tr.-sl. infections were present in most plantings about Saskatoon, Sask. (R.J. Ledingham). Purple top was found in nearly all fields inspected in Sask., and was definitely more prevalent than usual (A. Charlebois). Purple top was also more prevalent in Man.; most fields showed 1-3% affected plants (D.J. Petty).

In Ont. a single affected plant was seen in a field at Strathroy (F.J.Hudson) and in each of 4 fields in district 2 (W.L.S. Kemp). Incidence of purple top was low in district 3, but it was more prevalent n. and w. of North Bay (H.W. Whiteside). The disease was seen in 5 fields in e. Ont. (E.H. Peters). Purple top occurred to a sl. extent in all varieties in Que., particularly in President, Canso, Sebago and Irish Cobbler (B. Baribeau). Bunch top appeared to be less prevalent than last year in N.B. although small percentages were observed in a few fields in all the potato growing areas (C.H. Godwin). Purple top was observed in potato fields in several counties in N.B. It was observed on Green Mountain, Canso, Chippewa, Bliss Triumph, Irish Cobbler, Houma, Keswick, Kennebec, Katahdin, Netted Gem, Pontiac, Sebago, Teton, and Warba. The late leaf-roll stage was common in Katahdin, Kennebec, and Irish Cobbler in some of the fields examined (D.J.MacLeod). Purple top was reported in a few fields of Sebago in N.S. (R.C. Leyton). Traces were observed in table stock fields of Irish Cobbler, Sebago, and Green Mountain examined in August in P.E.I. (R.R. Hurst). Tr. infection was present in a few fields of Arran Victory in Nfld. (G.C. Morgan). Reiner Bonde and E.S.Schultz (Me. Agr. Exp. Sta. Bull. 511. 1953) present evidence to show that purple top differs from haywire and an apical leaf-roll, which is easily confused with purple top. They were only able to transmit purple top by inarch grafting of affected plants on to young plants (I.L.C.).

SPINDLE TUBER (virus) was found in a field at the Provincial Horticultural Station, Brooks, Alta., where the disease was noted last year (R.P. Stogryn). The disease was present in several fields mostly in northern part of district 3, Ont. (H.W. Whiteside). Spindle tuber was observed in Sebago and possibly in Kennebec in Que. (B. Baribeau). Spindle tuber was common in commercial fields in York, Sunbury and Carleton counties, N.B. It was observed in Canso, Bliss Triumph, Katahdin, Irish Cobbler, Keswick, Kennebec, and Netted Gem. More notice should be taken of this important disease (D.J. MacLeod). Traces or small percentages were observed in a few fields entered for certification, but disease incidence was low (C.H. Godwin). A few suspected cases were observed in Kennebec and Sebago in N.S. (R.C. Leyton). Spindle tuber was unusually prevalent in Irish Cobbler in P.E.I.; in all 83 fields were rejected on account of the disease (H.L. McLaren). Infection was mod. in 15 fields in Bonavista Bay and in one at Cormack (west coast), all of Arran Victory; and sl. in 5 (variety unstated) in Trinity Bay, Nfld. (G.C. Morgan).

WITCHES' BROOM (virus) was found in 81 (9.7%) of the fields inspected in B.C. and caused 8 to be rejected. It appeared to be more prevalent in the Pemberton area than last year whereas its occurrence in the Cariboo and central B.C. was about the same as in 1952 (H.S. MacLeod). Tr. infections were present in scattered gardens about Edmonton, Alta. (T.R. Davidson). Witches' broom was found in 26 (24%) of the fields inspected in n. Alta.; it was again most prevalent in the Peers district (J.W. Marritt). The disease was again observed in the North Bay and Cochrane districts, Ont. (H.W. Whiteside). Witches' broom was observed in 2 plants of Irish Cobbler, and one plant each in Irish Cobbler and White Rose in York Co., N.B. (D.J. MacLeod).

YELLOW DWARF (virus). A few affected plants were observed in Keswick about Cochrane and in n. Simcoe, Ont. (H.W. Whiteside) and in Green Mountain in 2 fields in w. Que. (B. Baribeau).

BLACK HEART (non-parasitic) affected about 1% of the tubers in a lot of Green Mountain grown in Que. and sent in for examination (B. Baribeau).

FROST INJURY was practically absent in potato crops in n. Alta. in 1953, growing conditions being good except for too much rain in some sections (J.W. Marritt). About 0.5% of the tubers were affected in some bins in counties n. of Montreal and in the Lake St. John district, Que. (B. Baribeau). Field frost sev. affected 15% of the tubers of Green Mountain and 25% of Sebago in 2 late-harvested crops in Queens Co., P.E.I. (R.R. Hurst). Several fields of Arran Victory showed typical frost injury at harvest time in Bonavista Bay, Nfld. Injury was also observed in other varieties there and in Trinity Bay and Conception Bay (G.C. Morgan).

GIANT HILL. A trace was recorded in 9 fields inspected in s. Alta. (R.P. Stogryn). A few affected plants were observed in fields at North Bay and northward in Ont. (H.W. Whiteside) and in fields of Green Mountain in Que. (B. Baribeau).

HOLLOW HEART was particularly prevalent about Grand Forks and in some parts of the Kootenays, B.C., following unfavourable weather and misjudging of irrigation requirements (H.S. MacLeod). The trouble was observed in Que., chiefly in Canso and Kennebec varieties (B.Baribeau).

INTERNAL BROWN SPOT. A high percentage of the tubers were affected in several bins of Katahdin and Ontario. The crops had been grown on very light land under hot and dry conditions in district 3, Ont. (H.W. Whiteside). Affected tubers were received from Penetang and Scotland, Ont. See U.S.D.A. Misc. Publ. 98, 1936, plate 6 (H.N. Racicot).

LIGHTENING INJURY. A typical case was reported in Queens Co., P.E.I. (R.R. Hurst).

LOW TEMPERATURE BREAKDOWN. Two cases came to the attention of the Ottawa laboratory. The tubers had been stored below 32°F. and at 35°F. respectively. The latter lot was also immature and suffered bruising at harvest (H.N. Racicot).

MAGNESIUM DEFICIENCY severely affected about 20% of the plants in a field of Irish Cobbler at Covehead, P.E.I. (R.R. Hurst).

NET NECROSIS. Phloeum necrosis (virus) was found in only a few crops in B.C. and caused one to be rejected. Net necrosis as a result of frost was present in some crops in the Grand Forks area (H.S. MacLeod). Net necrosis was observed in a few bins of Green Mountain about Grand Falls, N.B.; the trouble is less prevalent than formerly (C.H. Godwin). Net necrosis has been particularly prevalent this year in N.S. in Netted Gem. One car shipped to N.B. was reported showing 40% of severe necrosis on arrival. About 100 tubers of this lot were planted in the greenhouse and none of the plants developed leaf roll. In one lot of table stock 20% of the tubers were affected and lesser amounts were reported in other crops (R.C. Leyton). New necrosis was observed in a few tubers from Netted Gen crops the vines of which were killed with herbicides at Sidney and Courtenay, B.C. (W. Jones).

NO-SPROUT TUBERS. There were considerably more misses in all fields and all varieties than usual in district 3, Ont.; investigation revealed that sets failed to germinate (H.W. Whiteside). Misses from this cause were so high in a field of Canso planted with Foundation A seed at Field that the grower will suffer a heavy financial loss (C.B. Kelly). About 85% of the

sets in a 1½-acre field of Canso near Bainsville failed to germinate, but remained hard; the soil was saturated with moisture after the crop was planted (E.H. Peters). This trouble was again noticed in Canso in Que. Tubers produced by a crop grown on sandy soil in 1952 and planted on heavier soil produced 25% misses in 1953. Tubers produced on heavy soil in 1952 and again planted on a heavy soil produced a crop free of misses. Storage conditions appear to be only one factor in this disorder (B. Baribeau).

STEM-END BROWNING was again observed in Keswick and Canso, mostly in the larger tubers, in district 3, Ont. (H.W. Whiteside). This disorder was observed in Que. to some extent in Green Mountain and Kennebec, but it was present mostly in Canso in large tubers comprising 8% of the crop in some fields (B. Baribeau). Most of the tubers from a 7-acre field of Canso at Rustico, P.E.I., showed stem-end browning. Plating the discoloured tissue revealed that Verticillium was present but for the most part no parasitic organism was found (J.E. Campbell).

2,4-D INJURY. Severe distortion of stems and foliage was noted in some varieties at Brandon, Man. (J.E. Machacek).

PUMPKIN

POWDERY MILDEW (Erisyphe cichoracearum) was quite general late in the season in the Okanagan Valley, B.C. (G.E. Woolliams). The disease was quite severe on crops in s.w.Ont. (C.D. McKeen).

RHUBARD

CROWN GALL (Agrobacterium tumefaciens). A typical specimen was observed in a garden in Saskatoon, Sask. This is the first time that I have seen rhubarb affected (T.C. Vanterpool).

GREY MOULD (Botrytis cinerea). A severe case was found in January in Surrey, B.C., on forced rhubarb. The moisture-laden air was condensing in large globules on the backs of the leaves at the points the large veins joined. Infection was taking place at these points. The primary cause of the trouble appeared to be lack of ventilation in the forcing house. Fans were installed and severe infection of the leaves was eliminated (I.C. MacSwan).

RED LEAF (cause unknown) was present in nearly all plantings observed in the Lethbridge area, Alta. In one farmer's garden all 8 plants began to show striking symptoms in early July; one month later all plants were dead (J.T. Slykhuis). This disease was recorded in the plots at Edmonton and Lacombe and in a field at Oliver (W.P. Campbell). Red leaf was present in most of the older plantings in the Saskatoon area, Sask. (R.J. Ledingham). Diseased specimens were received from Cedoux, Spalding and Wolsley (T.C. Vanterpool). Red leaf has caused substantial losses in recent years in Man., particularly in plantings of Valentine (W.A.F. Hagborg). Two plants showing typical red leaf symptoms were found in a private garden in Fredericton, N.B. (D.J. MacLeod). A quick survey of growers' fields in the Lower Fraser Valley, B.C., failed to reveal the disease (H.N.W. Toms).

SQUASH

ALTERNARIA SPOT (A. cucumerina) was found affecting about 10% of the Sweet Keeper squash in storage at Cambridge, N.S., on 12 Feb. 1952. The identification of the organism was confirmed by J.W. Groves (K.A. Harrison, D.B.O. Savile).

POWDERY MILDEW (Erysiphe cichoracearum). Most squash crops were affected more heavily than usual in Essex Co., Ont. (C.D. McKeen).

SOFT ROT (Rhizopus sp.) was sev. on 6% of the Acorn squash grown on Upton farm, near Charlottetown, P.E.I. (R.R. Hurst).

STEM ROT (Sclerotinia sclerotiorum) caused sev. damage to some plants in a garden in Edmonton, Alta. (L.E. Tyner).

LEAF SPOT (Septoria cucurbitacearum Sacc.) sev. damaged the leaves in a large planting at the Station, Kentville, N.S. Trace infections were also found on citron and pumpkin. This disease has not been previously reported from N.S. (D.W. Creelman). This disease has been previously reported on melon (P.D.S. 20:37)in Ontario and specimens on the same host were collected at Ste Anne de la Pocatiere, Que., in 1935 (I.L. Conners).

MOSAIC (virus). Although affected plants were found in most fields in Essex Co., Ont. the incidence of mosaic was less than usual. Aphid infestations were much lower than in recent years (C.D. McKeen).

YELLOWS (Callistephus virus 1). Eight plants showing severe yellows were observed in a test plot at the Station, Fredericton, N.B. (D.J. MacLeod).

SWEET CORN

BACTERIAL BLIGHT (Bacterium stewartii). Early sweet corn hybrids were severely affected everywhere in Essex Co., and in some parts of Kent Co., Ont. The disease was not seen in Norfolk Co. Late varieties were but sl. affected. Flee beetles were numerous this year. The early or seedling stage of the wilt was not encountered (N.J. Whitney).

RUST (Puccinia sorghi) infection was heavy in Sept. on the younger leaves in 2 garden plots at Kentville, N.S. (K.A. Harrison). Rust was found on a few plants in a field at Ste. Clothilde, Que. (L. Cinq-Mars, R. Crete).

SMUT (Ustilago maydis) formed large boils on 10% of the stalks and ears in a planting in Lincoln Co., Ont. (G.C. Chamberlain). Specimens were received from Hillston; rarely observed in N.S. (K.A. Harrison). A light infection was seen in a field at Rougemont, Que. (L. Cinq-Mars, R. Crete).

MAGNESIUM DEFICIENCY was found affecting about 10% of the plants of several varieties at the Sub-station, Ste. Clothilde, Que. (H.N. Racicot). Symptoms were seen in several fields visited in Kings Co. in July. Prompt treatment with magnesium sulphate was effective in correcting the trouble. However a 2-acre field showing symptoms failed to respond to treatment. When tissue tests were made by the Station staff, very high tests for nutrients were obtained. The field had been in constant cultivation for

several years; a succession of potato crops had been grown and commercial fertilizer had been applied at high rates (K.A. Harrison).

PHOSPHORUS DEFICIENCY. Several gardens were visited in Kings Co., N.S., that showed typical phosphorus deficiency symptoms (K.A. Harrison).

TOBACCO

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

Seedbed Diseases

BLUE MOULD (Peronospora tabacina). Late season outbreaks of blue mould occurred in a number of greenhouses and seedbeds in the Old and New Tobacco Belts of Ont. The disease did not cause much damage because by that date transplanting was completed in most areas. Blue mould has not yet been noted in Que.

YELLOW PATCH (excessive nutrients) caused some damage throughout the Old and New Tobacco Belts. Some growers still tend to overfertilize their tobacco seedbeds which results in areas of the seedbed remaining stunted and patchy through lack of proper nutrient balance in the soil. In some seedbeds where there was excess of fertilizers the seedlings appeared healthy but their root systems were very stunted resulting in almost complete loss when transplanted to the field.

DAMPING-OFF (Pythium spp. and Rhizoctonia solani) was widespread and caused mod.-sev. damage during the early part of the season when the weather was cloudy and cool. Most sev. damage was caused where plants in the seedbed were too crowded and where water was applied in excess or in a faulty manner. It was noted that in beds where damage was heavy the growers had not followed the recommended program for control of blue mould (See P.D.S. 32:73).

MUSHROOMS caused mild damage throughout the burley and dark areas of Kent Co. where outside seedbeds are the practice.

2,4-D INJURY. A number of cases of 2,4-D injury were noted. This type of injury is becoming less common because the growers realize the danger of using improperly cleaned sprayers or of drift from adjacent weed-spraying operations.

Field Diseases

BLUE MOULD (Peronospora tabacina). No cases of blue mould in the field were observed in the tobacco growing areas of Ont. and Que.

BROWN ROOT ROT (nematodes) is still one of the most serious diseases of burley and flue varieties throughout Ont. The disease was widespread causing sl.-mod. damage and in most of the fields visited, some brown root rot damage was noted.

BLACK ROOT ROT (Thielaviopsis basicola) caused very little damage throughout the flue-cured areas of Ont. Its inactivity may be attributed in part to the widespread use of the resistant variety Delcrest. (Some black root rot damage was reported in the Peterborough area).

FRENCHING (?soil toxins). A few fields of flue tobacco in Kent, Norfolk and Simcoe counties were sl.-mod. damaged by frenching. This disorder was limited to fields where the soil type is marginal or unfavourable for growing tobacco.

LEAF SCALD (cause undetermined) is characterized by the tip ends of the leaves becoming wilted and failing to recover. The wilting occurs in hot weather following periods of rapid growth. This disorder is often attributed to the sting of one of the stinkbugs. The damaged leaves turn brown and die. Only sl. damage was caused.

NON-PARASITIC LEAFSPOT (cause undetermined) is characterized by small brown spots on the leaves which later become dead and often turn greyish-white. It was more prevalent this season than for some years. The degree of spotting varied from a few widely-separated spots on the leaf to a condition in which the leaf is entirely covered with spots. Severely affected leaves on burley varieties turn yellow prematurely and later may die. The spotting, although less intense on flue varieties, may often cover all the leaves on a plant resulting in a lowered grade.

MOSAIC (virus) was widespread throughout the burley, dark and flue cured tobacco growing areas of Ont. A few plants affected by mosaic were present in most fields but damage was heavy only in those fields where the growers failed to take proper sanitary precautions in their transplanting operations.

ETCH (virus) caused some damage to burley and black tobaccos in the Old Tobacco Belt. The disease was much less prevalent than in the previous two seasons.

RINGSPOT (virus) was more common on burley, black and flue varieties than in the previous season. It was found on a few plants in nearly every field visited both in the Old and New Tobacco Belts of Ont. The damage to the leaves, however, was not severe.

HOLLOW STALK (Erwinia carotovora and E. atroseptica). A few cases of stalk soft rot were observed as a result of topping damage and the use of suckering oils; the trouble was not serious.

SORE-SHIN (Rhizoctonia solani and Pythium spp.) A few plants affected with sore shin were observed in the early part of the season in corners of the fields where drainage was poor.

OTHER DISTURBANCES:

Lightning Injury. Damage due to lightning was observed in a number of tobacco fields. Up to 20 plants in the circular area affected were dead while the plants toward the margins showed various degrees of damage.

Hail Damage. Hail storms towards the end of the growing season caused considerable damage to flue tobacco in the New Tobacco Belt.

Uneven Ripening was encountered in most of the tobacco growing areas of Ontario. This condition was caused by dry weather throughout most of the growing season followed by rain just prior to and during harvest, resulting in the plants commencing to grow again. Total damage due to uneven ripening is difficult to estimate; it delays and prolongs harvesting so that all the crop is not harvested before frost. Also, it is difficult to cure the leaves properly and hence the grade is lowered.

TOMATO

EARLY BLIGHT (Alternaria solani) was present in most canning crops in Essex Co., Ont., but it caused negligible damage. It was also found in most fall greenhouse crops and caused for some unknown reason more leaf necrosis than usual (C.D. McKeen). A survey of canning crops fields in Northumberland, Durham and Prince Edward counties in mid-July revealed a trace to very light infection in most fields examined (C.B. Kelly). Early blight caused a 10% infection in a field of Bonny Best at Fredericton, N.B. (S.R. Colpitts). Early blight was less sev. than usual in N.S., infection being 10% by mid-September. About 15% of the fruit in one lot developed rot during ripening in storage (K.A. Harrison). A tr. infection was noted at the Upton farm, Queens Co., P.E.I. (R.R. Hurst). Sl. infections were seen in 2 plantings in St. John's, Nfld. (G.C. Morgan).

GREY MOULD (Botrytis cinerea) caused mod. damage to the fall crop in several greenhouses on Vancouver Island, B.C. (W.R. Foster). About 50% of the plants were affected in the Univ. greenhouse, Edmonton, Alta. (G.B. Sanford). Grey mould destroyed much of the foliage and caused stem cankers on a large greenhouse crop at West Lorne, Ont. When a fall greenhouse crop was examined late in the season at Ridgetown, 15% of the plants were found killed by a fungus that had entered through pruning wounds and formed sclerotia embedded in the stems. Although the conidia were not seen, the causal organism was probably B. cinerea (C.D. McKeen). A shipment of 10,000 plants was held under moist conditions in storage over a week-end before planting in the field in Kings Co., N.S.; some 35% of the plants were subsequently lost from grey mould in the field. A tr. of fruit rot developed in early October in the plots at Kentville (K.A. Harrison).

GHOST SPOT (Botrytis cinerea). Diseased fruits showing mod. infection were received from Cornerbrook, Nfld. It occurred on fruits on the 3rd and 4th truss in plants pruned to 3 stalks. Upon ripening the fruits become unsightly and where the disease is severe, they are unmarketable. Ghost spot occurs sporadically in field tomatoes in Ont., but it has never been investigated because of its apparent unimportance. However the lesions were so numerous in this sample that it could be easily identified with the Botrytis disease of greenhouse tomatoes reported in England (K.M. Graham).

LEAF MOULD (Cladosporium fulvum) was already sev. in all plantings of one greenhouse grower at Albion, B.C., before he reported the disease; he estimated a loss of one-third of his crop. Leaf mould was also common in many other houses in the district, but it was kept under control by proper regulation of the temperature and humidity (I.C. MacSwan). Infection was

heavy in a greenhouse crop of Vetomold in full bearing on 13 May at Surrey; ventilation was probably not well controlled (H.N.W. Toms). The disease was prevalent in 3 greenhouses at Edmonton, Alta. (A.W. Henry). Leaf mould fruited profusely on fall crops of V121, Vulcan and Michigan Forcing in greenhouses around Leamington, Ont. Improved Bay State and Vineland 508 proved to be resistant. The fungus was also found fruiting on early varieties grown in the field and it persisted through the hot weather in July. The disease also caused sev. defoliation of several varieties of canning tomatoes being grown under irrigation at Ridgetown. These observations indicate that the fungus is probably more widespread in the field than hitherto realized. It is suggested that its presence in the field would afford greater opportunity for the fungus to evolve with its host than if it were restricted to greenhouse crops (C.D. McKeen). Infection was general on 27 May in a 100 ft. greenhouse of Vetomold 121 in Lincoln Co. (G.C. Chamberlain). Leaf mould caused sl. damage in one greenhouse and extensive defoliation and damage in another at St. John's, Nfld. (G.C. Morgan).

ANTHRACNOSE (Colletotrichum phomoides) was sev. in a few canning crops in Essex Co., Ont. Differences in disease reaction were apparent between varieties. As observed in previous years, the disease was most sev. on sandy soils (C.D. McKeen). Anthracnose was observed on a few fruits in a field at Rougemont, Que. (L. Cinq-Mars, R. Crete). The disease caused the loss of several fruits from a home garden at Ottawa as they were being ripened indoors (D.B.O. Savile). Fruits from the unsprayed test plots at Kentville, N.S., were sev. infected and broke down during ripening. Commercial fields in the area were almost free of disease (K.A. Harrison).

BACTERIAL CANKER (Corynebacterium michiganense). Diseased plants were brought to the laboratory from a field of Gem, also in tomatoes in 1952, at Cawston, B.C., where 20-30% of the plants were reported infected; the seed was untreated. Later the disease was found in a field of Earliana at Ashcroft, causing stunting and death of 50% of the plants; a small block of Loran Blood in the centre of the field were little affected (G.E. Woolliams).

WILT (Fusarium lycopersici) caused the death of scattered plants throughout a planting at Lethbridge, Alta. (F.R. Harper). The disease caused losses in both early and canning crops in Essex Co., Ont. A few areas were found on farms previously unknown to be infected. The last 2 hot dry summers have been favourable for manifestation of symptoms (C.D. McKeen).

PHOMA ROT (Phoma destructiva). Diseased specimens brought to the laboratory for diagnosis were from several cartons of fruit from a greenhouse near Leamington, Ont. (C.D. McKeen). Late in the season Phoma rot occurred in the field in Kings Co., N.S., and caused losses from 2-3% to 100%, average 15% as the tomatoes were ripening in storage. It first appeared in N.S. in 1952 in tr. amounts. (K.A. Harrison).

LATE BLIGHT (Phytophthora infestans) became noticeable on on unsprayed plants in the Univ. trial plots at Vancouver, B.C., in early September (H.N.W. Toms). Affected specimens were brought in from a home garden at Cranberry Lake (I.C. MacSwan). The disease was apparently fairly general in n.e.Sask. as judged from specimens received (R.J. Ledingham). An outbreak of late blight occurred in a single field at Comber, Essex Co., Ont. A nearby potato refuse pile served as a source of inoculum. Preventive sprays were applied. Further spread was halted by a long hot spell. Adjacent fields remained free of blight (C.D. McKeen). Late blight was rare in Que.

In one field at Ste. Sophie, Terrebonne Co., 50% of the fruit were badly affected and a sl. infection was noted in a small field at Ste. Anne de la Pocatiere in late September (H. Genereux). Late blight was sev., killing the tops and rotting the fruits in a field at Fredericton, N.B.; the sprayed portion of the field showed less fruit rot (S.R. Colpitts). Late blight was first reported in a field at Somerset, N.S., on Sept. 1. Spraying was very effective in checking blight and losses were sl. in commercial plantings. The disease was present by late Sept. in all gardens where spraying had been neglected (K.A. Harrison). Sl.-mod. infections were seen at St. John's and Topsail, Nfld. (G.C. Morgan).

BUCKEYE ROT (Phytophthora parasitica) affected a few fruits in several early and canning tomato crops in Essex Co., Ont. Its incidence was as usual (C.D. McKeen).

DAMPING-OFF (Pythium sp.) caused a loss of 15% of the seedlings in a greenhouse in Lincoln Co., Ont. (G.C. Chamberlain).

STEM ROT (Sclerotinia sclerotiorum). A single infected plant was found in the plots at Kentville, N.S. (K.A. Harrison).

LEAF SPOT (Septoria lycopersici). A mod. infection was found on 10% of the plants in a planting at St. Vital, Man. (J.E. Machacek). Leaf spot was about as prevalent in Essex Co. as in 1952. On account of the drought, defoliation was light even where plants bearing foliage infections were set in the field. Only crops grown under irrigation suffered much defoliation (C.D. McKeen). Leaf spot is not usually troublesome in N.S., but it caused some defoliation in a 5-acre field in Kings Co. Infection apparently started in the seed bed and the spray program did not hold it in check in some parts of the field (K.A. Harrison).

WILT (Verticillium spp.) caused sev. damage in one garden at Keating, B.C. V. dahliae was isolated (W. Orchard). Wilt occurred on all commercial varieties being grown but was most prevalent on Earliana, Chatham, Clark's Early and Gem. It was observed in the Okanagan, Thompson, and Upper Fraser valleys. Infection varied from a tr. in a few fields to 100% in most. The disease is the most serious and widespread disease in the B.C. Interior. It has also been observed in greenhouse crops (G.E. Woolliams). Verticillium wilt appeared to be more widespread than usual in Essex Co., Ont. Infected plants outgrew much of the early injury. Damage is still regarded as slight (C.D. McKeen).

ETCH (virus). Affected plants were found in a few canning tomato crops in the Harrow area, Ont. (C.D. McKeen).

MOSAIC (virus) affected 10% of the plants in a field of Loran Blood at Osoyoos, B.C. (G.E. Woolliams). Infection from tobacco mosaic virus varied from a tr. to 75% in many early and canning tomato crops in s. Essex Co., Ont. As usual, infection was high in greenhouse crops. Many fruits were observed showing "internal browning" and "gray wall" in one greenhouse crop at Leamington (C.D. McKeen). Mosaic was reported to have affected most plants in a 2-acre field in the Montreal district, Que. Plants submitted were affected by tobacco mosaic (H.N. Racicot). Mosaic was less prevalent than usual in Kings and Hants counties, N.S.; greenhouse crops were infected 100% by the time the first fruit were ripe (K.A. Harrison). Sl.-mod. infections were noted in 2 greenhouses in e. Nfld. (G.C. Morgan).

PURPLE TOP (virus). A tr. was observed in one field of early tomatoes near Harrow, Ont. (C.D. McKeen), and in 2 plantings in York Co., N.B. (D.J. MacLeod).

STREAK (virus) caused sev. damage to 2 tomato crops near Harrow, Ont. These fields adjoined early potato fields. Three weeks after the potatoes were dug, virus symptoms appeared in the tomatoes. Damage to the crop was most sev. in the rows nearest the potato fields (C.D. McKeen). About 25% of the plants were stunted and necrotic with malformed fruit in a greenhouse in Welland Co. (G.C. Chamberlain).

BLOSSOM-END ROT (non-parasitic) caused some damage to the fruit of the first truss in fields in the B.C. Interior. Little rot was observed later in the season (G.E. Woolliams). The disorder affected numerous fruits in a greenhouse at Medicine Hat, Alta. (M.W. Cormack). Blossom-end rot injured some fruit in most tomato crops in Essex Co., Ont. The severe drought in s.w. Ont. was the cause of its increased prevalence in 1953 (C.D. McKeen). The disorder was seen in most fields of tomatoes in s.w. Que.; the summer was hot and dry (L. Cinq-Mars, R. Crete). About 25% of fruits were affected in plots on a dry location at Ste. Anne de la Pocatiere, Que. Elsewhere the disorder was much less destructive (H. Genereux). This disorder was little in evidence in N.S. this year (K.A. Harrison). Blossom-end rot affected only Stokesdale at the Upton Farm, Queens Co., N.S. (R.R. Hurst). The disorder was observed both in the greenhouse and the field in e. Nfld. (G.C. Morgan).

BLOTCHY RIPENING (non-parasitic) was present in tr. amounts in N.S. but it caused little loss (K.A. Harrison). Blotchy ripening caused mod. damage in one greenhouse at Sooke, B.C. (W.R. Foster).

2,4-D INJURY was sev. in the greater Winnipeg area, Man. Apparently injurious concentrations of 2,4-D fumes may occur at considerable distance from where the material is being applied (J.E. Machacek). About the usual amount of 2,4-D injury was reported in Essex Co., Ont., but the damage was generally sl. Spraying near greenhouses to kill weeds has been observed on occasion to be quite disastrous (C.D. McKeen). Cases of injury were submitted from Woodstock and near Carrying Place (C.B. Kelly).

BORON TOXICITY. A case of boron toxicity was observed at Trepanier, B.C. Boric acid had been applied at the recommended rate of 30 lb. per acre, but instead of using a cyclone seeder, the chemical was broadcast by hand. The injured plants occurred in groups evenly spaced through the field (G.E. Woolliams).

PHOSPHORUS DEFICIENCY according to Dr. C.G. Woodbridge, occurs in tomatoes grown at Trout Creek Point, Summerland, B.C. (G.E. Woolliams).

PLANT INCOMPATIBILITY. Sev. damage was found in 1952 in a garden at Guelph, Ont., and at La Trappe, Que. Tomatoes planted under black walnuts were wilted, stunted, and failed to bloom (C.B. Kelly, Fr. M. Claude).

SUN SCALD (non-parasitic). Many crops of canning tomatoes suffered heavily during the extreme hot spell in late August and early September in Essex Co., Ont. (C.D. McKeen).

TURNIP

SOFT ROT (Erwinia carotovora) caused tr. infection in a lot of Laurentian swedes in Queens Co., P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe polygoni) became fairly heavy on Ditmars swedes at Barton, N.S. (K.A. Harrison).

DOWNY MILDEW (Peronospora brassicae) was general on the leaves of overwintered plants on 3 March at North Saanich, B.C. (W. Jones).

BLACK LEG (Phoma lingam) caused a loss of 20% of the crop in a small field in Bonaventure Co., Que. (D. Leblond). Infection was reported to be 50% in an acre field of swedes in Halifax Co., N.S., and 10% in one in Lunenberg Co. (K.A. Harrison, D.W. Creelman). Traces were found in 15 fields of Laurentian examined in P.E.I. (R.R. Hurst).

CLUB ROOT (Plasmodiophora brassicae). A half-acre plot of swedes was a total loss in Bonaventure Co. (D. Leblond). Club root caused a crop failure in a field at Salisbury, N.B. (S.R. Colpitts). Natural drainage from an infested field at Barton, N.S., crossed some small plots; where the wash occurred the swedes were a complete loss (K.A. Harrison). High soil moisture conditions prevailing in 1953 in P.E.I. favoured infection of swedes by club root. A sl. infection was present in many fields and two growers were known to have suffered complete loss of crop. Shepherd's purse (Capsella bursa-postoris) in one of these fields was almost free from infection (G.W. Ayers). Infection was mod. in 10 fields in the Bay Roberts area and sev. in several gardens in Bonavista Bay and Trinity Bay, Nfld. Where sufficient land had been cleared in the last 2 years to permit crop rotation the disease was less prevalent than formerly (G.C. Morgan).

SOFT ROT (Rhizopus sp.) destroyed large quantities of swedes in Dec. 1952 in a wholesale storage cellar at Lethbridge, Alta. Spread was very rapid while the humidity and temperature were high (M.W. Cormack).

BLACK ROT (Xanthomonas campestris) caused tr. infection in Laurentian in a field in Queens Co., P.E.I. (R.R. Hurst).

MOSAIC (virus). An isolated steckling plot showed 30% infection at harvest time at Burton, N.S. This field had previously raised a crop much more heavily infected (K.A. Harrison).

STERILITY (virus) affected 9 plants and WITCHES' BROOM (virus) 2 plants in a seed plot in York Co., N.B. (D.J. MacLeod).

BROWN HEART (boron deficiency). A severe case of boron deficiency was found at North Hatley, Compton Co., Que. (L. Cinq-Mars, R.O. Lachance). Specimens received from 2 counties in e. Que. (D. Leblond). Sl. damage was seen in several gardens at St. John's and elsewhere in Nfld. (G.C. Morgan).

WATERMELON

WILT (Fusarium bulbigenum var. niveum) destroyed 50% of the plants in one garden at Harrow, Ont. (C.D. McKeen).

IV. DISEASES OF FRUITS CROPS

A. POME FRUITS

APPLE

HEART ROT and CANKER (Daedalea unicolor) apparently caused the death of one tree in an orchard at Hemmingford, Que. The fungus, identified by Dr. Mildred K. Nobles, was isolated from the wood and also induced to fruit on the wood in a damp chamber. According to her records the fungus was isolated in 1934 from an apple tree that had been cut down at St. Catharines, Ont. (H.N. Racicot).

FIRE BLIGHT (Erwinia amylovora). A mod. infection was found on crabapple trees in several gardens in Edmonton, Alta. (W.P. Campbell, A.W. Henry) and sev. damage was present in several plantings of crabapple at Brooks and in one at Warner (M.W. Cormack). Fire blight was 2-tr. 3-sev./15 trees of Sandow in the variety orchard at the Sub-station, St. Clothilde, Que.; no blight was seen on any other variety (H.N. Racicot). A few trees were affected in nurseries at Rougemont and St. Hilaire (L. Cinq-Mars). As a result of an orchard and nursery survey carried out in June and July in w. N.S., specimens suspected of being affected by fire blight were sent to the laboratory, Kentville, for determination. Six samples of pear twigs and 2 of apple were received. Five proved to be affected by black rot (Sphaeropsis malorum) and 2 by European canker (Nectria galligena); one specimen showed severe damage to the foliage by red mite. Symptoms of fire blight were not observed and all the plate cultures made from the samples failed to show fire blight bacteria. It can only be concluded that fire blight is not present in apple and pear trees in N.S. (J.F. Hockey).

SOOTY BLOTCH (Gloeodes pomigena) was observed on fruits of Northern Spy from Chatham and of Greening from Grimsby, Ont. (G.C. Chamberlain).

RUST (Gymnosporangium clavipes). Only a tr. was seen in 3 demonstration orchards in Kings and Annapolis counties, N.S., in spite of heavy production of basidia on the juniper (J.F. Hockey.).

DIE-BACK (Nectria cinnabarina). A light infection was seen on Rome Beauty at Rockland, N.S. (R.G. Ross).

EUROPEAN CANKER (Nectria galligina). See report under Black Rot.

BLACK ROT (Physalospora obtusa) was found on a few trees in a nursery at Rougemont, Que. (L. Cinq-Mars, R. Crete). Three Cortland trees were found sl. damaged by some canker-forming pathogen at Stanley, N.B.(S.R. Colpitts), A few diseased limbs collected later after the trees were heavily pruned were sent to Ottawa. About 150 chips from these branches were made; 18 isolations of Sphaeropsis malorum Peck and 12 of Cylindrocarpon mali (Allesch.) Wr. were obtained. The latter fungus is the conidial state of Nectria galligena (Ruth Horner).

POWDERY MILDEW (Podosphaera leucotricha). Foliage of Jonathan, McIntosh, Newtown and Stayman were heavily infected in all districts of the south Okanagan, N.C. New shoots were also blighted.. Fruit was rarely

infected but the perfect stage was found on the fruit of Newtown and McIntosh (D.L. McIntosh).

Observations made since 1951 at the Sub-station, Smithfield, Ont., on apple seedlings being produced under the breeding program for scab resistance have indicated that the scab resistant seedlings, which receive no fungicide, were attacked in various degrees by powdery mildew. As no information was available on the importance of the disease in Ont. and Que. in orchards in which no fungicide was applied, a survey was made of apple tree nurseries in the two provinces. Such nurseries are usually only sprayed once or twice early in the season. From the results of one year's survey it appears that powdery mildew is more prevalent in s.w. Ont. than in Que. Although it was not observed on bearing trees, it was rather sev. on 4-year-old Yellow Transparent and Cortland at Strathroy, Ont. (J.B. Julien).

BROWN ROT (?Sclerotinia fructicola) affected scattered fruits of Cox's Orange and McIntosh at Queens Bay and Robson, B.C. Entrance was through codling moth tunnels and cracks in the skin caused by apple scab (D.L. McIntosh).

SILVER LEAF (Stereum purpureum). A few affected trees were seen in a nursery at Rougemont, Que. (L. Cinq-Mars).

SCAB (Venturia inaequalis) was sev. on the leaves and fruit in a 100-tree orchard of Early McIntosh at Sardis, B.C.; most of the fruit sold as culls (I.C. MacSwan). Scab was sev. on both fruit and foliage of most varieties in all districts of the B.C. Interior where scab is normally present. Heavy losses also occurred in the Vernon, Kelowna, and Oliver districts of the Okanagan valley. Losses from pin-point scab were substantial. A large proportion of the crop was reduced in grade on account of scab (D.L. McIntosh). Sl. infected crabapple fruit were received from Acadia Valley, Alta. (M.W. Cormack). Sev. infection in a planting at Halbstadt, Man. (J.E. Machacek). Scab was epidemic in many Ont. orchards and caused total loss of fruit in some. The season was a most difficult one in which to secure effective control of the disease. At St. Catharines in the laboratory orchard of McIntosh, scab infection ranged from 2.3 to 44% of the fruit scabbed depending on the sprays used. No fruit were harvested from unsprayed trees, the foliage was 100% scabby and leaf fall was considerable (G.C. Chamberlain). Weather conditions were mod. favourable for the development of apple scab in s.w. Que. in the spring of 1953. A light infection occurred 26-28 April and heavy infections on 14-15 May and 4-6 June with other light infections in May and June. Very dry weather in the later months prevented most late season scab. In general well sprayed orchards were almost free of scab, but other orchards where spraying operations began late or were poorly timed up to 25% of the crop was scabby. (L. Cinq-Mars, R. Crete). A random survey of 9 orchards in s.w. Que. showed that several growers (who applied 2-3 applications of an organic mercurial) secured clean crops, but many others failed to get fair results. Infection on McIntosh ranged from 0.2% to 87% of scabby fruits (R. Desmarteau). Infection was sev. in an orchard examined in Rimouski Co. (H. Genereux).

A light discharge of ascospores occurred near Fredericton, N.B. on 14 May, when the apple buds had reached the pre-pink stage of development. During May and the greater part of June rain fell frequently in the St. John River valley and made timely application of spray difficult unless sufficient equipment and labour were available to cover the orchard within 2-3 days. The summer was

dry and no further infection occurred. In orchards where the applications were properly timed, the crop was free of scab.

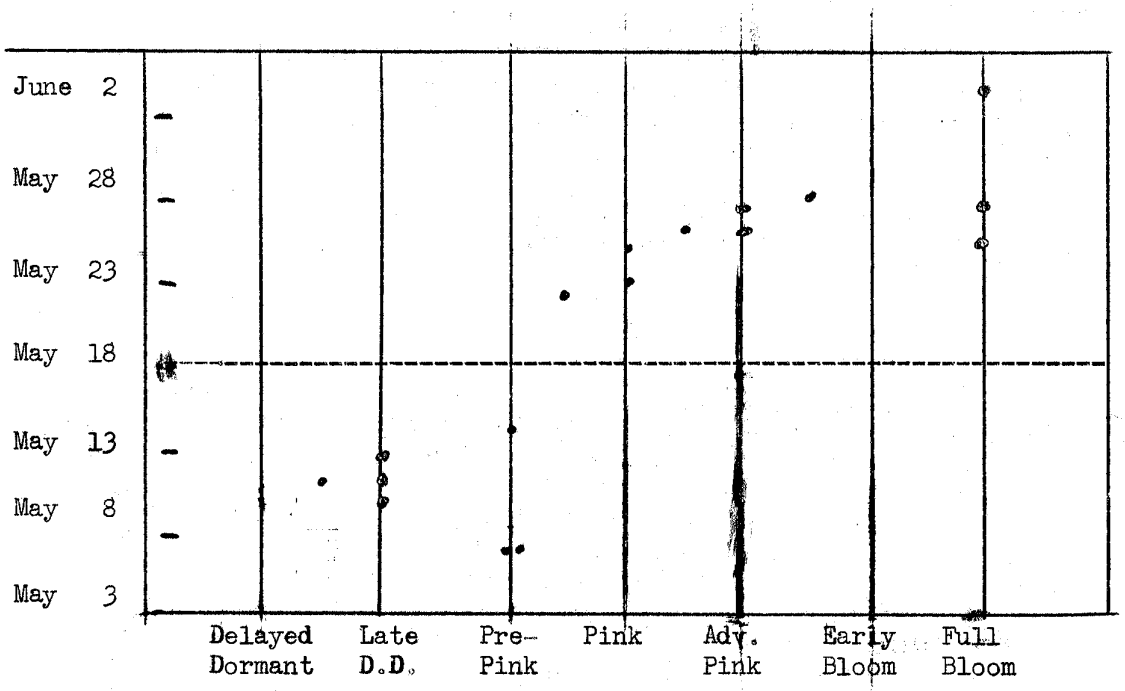
Table 17. Primary Ascospore Discharge and Stage of Apple Bud Development for the Years 1934 to 1953 in the Saint John River Valley.

Year	Primary Ascospore Discharge	Bud Development of McIntosh Variety
1934	May 11	Late Delayed Dormant
1935	May 22	Pre-pink to Pink
1936	May 4	Late Delayed Dormant
1937	May 10	Late Delayed Dormant
1938	May 12	Late Delayed Dormant
1939	May 27	Advanced Pink
1940	May 25	Pink
1941	May 23	Pink
1942	May 25	Full Bloom
1943	June 3	Full Bloom
1944	May 27	Full Bloom
1945	May 7	Pre-pink
1946	May 26	Advanced Pink
1947	May 28	Advanced Pink to Early Bloom
1948	May 26	Pink to Advanced Pink
1949	May 7	Pre-pink
1950	May 11	Dormant to Early Pre-pink
1951	May 7	Delayed Dormant to Late D.D.
1952	May 7	Delayed Dormant
1953	May 14	Pre-pink

Records have been kept of the dates of ascospore discharge in the Saint John River valley for the last 20 years, 1934 to 1945, at the Laboratory of Plant Pathology and since 1946 at the N.B. Department of Agriculture. Because of limited labour and equipment in camparison to the size of the orchards, it is most important that the growers know when primary ascospore discharge takes place. From then on they try to keep their orchard covered with spray during periods of spore discharge and infection. These dates of primary discharge and stage of apple bud development for the last 20 years are shown in Table 17 (S.F. Clarkson). These data are shown graphically in Fig. 4. The mean date of primary discharge is May 18, when the trees are in the pre-pink to pink stage. As might be expected there was a general advance of bud development with the date when spore discharge took place. No careful analysis of scab severity in relation to its date of appearance has been made, but in general its precocious appearance is apt to increase the difficulties of control (I.L. Conners).

The open winter of 1952-1953 favoured the early development of perithecia of V. inaequalis in N.S. Early in April when trees were in the silver-tip stage of development, ascospores reached maturity. The first infection period occurred when early varieties were at the mouse-ear stage. Subsequent infection periods were frequent and sometimes prolonged for 90 hours.

Fig. 4. Stage of apple bud development at primary ascospore discharge for the years 1934-1953 in the Saint John River Valley, N.B.



Ascospore discharge ceased about mid-June but conidia were found on 11 May and increased the scab potential through the bloom period. July, August and September provided several severe infection periods of 2 and 3 days duration. Some sprayed orchards that appeared free from fruit scab on 30 June had from 30 to 90 per cent scab on the fruit by mid-September. In the laboratory spray plots excellent control was obtained by 6 well timed applications on Cortland, Golden Delicious, Red Delicious and Spy (J.F. Hockey). Scab was sev. on unsprayed trees in the Waterford Valley area and at Topsail, Nfld. (G.C. Morgan).

S.J. Hughes (Can. J. Bot. 31:560-576. 1953) has shown that the correct name for the imperfect state of Venturia inaequalis is Spilocea pomi Fr. Its annellate conidiophores distinguish the genus from Fusicladium (see V. pirina on pear) (I.L.C.).

BITTER PIT (non-parasitic) was unsually prevalent in 1952 in orchards and tree run apples in the Georgian Bay area, Ont. Sev. symptoms were noted in Northern Spy at harvest time. Immediate processing was advised to avoid excessive loss in storage. The Spy crop was generally well coloured but bitter pit was noticeable in even highly coloured fruits (C.B. Kelly). About 10% of the fruit of Northern Spy in the laboratory orchard, St. Catharines were affected (G.C. Chamberlain). An appreciable amount occurred in Northern Spy and late varieties prior to harvest in N.S. Most of the affected crop was salvaged by the processors (J.F. Hockey).

SPRAY INJURY. Russetting was very prevalent in many orchards in N.B. especially where Bordeaux Mixture was applied in the pre-pink or the immediate

post blossom sprays (J.L. Howatt). For the first time in 6 years, sulphur scald was noted in the laboratory plots at Rougemont, Que.; less than 1% of the fruit were affected (L. Cinq-Mars).

SUNSCALD (non parasitic) affected a single tree in an orchard of 40 at Ste. Anne de la Pocatiere, Que. (R.O. Lachance). Three trees were killed and many others showing injury in a McIntosh orchard at Stanley, N.B., under poor cultural practice (S.R. Colpitts).

WATER CORE (non-parasitic) affected 6-8% of the fruit in a Delicious planting in Lincoln Co., Ont. (G.C. Chamberlain).

PEAR

FIRE BLIGHT (Erwinia amylovora). The epidemic that began suddenly in 1948 in the Kootenays and Creston valley subsided in 1952. A few cankers appeared in 1953 in scattered orchards, the loss being of no economic importance. Annual inspections are being continued by the B.C. Department of Agriculture to ensure proper pruning out of cankers in winter (M.F. Welsh, J.M. Wilks). Isolated outbreaks occurred in the Okanagan Valley. Infections were numerous in late or secondary bloom. Losses were relatively light (D.L. McIntosh). A sev. outbreak occurred as a result of spur infection in an 8-acre block of vigorous 15-year-old Bartlett in Wentworth Co., Ont. About 60% of the trees were infected and in 10% the heavier wood was involved. Scattered infections were also noted in 8-year-old Bartlett trees in Lincoln Co. (G.C. Chamberlain). Fire blight will cause the loss of 2-3 trees and a few branches in about 1,800 trees principally Bartlett at Collingwood (C.B. Kelly).

SOOTY BLOTCH (Gloeodes pomigena). A few affected fruits received from Vineland, Ont. (G.C. Chamberlain).

RUST (Gymnosporangium clavariaeforme). Severe infection was observed on a Japanese root-stock variety, Pyrus calleryana, at Kentville, N.S. (J.F. Hockey).

SCAB (Venturia pirina) was sev., affecting 25-50% of the fruit in the Fonthill-Fenwick district in Ont. It is common on Bartlett and Flemish Beauty; the fruit rather than the foliage was affected (G.C. Chamberlain). A sl. infection was observed at Ste. Anne de la Pocatiere, Que. (H. Genereux). Severe infection occurred on unsprayed trees of Clapps Favorite at Kentville, N.S. (D.W. Creelman). Scab was fairly general on the foliage of a few pear trees in a commercial orchard at Southport, P.E.I. (J.E. Campbell). S.J. Hughes (Can. J. Bot. 31:560-576. 1953) points out that the correct specific name of the imperfect state, with its denticulate conidiophores, of V. pirina is Fusicladium pyrorum (Lib.) Fuckel (I.L.C.).

LEAF SPOT (Fabraea maculata). A sl. infection in a nursery on Lulu Island, B.C. (W.E. Woods, W. Jones). Affected leaves collected during nursery inspection were received from Thornhill and Leamington, Ont. (H.S. Thompson).

B. STONE FRUITS

APRICOT

CORYNEUM BLIGHT (Clasterosporium carpophylum) caused sev. spotting of the fruits in all unsprayed orchards in the Kootenays and Creston Valley, B.C. Timing of the shuck-fall spray was critical; when too early the proximal portions of the fruit were covered by the shucks, received no spray and became infected later, but when too late the tips of the fruits were already infected before the spray was applied (M.F. Welsh, J.M. Wilks).

POWDERY MILDEW (?Podosphaera oxyacanthae) spotted a small percentage of the fruit on trees, almost exclusively Perfection, at the Station, Summerland, B.C.; the leaves were not attacked (D.L. McIntosh).

WILT (Verticillium albo-atrum) attacked several 4-5-year-old Perfection trees in an orchard at Osoyoos, B.C.; some trees were sev. wilted and appeared to be dying (G.E. Woolliams).

CHERRY

BLACK KNOT (Dibotryon morbosum). Specimens on Prunus pensylvanica were collected at Lac la Biche, Alta., by W.J. Cody and R.L. Gutteridge (D.B.O.S.). Several home-garden trees of plums and cherries showed the knots in St. John, Iberville, Chambly and Rouville counties, Que. (R. Crete). Black knot was common and sometimes severe in the Quebec and Ste. Anne de la Pocatiere districts (D. Leblond). Black knot was heavy on sour cherry at St. John's and Topsail, Nfld.; at one time cherries and plums were grown on a commercial scale at Lethbridge, but almost all the trees have since been killed by black knot (G.C. Morgan).

LEAF SPOT (Higginsia hiemalis) was unusually sev. on all varieties in the West Kootenays, B.C. causing complete defoliation in some orchards. Lesions on the fruit pedicels reduced fruit size (M.F. Welsh, J.M. Wilks). Leaf spot caused complete defoliation of sour cherry orchards in the Fonthill and Fenwick districts,Ont. It was also prevalent at Hamilton and in Halton Co. and caused considerable yellowing and defoliation. Below the escarpment in Lincoln Co., the disease caused only mod. defoliation by late September. It was particularly severe in nursery rows of young trees long before it appeared in orchards. It was also noted near Hamilton on sweet cherry (G.C. Chamberlain). Leaf spot caused 25-40% premature defoliation in young sour cherries at Tupperville, N.S.; sweet cherries were not nearly as severely affected (C.O. Gourley).

BROWN ROT (Monilinia fructicola and M. laxa). A specimen labelled Hansen Bush cherry affected by blossom blight was received from Salmon Arm, B.C.; the pathogen was M. fructicola (D.L. McIntosh). Blossom blight was quite sev. in the West Kootenays; wet weather in May and June resulted in mod. damage from rotting of green and ripe fruit (M.F. Welsh, J.M. Wilks). About 25% of the fruits were infected on dwarf cherries in a nursery at Rougemeont, Que. (L. Cinq-Mars).

POWDERY MILDEW (Podosphaera oxyacanthae) caused sl. injury to the terminal growth of many Montmorency trees in Wentworth Co., Ont. (G.C. Chamberlain).

WITCHES' BROOM (Taphrina cerasi) was general on older trees in rarely pruned farmhouse orchards in the Lower Fraser Valley, B.C. (H.W.N. Toms).

WILT (Verticillium dahliae) symptoms were observed in 202/220 three-year-old seedlings in one block at the Station, Summerland, B.C.; isolated cases were present in other young plantations in the Okanagan Valley (D.L. McIntosh). Two trees were found affected in 2-year-old planting of 1,000 trees in Welland Co., Ontario (G.C. Chamberlain).

LITTLE CHERRY (virus). Symptoms were unusually sev. especially on Lambert in all districts in the Kootenays, B.C. For the first time, little cherry fruits were refused by the processors so that the last market for these cherries has been closed. Several isolated orchards are the only ones not affected (M.F. Welsh, J.M. Wilks).

NECROTIC RING SPOT (virus). About 20% of the trees of an 8-year-old Montmorency orchard in Wentworth Co., Ont. Foliage was small and tattered and little fruit set. The cool damp weather this spring is believed to have increased the severity of the symptoms (G.C. Chamberlain). No extensive survey for virus diseases was made in the Niagara Peninsula this year (I.L.C.).

REVERSION (virus) caused sev. damage in one small orchard of Olivet in Saanich, B.C. (W. Jones).

RUGOSE MOSAIC (virus) was first noted in 1947 in 3 trees of a block of 23 Lambert in the Creston Valley, B.C.; one tree showed symptoms throughout and two trees in only one small branch each. No spread in the ensuing years occurred either through the affected trees or to other trees. In 1953 symptoms appeared in scattered branches throughout the 2 partially infected trees and the disease appeared in 4 additional trees (M.F. Welsh).

X-DISEASE (virus). A single Montmorency tree was found in an orchard in Welland Co., Ont. The fruit were small, pointed, and were not ripening normally. Four clumps of Prunus virginiana in a hedgerow close to the orchard showed typical X-disease symptoms (J.H. Phillips).

CRINKLE (?non-parasitic) affected 4 trees in a block of 20 Black Tartarian in Wentworth Co., Ont.; very light crop on the affected trees (G.C. Chamberlain).

PEACH

CROWN GALL (Agrobacterium tumefaciens) affected 60% of the trees in a shipment of nursery stock in Welland Co., Ont. (G.C. Chamberlain).

SCAB (Cladosporium carpophilum). Small cankers were observed on last year's wood of Early Red Fire at the Station, Kentville and at Wolfville, N.S. Light infections were noted on the fruit in two plantings in Kings Co. (C.O. Gourley, J.F. Hockey.) According to S.J. Hughes (Can. J. Bot. 31:560-576. 1953) the correct name for the peach scab fungus is Fusicladium carpophilum (Thum.) Oud. (I.L.C.).

CORYNEUM BLIGHT (Clasterosporium carpophilum). Dry weather during the usual fall infection period resulted in unusually low incidence of twig cankers

in the Creston Valley, B.C. On the other hand fruit infection was unusually sev. in unsprayed orchards and in those in which a spray schedule had been used for less than 3 years (M.F. Welsh, J.M. Wilks). Several nursery seedlings sent to the laboratory from Oliver bore cankers and gum deposits on the branches (D.L. McIntosh).

BROWN ROT (Monilinia fructicola). A severe case was reported by a home gardener in Vancouver, B.C. (H.N.W. Toms). Losses from brown rot were sev. in stone fruits in the Kootenays this year. Sl. infections occurred in peaches and prunes at Peachland and Summerland in the Okanagan (D.L. McIntosh). The blossom blight phase was of minor importance in the Niagara Peninsula, Ont. In the laboratory orchard 11% of blight occurred in unsprayed trees and 2.5-4.0% in sprayed blocks. Brown rot was quite troublesome in shipments of early and mid-season varieties. Hot dry weather hastened ripening of the fruit. In consequence the market became sluggish and permitted considerable rot to develop. Brown rot of harvested fruit after 7 days in common storage was: unsprayed 59.5%, sprayed 16.3%. In the late season crop, brown rot was of minor importance (G.C. Chamberlain). Sl. infections of blossom blight and brown rot were noted in Kings Co., N.S. (C.O. Gourley).

CROWN ROT (Phytophthora cactorum). Isolated trees killed in youg plantations at Summerland, B.C. (D.L. McIntosh).

POWDERY MILDEW (Sphaerotheca pannosa) caused sl. infection on the fruit in most peach-growing districts in the Okanagan Valley, B.C. Only the oidia were seen (D.L. McIntosh).

LEAF CURL (Taphrina deformans). Wet weather in May and June caused unusually sev. leaf curl on unsprayed trees in the Kootenays, B.C. (M.F. Welsh). The disease was epidemic in the Niagara Peninsula, Ont., in orchards that were poorly sprayed or in which the dormant spray was delayed. Fall-sprayed orchards were free from curl (G.C. Chamberlain). Specimens received from Whitby and Collingwood (C.B. Kelly).

CANKER (Valsa spp.). About half the trees in an orchard of Red Haven in Lincoln Co., Ont., were affected by sev. cankers on limbs and trunk about the crotch; vigour was poor and fruit failed to size. The variety lacks sturdiness and is extremely susceptible to canker (G.C. Chamberlain). A cankered twig bearing pycnidia was received from W.R. Foster, Victoria, B.C. (I.L.C.). Canker (Cytospora leucostoma) caused sl. damage to Early Red Fire at Wolfville, N.S. (C.O. Gourley).

WILT (Verticillium albo-atrum) slightly affected several 7-8 year-old trees in a commercial orchard at Osoyoos, B.C. (G.E. Woolliams).

BACTERIAL BLIGHT (Xanthomonas pruni) lightly affected the leaves of Early Red Fire trees in the Grand Pre area, (C.O. Gourley).

X-DISEASE (virus). Ten trees, all Vidette, showed typical symptoms and partial defoliation in an orchard in Lincoln Co.; a single Vidette tree was found diseased in Wentworth Co., Ont. (G.C. Chamberlain).

SPRAY INJURY. Peach trees scattered through a pear orchard in Lincoln Co., Ont., showed heavy shot-hole and much defoliation from copper sprays applied to the pears (G.C. Chamberlain).

PLUM

BLACK KNOT (Dibotryan morbosum). Sev. infection of all 30 trees in a 4-year-old orchard at Chilliwack, B.C. (I.C. MacSwan). Only a few knots were present in an orchard of Grand Duke and Monarch at Collingwood, Ont., when the orchard was pruned in the winter 1952-53. On 28 Aug. from 5 to 12 knots per tree were present requiring the pruning away of considerable fruiting wood in some trees. Nearest neglected plums reported to be 300 yards away (C.B. Kelly). The disease was found on a few trees in a 2-acre block of Stanley prune and in a planting of 200 mazzard budded stock in a nursery in Lincoln Co. (G.C. Chamberlain). Although black knot causes some damage to plums in Que., it is less common and sev. than on cherries (D. Leblond). Black knot was sev. in a young orchard of Japanese plums at Wolfville, N.S.; the knots were not removed in the last 2 years (C.O. Gourley). A sl. infection was seen in a commercial orchard at Southport, P.E.I. A tr. was observed [illegible] at the Upton farm, near Charlottetown (J.E. Campbell). Black knot was heavy in gardens at St. John's and elsewhere in Nfld. (G.C. Morgan).

SHOT HOLE (Higginsia prunophorae) was sev. at La Trappe, Que. in 1952 (Fr. M. Claude). The disease was general on several varieties in an orchard at Southport, P.E.I. (J.E. Campbell).

BROWN ROT (Monilinia fructicola) was sev. in one home garden at Comax, B.C. (W. Jones). Apparently the disease was unusually sev. in home gardens in the Vancouver area, up to 75% of the fruit being reported infected (H.N.W. Toms). A sl. infection was already noted on 25 June in the station orchard, Kentville, N.S. (C.O. Gourley). A mod. infection was noted on cultivated plum and chokecherry growing nearby at Charlottetown, P.E.I. (J.E. Campbell).

PLUM POCKETS (Taphrina communis). Affected fruits were received from gardens at Trossachs, Redvers, and Aylsham, Sask.; apparently infrequent but where established sev. damage may result (R.J. Ledingham, T.C. Vanterpool). The entire crop of a large tree was lost at Berthier, Montmagny Co., Que. (D. Leblond). Plum pockets caused mod. damage to all trees in a small Burbank planting at Clarence, N.S. (D.W. Creelman).

PRUNE DWARF (virus) was observed in 2 Burbank trees at the Station, Kentville, N.S. The virus has been present in one tree for the last 3 years but was noticed for the first time this year in the second, only a few branches of which showed the strap-shaped mottled leaves (C.O. Gourley).

FRUIT SHRIVEL (cause unknown), which has been sev. in some years in the Kootenays, B.C., was not evident this year. On the other hand it was unusually sev. in early varieties and Italian prunes in the Okanagan Valley (M.F. Welsh, J.M. Wilks).

GUMMOSIS (non-parasitic) caused mod. damage on one variety at Southport, P.E.I.; the trouble is believed to be caused by lack of boron, the trees being over fertilized with nitrogen (J.E. Campbell).

SAND CHERRY

BLOSSOM BLIGHT (Monilinia fructicola) has been sev. for several years on this tree planted in the Canard area, N.S., and left unsprayed; an adjacent morello-type cherry showed only a trace.

C. RIBES FRUITS

CURRANT

GREY MOULD (Botrytis cinerae) caused a die-back of twigs on a few currant bushes in a home garden at Sidney, B.C. (W. Jones).

WHITE PINE BLISTER RUST (Cronartium ribicola) was heavy on leaves of black currant received from Princeton, B.C. (D.L. McIntosh). This rust was sev. on black currant, causing the death of the leaves in the University garden, Fort Garry, and at Charleswood, Man. A mod. infection occurred on red currant and wild Ribes spp. at Clearwater Bay, Ont. (W.L. Gordon). The rust was noticed on Victoria black currant at the Station, Kentville, N.S. on 17 June (C.O. Gourley).

ANTHRACNOSE (Pseudopeziza ribis) was affecting 25% of the red currant fruits received from a garden at Knowlton, Que. (J.B. Julien).

POWDERY MILDEW (Sphaerotheca mors-uvae). Sl. infection in the Univ. plots, Edmonton, Alta. (T.R. Davidson). Sev. damage to a few bushes in gardens at Lethbridge and Cardston (M.W. Cormack). Terminal growth infected and stunted in 4 bushes of O-396 black currants in Lincoln Co., Ont. (G.C. Chamberlain). Relatively heavy on Coronet, Crusader and Kerry at the Station, Kentville, N.S. (C.O. Gourley).

GOOSEBERRY

LEAF SPOT (Mycosphaerella ribis) mod. infected Pixwell in a nursery stand at Southport, P.E.I. (J.E. Campbell).

RUST (Puccinia caracina DC.) was observed on several varieties at the Station, Kentville, N.S. (C.O. Gourley). The above name is the valid one for the rust previously called P. caricis (P. pringsheimiana).

POWDERY MILDEW (Sphaerotheca mors-uvae). Sl. infection at Southport, P.E.I. (J.E. Campbell).

D. RIBES FRUITS

BLACKBERRY

CANE GALL (Agrobacterium rubi) was observed in all commercial plantings of Himalayan blackberry in North Saanichton, B.C. causing injury to about 75% of the plants (W.E. McKeen).

ANTHRACNOSE (Elsinoe veneta) was very sev. on specimen submitted from Columbus, Ont. (C.B. Kelly).

BOYSENBERRY

CANE GALL (Agrobacterium rubi) affected 20-100% of the plants in 3 plantings in the Saanich Peninsula, B.C.; the disease causes death of terminal

portions of some branches and general unthriftiness of the plants (W.E. McKeen).

SEPTORIA LEAF SPOT (Mycosphaerella rubi) caused mod. damage in N. Saanich, B.C. (W.E. McKeen). Sl. infection at Southport, P.E.I. (J.E. Campbell).

LOGANBERRY

CANE GALL (Agrobacterium rubi). All plants infected in 2 fields and tr. in other fields at N. Saanich, B.C. Affected canes split, branches dry up and fruit ripen unevenly (W.E. McKeen).

CROWN GALL (Agrobacterium tumefaciens) occurs in varying amounts in all fields in N. Saanich, B.C.; plants unthrifty and finally die (W.E. McKeen).

SEPTORIA LEAF SPOT (Mycosphaerella rubi). In one planting in the Abbotsford district, B.C., the foliage and fruit dried up before harvest, apparently as a result of infection on the leaves and canes (R. Stace-Smith). Leaf spot caused sl.-sev. damage in the Saanich Peninsula (W.E. McKeen).

ROOT ROT (Phytophthora sp., Pythium sp. and Rhizoctonia solani). All fields on Vancouver Island, B.C., are affected; plants unthrifty and finally die (W.E. McKeen).

Heavy populations of the nematodes, Pratylenchus penetrans, Xiphinema sp. and Pratylenchus sp. were found associated with root rot and decline of plant vigour at Keating. Pratylenchus sp. was present in large numbers in a planting at Victoria; the fruiting canes were drying up. Four species were seen, Criconema sp. and Criconemoides sp. in large numbers and Xiphinema sp. and Pratylenchus sp. in smaller populations, at Brentwood; the grower had already ploughed up part of the planting on account of its lack of vigour (J.E. Bosher).

DRY BERRY (cause unknown) was present in every field examined on Vancouver Island, B.C., causing 25-75% loss of crop. A sev. epidemic occurred this year although the disease was not observed in 1952 (W.E. McKeen). The disease here called "dry berry" caused a drying and necrosis of the whole fruit aggregate and the pedicel, infection occurring during the ripening period according to Dr. Mc Keen . The disease caused by Haplosphaeria deformans, which has also been called dry berry, destroys individual or small groups of drupelets and the remaining drupelets develop normally. The latter disease appears early in the development of the fruit and is much less destructive than the former disease. The disease has also been attributed to a bacterium, Bacillus dessicans W.R. Foster (See P.D.S. 11:71. 1932).

RASPBERRY

CROWN GALL (Agrobacterium tumefaciens). On roguing for virus disease 10% of the Viking plants were found affected in a nursery in Wentworth Co., Ont. (G.C. Chamberlain). Crown gall was found in 4/14 nurseries inspected in Que.; infection was 2-10%. About a third of the plants were infected in a 1/2-acre fruiting plantation of Latham on sandy soil at Abbotsford; the galls

were large and inhibited the growth of the plants (J. Ringuet). Crown gall sev. affected every plant in a planting at Millville, N.B. (S.R. Colpitts). Most of the plants are affected at the Horticultural Station, MacDonald's Corners, and in small plantings in York Co. (P.N.Grainger). An occasional plant was affected in a Viking plantation at Charlottetown, P.E.I. (R.R. Hurst).

SPUR BLIGHT (Didymella applanata) was usually prevalent at Edmonton and sev. affected a 6-year-old patch at Viking, Alta. (A.W. Henry). Mod. infection was observed in a garden at Lethbridge (M.W. Cormack). Spur blight appeared to have already killed the buds on new canes in a planting near Collingwood, Ont., by 23 July (C.B. Kelly). Sl. infection on canes submitted from Belleville, Ont., and in a garden patch at Ste. Clothilde, Que. (H.N. Racicot). The disease was sev. in a home garden at Charlottetown, P.E.I.; the canes were crowded and air drainage poor (J.E. Campbell).

ANTHRACNOSE (Elsinoe veneta) was heavy in a Washington planting in Simcoe Co., Ont. (G.C. Chamberlain). Sev. infection was seen on Madawaska near Collingwood on the fruiting canes and mod. infection later on tips of new canes (C.B. Kelly) Infection very sev. on canes of a purple variety received from Belleville and mod. in a garden at Ste. Clothilde, Que. (H.N. Racicot). Mod. infection on canes, leaves, and petioles of Lloyd George in a planting in Queens Co., P.E.I. (J.E. Campbell).

CANE BLIGHT (Leptosphaeria coniothyrium). Mod. general infection in a planting at Souris, Man. (J.E. Machacek).

SEPTORIA LEAF SPOT (Mycosphaerella rubi). Infection was sev. on the foliage on Viking and other varieties at South Berwick, N.S. (C.O. Gourley) and sl. in a small garden plot at Summerside, P.E.I. (J.E. Campbell).

YELLOW RUST (Phragmidium rubi-idaci) was sev. on the leaves of unsprayed Washington plantings in the Fraser Valley, B.C. early in the season, but a change of weather from spring-like temperatures and frequent rains to normal summer temperatures with dry periods checked its spread, but after the fruit were harvested the disease became sev. on the leaves of new canes and the amount of inoculum for the winter carry-over was heavy. In a Washington planting on Lulu Island application of a dormant spray of lime-sulphur, 1-9, on 16 Feb. and of ferbam 4 lb./100 gallons when the young shoots were 8 inches high on 6 May gave almost 100% control. Adjacent unsprayed plantings were sev. affected. Spraying annually to control this rust on Washington is becoming recognized as a profitable practice by growers in the Fraser Valley. Yellow rust was not seen on Newburg or Willamette (I.C. MacSwan). The rust was found on a few Washington plants in a garden at Summerland (G.E. Woolliams) and was heavy on specimens from Chase (D.L. McIntosh). Rusted specimens received from Peterborough Co., Ont. (C.B. Kelly).

ROOT ROT (complex of Phytophthora, Pythium and Rhizoctonia solani)appears to be present in some plantings on Vancouver Island, B.C. (W.E. McKeen).

ROOT ROT (undetermined, possibly Phytophthora). Several plantings of different varieties in the Fraser Valley, B.C., showed cane symptoms similar to spur blight in late June and many canes wilted and died as the summer progressed. Neither the spur blight nor the cane blight organism was isolated from the affected canes; in consequence the disease was attributed to some root

rot organism. The trouble is restricted to plantings on heavy clay soils (R. Stace-Smith).

LATE YELLOW RUST (Pucciniastrum americanum). A mod. infection was seen in a 2-acre nursery planting of Viking and Latham at Abbotsford; sl. infections were present in 4 other nurseries in Que. (J. Ringuet). A mod. infection was noticed at South Berwick, N.S. (C.O. Gourley).

POWDERY MILDEW (Sphaerotheca humuli). An outbreak caused marked stunting of the terminal foliage and curling of leaves in a Viking planting in Wentworth Co., Ont. (G.C. Chamberlain). A sl. infection was seen in a small planting of Tweed at L'Assomption, Que. (J. Ringuet). A trace occurred on a few canes of Latham (J.E. Campbell) and on Latham and Viking in the same garden in Queens Co., P.E.I. Not previously observed on Viking (R.R. Hurst).

WILT (Verticillium sp.). A 5% infection was observed in a Taylor planting in Lincoln Co. Ont.; entire plants were killed in a low area of the field (G.C. Chamberlain). Wilt was sev. in a planting of 1,200 Viking on low, poorly drained soil at Ste. Foy, Que. Sl.-mod. infection also noticed in 2 Newburgh plantings in the Quebec area (D. Leblond).

LEAF CURL (virus) affected 2 plants in a Taylor planting in Lincoln Co., Ont. (G.C. Chamberlain) and 2% of the plants in a 1/4-acre planting of Viking at Rougemont, Que. (J. Ringuet).

GREEN MOSAIC (virus complex). Mod. infections were observed in plantations of several varieties in the Fraser Valley, B.C.; damage was mod. By using the aphid vector, Amphoraphora rubi, this virus disease, which previously was assumed to be caused by a single virus, was demonstrated to result from the combined infections of at least two virus entities, provisionally called mild mosaic and yellow mosaic (R. Stace-Smith).

MILD MOSAIC (virus). Transmission studies in which the aphid vector, Amphoraphora rubi, and black raspberry seedlings were used demonstrated that the commercial variety Newburg and several non-commercial varieties are carrying a latent virus. The presence of this virus in Newburg in the Fraser Valley, B.C., probably causes little damage (R. Stace-Smith).

MOSAIC (virus). Infection was a tr. in the Univ. plots, Edmonton, Alta. (T.R. Davidson) and sl. in a planting at St. Norbert, Man. (J.E. Machacek). A tr. to 0.5% of the plants were affected in 6/14 plantations inspected in Que. (J. Ringuet). The disease affected 2% of the plants in a Latham planting in York Co., N.B. (D.J. MacLeod). Mosaic infection in Queens Co. P.E.I. (J.E. Campbell).

ROOT ROT was general and caused sev. damage in a planting of Willamette at the Station, Saanichton, B.C.; Pratulenchus sp. were found in the roots (J.E. Bosher).

WINTER INJURY was sev. on 25% of the Lloyd George plants and nil on Viking in a planting in Queens Co., P.E.I.; injury was believed to be due to freezing and thawing (R.R. Hurst).

E. OTHER FRUITS

BLUEBERRY

TWIG BLIGHT (Botrytis cinerea and Monilinia sp.). A survey of many fields in N.B. and N.S. revealed both organisms causing twig and blossom blight. Infection varied from nil to 50% (in the Pennfield area, N.B.) (J.F. Hockey).

WITCHES' BROOM RUST (Calyptospora goeppertiana) was common in N.B. and N.S. in areas where the alternate host Abies balsamea is near. It was most prevalent in solid stands of blueberries with few weeds present (J.F. Hockey). The rust affected 5-20% of the plants of highbush blueberry at Mill Village and Port Mouton, N.S. (D.W. Creelman).

RED LEAF (Exobasidium vaccinii) was commonly observed throughout N.B. and N.S. in the early summer (J.F. Hockey).

POWDERY MILDEW (Microsphaera alni var. vaccinii) was widespread on Vaccinium myrtilloides and V. angustfolium in Queens and Shelburne counties, N.S., but caused little apparent damage. It was also observed on Gaylussacia (D.W. Creelman).

LEAF RUST (Thekopsora vacciniorum) was general on V. angustfolium throughout the areas observed in N.S. It was also collected on Gaylussacia and Rhodora. It is believed that much of the so-called "sterile" leaf spotting observed early in the season is caused by this rust not yet in fruit (D.W. Creelman).

DAMPING-OFF (Verticillium sp.). A few patches, perhaps amounting to 30 feet square, in shaded beds of closely set cuttings of highbush blueberry were affected at Pitt Meadows, B.C. (H.N.W. Toms).

FROST DAMAGE. Flesh of berries of highbush blueberry was discoloured by a late frost on Lulu Island and in the Lower Fraser Valley, B.C., but the fruits appeared to recover with very little drop (R.E. Fitzpatrick).

GRAPE

DEAD ARM (Fusicoccum viticola). Of 1,864 vines of Concord and some Agawan, under observation in Lincoln Co., Ont., 13% bore trunk lesions, which caused more or less stunting growth and sometimes death of arms. In addition, the green shoots on many arms were heavily lesioned depending on the effectiveness of the spray treatment. The disease is widespread and prevalent in the Niagara Peninsula (G.C. Chamberlain).

DOWNY MILDEW (Plasmopara viticola) caused light spotting of the leaves in a Delaware planting in Lincoln Co., Ont. In a planting of 18 different hybrids, also in Lincoln Co., only Seibel 7053 showed any infection. In some vines of this hybrid, however, 75% of fruit clusters were destroyed and foliage was also attacked (G.C. Chamberlain). The disease was observed in a garden at Greenfield Park, Que.; dry weather did more damage than the disease (A. Payette).

POWDERY MILDEW (Uncinula necator) was sev. on specimens received from Maple, Ont. (A.T. Bolton). Powdery mildew was heavy on the foliage and fruit

of Pinot Blanc (hybrid) with scattered infections on the other varieties in a test planting in Lincoln Co., Ont. A vineyard of Senaca in the same county was also heavily infected, both the foliage and fruit were attacked and the berries shelling and hardening (G.C. Chamberlain). About 25% of the fruit were affected in a planting of Concord in Kings Co., N.S. (C.O. Gourley).

CHLOROSIS (iron deficiency) occurs annually in Lincoln Co., Ont., in vineyards subject to flooding. In 1953 the chlorosis was less intensive and the affected vines recovered their normal colour more quickly than usual (G.C. Chamberlain).

DEFICIENCY DISORDERS. A 5-acre vineyard of Concord in Lincoln Co., Ont., showed considerable interveinal paling attributed to manganese and magnesium deficiency. In a second vineyard of French hybrid selections marginal scorch associated with potash deficiency was prevalent (G.C. Chamberlain).

2,4-D INJURY. Sev. injury was observed in 3 different plantings in Halton Co., Ont. Near Sheridan, 8 acres of 50-acre vineyard was sev. affected, but some injury could be detected at the farthest point from roadside where spraying was done, a distance of 1,500 feet (C.B. Kelly).

STRAWBERRY

CROWN ROT (Armillaria mellea) caused mod. damage in a small planting on newly cleared land at Comox, B.C. (W. Jones).

GREY MOULD (Botrytis cinerea) caused mod. infection of the berries in a planting at Medicine Hat, Alta. (M.W. Cormack). It caused mod. damage in a patch of Gem ever-bearing strawberries at Connor Creek (A.W. Henry). A sl. infection of the calyx of half-formed berries was seen on 10 June at Grand Lake, N.B. (C.O. Gourley). Decay of the fruit by Rhizopus and B. cinerea caused sl. damage in a few plantings in the Saanich Peninsula, B.C. (W. Jones).

LEAF BLIGHT (Dendrophoma obscurans) caused mod. damage to most varieties grown in the Berwick area and at the Station, Kentville, N.S. Light infections were also observed on Fragaria vesca and F. virginiana (C.O. Gourley, D.W. Creelman).

The slime mould, Fuligo septica was found covering a few plants in Fort Garry, Man. (J.E. Machacek).

LEAF BLOTCH (Gnomonia fructicola) caused mod. infection on Catskill and Temple in a planting at Chester Basin, N.S. Zythia only on the plants, but the perfect state developed regularly in culture (C.O. Gourley).

LEAF SPOT (Mycosphaerella fragariae). A mod. infection was noticed on Premier planting in Lincoln Co., Ont. (G.C. Chamberlain). The disease was present in most of the 40 plantings visited in Joliette and Berthier counties, Que., a 25% infection being recorded in one of Senator Dunlap (A. Payette). Leaf spot was already showing in most plantings in N.B. on 16 June (S.R. Colpitts). Leaf spot caused sev. damage throughout Kings Co., N.S. Infection was already

heavy on the new growth on 21 May (C.O.Gourley). A mod. infection was noted on Louise in the Station plots, Charlottetown, P.E.I. A sl. infection was also seen on F. virginiana at East Point (J.E. Campbell).

POWDERY MILDEW (Sphaerotheca humuli) was heavy on 2 plantings of British Sovereign at Keating, B.C. (W. Jones). The disease was found in a home planting of the same variety at Summerland (G.E. Woolliams).

CRINKLE (virus). A mod. infection was found in a Premier planting at Port Williams, N.S. (C.O. Gourley).

DEGENERATION (virus) affects almost all strawberry plantings in the Creston Valley, B.C. Certified plants of British Sovereign were introduced 3 years ago from the Fraser Valley. Planted close to old diseased plantings, the new plants produced one excellent crop and one fair crop before degenerating to the level of the old plantings. When Dr. R.E.Fitzpatrick inspected the plantings in 1953, he noted that the certified plants remained healthy when the plantings were isolated from old diseased plantings (M.F. Welsh).

FROST caused sl. damage to the blossoms in a Senator Dunlap planting at Woodstock, N.B. (S.R. Colpitts).

ROOT ROT (cause unknown) caused sev. damage in a garden at Calgary, Alta. (M.W. Cormack). Many plantings were sev. affected in the Grand Lake area, N.B. Drought occurred at the peak of production and the yield of the weakened plants was reduced by 30-50% (S.R. Colpitts). Sl. infection was seen at Murray River, P.E.I.; Rhizopus, Fusarium and other fungi were isolated from the diseased roots (J.E. Campbell).

ROOT DECLINE or ROT caused sev. damage in several plantings of British Sovereign investigated in B.C. Parasitic nematodes were found associated with the diseased roots as follows: Abbotsford, Pratylenchus pratensis and Xiphinema sp.; decline observed for some years; four acres of the strawberries were ploughed up and planted to Washington raspberries; growth of the latter reduced by 25%. Exp. Station, Saanichton, Pratylenchus penetrans in large numbers in the roots. Keating, Pratylenchus sp.; growth poor in 4-acre field. The same nematode species alone or together observed in 4 other plantings (J.E. Bosher).

FROST INJURY was mod.-sev. in several districts in the Okanagan Valley. Apparently, the plants were not protected by the usual covering of snow. (W.R. Foster).

V. DISEASES OF TREES AND SHRUBS

ABIES - Fir

Witches' Broom (Melampsorella caryophyllacearum) was found on A. balsamea in Kings, Queens, Shelburne, and Lunenburg counties, N.S. In one acre near Kentville 5% of the trees were affected (D.W. Creelman). Brooms were seen on several branches of a single balsam fir at Southport, P.E.I. (J.E. Campbell).

ACER - Maple

Leaf Spot. The most prevalent leaf spot on maples this year in N.S. was caused by Phleospora aceris, which was found in all areas surveyed. Phyllosticta minima was common in the counties on the south shore. Gloeosporium apocryptum caused some damage to A. saccharophorum at Kentville. The leaves were also injured by a severe frost and wind early in the season and the maples presented a rather ragged appearance throughout the summer (D.W. Creelman). G. apocryptum was heavy on leaves of the sugar maple at St. Stephen, N.B.; the leaves had also been injured by wind (S.R. Colpitts).

Die-Back (Prosthecium innesii (Curr.) Wehm.) was heavy on 1% of the limbs of an A. pseudoplatanus tree at Kentville, N.S. Determination checked by L.W. Wehmeyer. First report for North America (D.W. Creelman).

Tar Spot (Rhytisma acerinum). Light infections on leaves of A. saccharinum from the Arboretum, Ottawa, Ont., and of A. saccharophorum from Treadwell were collected in the fall of 1952 and placed outside to overwinter. Mature ascospores were present on 5 May. At that date the leaves were beginning to unfold (J.A. Parmelee). Tar spot was general on A. rubrum in Queens Co., P.E.I. (J.E. Campbell).

Chemical Injury (2,4-D) was general on A. negundo in Edmonton, Alta. (G.B. Sanford).

AESCULUS - Horsechestnut

Leaf Blight (Guignardia aesculi) affected 25-75% of the foliage of A. hippocastanum at Kentville, N.S. (D.W. Creelman). A mod.-sev. infection occurred throughout P.E.I. (J.E. Campbell). The disease caused sl. damage to 5 trees in St. John's, Nfld. (G.C. Morgan).

ALNUS - Alder

Powdery Mildew (Microsphaera alni) was heavy on alders in Queens and Shelburne counties, N.S. (D.W. Creelman).

Leaf Spot (Septoria alni). Leaves of several clumps of A. sp. were badly scorched and browned on Gull Island, N.S. (D.W.C.).

AMELANCHIER

Black Leaf Curl (Apiosporina collinsii). Sl. infection at Edmonton and near Peers, Alta. (T.R. Davidson).

Leaf Blight (Entomosporium maculatum) was collected for the first time on A. sp. in N.S. when 20% of the leaves were found infected at White Point, N.S.

Rusts. Sl.-mod. infections of Gymnosporangium clavariaeforme and to a lesser extent of G. clavipes were seen in w. N.S. (D.W. Creelman).

Leaf Spot (Physalospora obtusa) sev. affected about 50% of the leaves on trees at Black Rock, N.S., causing a pronounced reddening of affected leaves and considerable defoliation. The Sphaeropsis state was fruiting in the lesions (D.W. Creelman).

BETULA - Birch

Rust (Melampsoridium betulinum) caused mod. infection in a nursery at Ocean Park, near Vancouver, B.C. (W.E. Woods, W. Jones).

Leaf Spot (Septoria betulina). A tr. was collected on B. alba and B. populifolia at East Port Medway, N.S. (D.W. Creelman).

Die-Back (non-parasitic). Increasing numbers of the native white birch are dying each year in Nfld. (G.C. Morgan).

CARAGANA

Leaf Spot (Phyllosticta gallarum Thuem.). Sl. infection was found in a nursery at New Carlisle, Que.; it was also sev. on some bushes at the Agricultural School, Ste. Anne de la Pocatiere (D. Leblond). The organism originally described on C. arborescens from Siberia is reported in Alaska and Wis.; first report for Canada (D.B.O. Savile).

CORYLUS - Hazelnut

Leaf Spot. Gloeosporium coryli caused considerable damage to C. cornuta in Kings Co., N.S. Gnomoniella coryli was widespread, causing little damage. Septoria corylina was collected for the first time in N.S. at White Rock, Kings Co.; it caused little damage (D.W. Creelman).

CRATAEGUS - Hawthorn

Leaf Blight (Entomosporium thuemenii) caused heavy premature defoliation of C. oxyacantha in a garden at Huntingdon, B.C. (H.N.W. Toms). Sl. infection in a nursery on Lulu Island (W.E. Woods, W. Jones). Leaf spot caused heavy defoliation at Kentville and Liverpool, N.S., on C. oxyacantha. The rose-flowered trees are much more susceptible than the white (D.W. Creelman).

Powdery Mildew (Podosphaera oxyacanthae) caused mod. damage to the leaves of Crataegus macrospora at Ingomar, Shelburne Co., N.S. (D.W.C.).

EXOCHORDA

Canker (Nectria cinnabarina). One large bush of E. racemosa was dead with Nectria fruiting profusely (D.W.C.).

FRAXINUS - Ash

Leaf Scorch (Gloeosporium aridum) was common on F. viridis along the boulevards in Edmonton, Alta. (G.B. Sanford).

Leaf Spot (Mycosphaerella effigurata). A tr. was seen on F. americana at East Port Medway, Queens Co., N.S. (D.W.C.).

Rust (Puccinia sparganioides). Infection was general but usually sl. on F. americana in Queens and Shelburne counties, N.S.; the light attack was in marked contrast to sev. damage caused in 1951 and 1952 (D.W.C.). A mod. infection was recorded on F. americana planted at the perimeter of a farm near a saltwater marsh in Queens Co., P.E.I. (J.E. Campbell).

JUGLANS

White Mould (Microstroma brachysporum). A tr. infection seen on J. cinerea at Kentville, N.S.; first report from N.S. (J.F. Hockey, D.W. Creelman).

Powdery Mildew (Phyllactinia corylea) was fruiting on walnut leaves received from Kaleden, B.C. (D.L. McIntosh).

Bacterial Blight (Xanthomonas juglandis) was general on the foliage in a small orchard of J. regia at Saanichton, B.C. (W. Jones).

JUNIPERUS

Rust (Gymnosporangium spp.). An ornamental planting of 8 trees at St. Catharines, Ont., were all affected by G. clavariaeforme, causing a die-back of the lower branches. A shipment of 90 European grown trees were found affected by this rust and destroyed (G.C. Chamberlain). Specimens of G. clavipes and G. junipero-virginianae on J. virginiana were received from Brighton (C.B. Kelly). The dormant galls caused by G. juniperi-virginianae and G. globosum were abundant on trees of J. virginiana of widely varying age in a pasture field near Delta, Ont., in October. A few hawthorn bushes and wild apple trees were also present (I.L. Conners). Mod. infections were noted on J. communis var. depressa and J. horizontalis in May and on Amelanchier, Aronia and Sorbus later in the season at Ste. Anne de la Pocatiere and elsewhere in Kamouraska Co., Que. (A. Payette). G. clavipes and G. clavariaeforme were abundant on J. communis var. depressa in Kings Co., N.S. and G. cornutum was collected on the same host at East Margaretville, Annapolis Co. (J.F. Hockey, D.W. Creelman).

LARIX

Rust (Melampsora epitea (bigelowii)) was heavy on L. occidentalis in B.C. north of Grand Forks, the east slope of Monashee Pass, between Rossland and Cascades and near Moyie (between Creston and Cranbrook,) or wherever larch was associated with Salix bebbiana (q.v.) (D.B.O. Savile). A few affected needles of L. laricina were found at Brooklyn, Kings Co., N.S. (J.F.Hockey, D.W. Creelman).

LONICERA - Honeysuckle

Leaf Blight (Herpobasidium deformans Gould, Iowa State Coll. J. Sci. 19:317. 1945). Chas J. Gould, Jr., in a paper entitled "The parasitism of Glomerularia lonicerae (Pk.) D. and H. in Lonicera species" (idem 19: 301-331) describes the perfect state of this common pathogen. Type on Lonicera bella candida, Ames, Iowa, Nov. 1942 (in Iowa State College Herb.). According to him, the binomial G. lonicerae (Pk.) Dearn. & House is based on a nomen nudum G. corni var. lonicerae, which he claims Peck never published. The disease appears in early spring, with secondary infections occurring throughout the season. The basidia and basidiospores appear first, followed by the conidia. A large number of species of Lonicera are affected, some being more susceptible than others. Infection was also secured on Symphoricarpos albus. Lonicera japonica var. halliana appeared to be immune. The disease occurs in n.e. and n. central states of the U.S. and adjacent areas of Canada including Newfoundland. (I.L.C.). Heavy infections of the Glomerularia state was observed on L. canadensis in Kings Co., N.S. Also officers of the N.S. Dept. of Agriculture report sev. damage on L. tatarica at Amherst in Cumberland Co. (D.W. Creelman).

Powdery Mildew (Microsphaera alni) was sev.on nursery stock at Southport, P.E.I. (J.E. Campbell).

Canker (Verticillium dahliae). A portion of a plant of L. morrowi from the grounds of the Prime Minister's official residence, Ottawa, Ont., was submitted for examination. Some of the leaves were yellow and branches dead. A narrow canker extended from the crown for several feet up the stem. Callus had formed at the margin of the canker but had failed to heal it over. Isolations from the juncture of the discoloured and healthy tissues consistently yielded V. dahliae. Besides this plant, a second one in a clump of three was showing symptoms. One plant reported to have shown the same symptoms had been lost on Parliament Hill. Only L. morrowi was affected (H.S. Thompson).

OSTRYA - Hop Hornbeam

Leaf Spot (Septoria ostryae) was heavy on O. virginiana at Highbury, Kings Co., and Mill Village, Queens Co., N.S. (D.W. Creelman).

PICEA - Spruce

Rust (Chrysomyxa spp.). Pustules of C. ledi found on 20% of the P. pungens trees in a young plantation at the Station, Beaverlodge, Alta. (W.P. Campbell, J.A. Parmelee). C. ledi was collected on P. ?glauca at Jordan Ferry and Ingomas, Shelburne Co., N.S., and C. ledicola at Low's Landing, L. Rossignol, Queens Co.

(D.W. Creelman, D.B.O. Savile).

Needle Cast (Lophodermium piceae). A tr. was collected on P. sp. at Port Joli, Queens Co., N.S. (D.W. Creelman).

Witches' Broom Rust (Peridermium coloradense). A large broom was found on a single tree of P. abies at the Station, Beaverlodge, Alta. The only other Canadian record on this host is from Brandon, Man. (W.P.C., J.A.P.). Witches' broom rust affected 50% of the trees of P. mariana on the w. side of Robertson L., Queens Co., N.S. (D.W. Creelman).

PINUS - Pine

Rust (Coleosporium solidaginis). A tr. was found on P. resinosa at Shelburne, N.S.; first record on red pine in N.S. (D.W.Creelman).

Blister Rust (Cronartium ribicola). P. albicaulis was heavily attacked on Blackwall Peak, Manning Prov. Park, B.C. (6,200 ft.) in proximity to Ribes viscosissemum on which later uredinia were found starting on 9 Aug. No appreciable infection on pine 1/4 mi. from Ribes. Light infections were found later on Copper Mtn., near Nelson and Mt. Apex, near Penticton. Heavy infection was observed on P. monticola near West Creston and light near Kaslo. (D.B.O. Savile). A mod. infection occurs in a plantation of P. strobus near the Agr. School, Ste. Anne de la Pocatiere, Que.; additional trees die each year (A. Payette). Blister rust was heavy in a young stand of P. strobus at the Station, Kentville, N.S. Aeciospores were being shed on 28 April. Considerable damage attributable to blister rust has occurred in recent years in white pine stands in Shelburne Co. Infected native Ribes were observed in numerous areas in 1953 (D.W. Creelman). Trace was found in a white pine plantation on a farm lot in Queens Co., P.E.I. (R.R. Hurst).

PLATANUS

Anthracnose (Gnomonia veneta) caused sev. infection on and defoliation of 30 plane trees in Stanley Park, Vancouver, B.C. (I.C. MscSwan).

POPULUS

Scab (Fusicladium radiosum) caused sl. damage to P. grandidentata at Kentville, N.S. (D.W. Creelman). A specimen on P. balsamifera collected at Kananaskis, Alta., by J. Kuijt 1 July was communicated by R.J. Bourchier, who reported the disease occurred widely in Alta. this year. According to S.J.Hughes (Can. J. Bot. 31:560-576. 1953), Pollaccia radiosa (Lib.) Bald. & Cif. is the correct name for the species. Canadian material needs restudy because 2 species are now recognized in Europe: P. radiosa with spores 18-26 x 5-8 microns and P. elegans Serv. with spores 35-38.5 x 11 microns (I.L.C.).

Canker (Hypoxylon pruinatum) caused sev. damage to stands of P. tremuloides at Steam Mill, Highbury and Kentville in Kings Co., N.S.; first collections in this area (D.W. Creelman, K.A. Harrison).

Anthracnose (Marssonina ?brunnea (Ell. & Ev.) Sacc.) mod. infected 2 trees of P. tremuloides at a summer home in Lincoln Co., Ont., causing the leaves on the lower part of the trees to yellow and fall (G.C. Chamberlain). M. populi (prob. M. brunnea) was general on P. tremuloides and P. grandidentata but not sev. in Kings Co., N.S. (D.W.C., I.L.C.). Recent study of herbarium suggests that M. castagnei is confined to P. alba and that specimens of P. tremuloides identified as this species are M. brunnea, a narrower-spored species (D.B.O.S.).

Anthracnose (Marssonina castagnei) caused slight damage to the leaves of P. alba at Kentville, N.S. (D.W. Creelman).

Anthracnose (Marssonina rhabospora). Traces were collected on P. grandidentata at several points in Queens and Shelburne counties, N.S. (D.W.C.).

Rust (Melampsora albertensis) was light on trees of P. tremuloides within 50 yards of Pseudotsuga at Richter's Pass, near Osoyoos, B.C., on 30 June; infection was just starting (D.B.O. Savile).

Rust (Melampsora occidentalis). Infection was light on P. trichocarpa associated with aecia on Pseudotsuga taxifolia near Nakusp, Upper Arrow L., B.C. (D.B.O.S).

Leaf Spot (Septogloeum rhopaloideum). A heavy infection was found on several small trees of P. grandidentata at Highbury, Kings Co., N.S. (D.W.C., I.L.C.).

Leaf Spot (Stigmina populi). A tr. was collected on P. balsamifera by J.S. Erskine at South River, Antigonish., N.S. (D.W.C.).

Leaf Blister (Taphrina populi-salicis Mix) infection was mod. near Nakusp, Upper Arrow L. and sev. n. of Slocam L. on P. trichocarpa in early July. Passing infections, presumably of the same species were seen elsewhere in s. B.C. on this host (D.B.O. Savile).

Powdery Mildew (Uncinula salicis) was heavy on small trees of P. balsamifera in partial shade at Banff, Alta. (D.B.O.S.). Mod.-sev. infections were seen on P. tremuloides about Edmonton, Alta. (T.R. Davidson). A mod. infection was recorded on P. grandidentata at Sunken L., Kings Co. N.S. (D.W.C.).

PRUNUS

Shot Hole (Cylindrosporium lutescens). Sl.-sev. infections were seen in N.S.; collections were made on P. serotina and P. pensylvanica in Kings Co. and on P. virginiana in Queens and Shelburne counties (D.W.C.).

Blossom Blight (Monilinia fructicola) caused a blight of 50-70% of the blossoms and also a die-back of a flowering almond (P. triloba) at Kentville, N.S. The disease also caused sev. spur and twig blight on P. tomentosa (J.F. Hockey). Planted occasionally as an ornamental P. triloba seems to be very susceptible to blossom blight (D.W.C.).

PSEUDOTSUGA - Douglas Fir

Rust (Melampsora albertensis) was heavy on the needles of P. taxifolia within 10 yards of Populus tremuloides (q.v.) at Ritcher's Pass, near Osoyoos, B.C. (L.L.O. Savile).

Rust (Melampsora occidentalis) was mod.-sev. on the needles of P. taxifolia where associated with Populus trichocarpa (q.v.) near Nakusp, Upper Arrow L., B.C. The aeciospores of this species are larger than those of M. albertensis. W.G. Ziller (M.A. thesis, Univ. of Toronto) has already demonstrated experimentally that Pseudotsuga is the aecial host of this rust (D.B.O.S.).

PYRACANTHA

Scab (Fusicladium pyracanthae). A sl. infection was reported on 50 P. coccinea plants in a nursery at Sheridan, Ont., by Plant Protection inspectors (H.S. Thompson). According to S.J.Hughes the fungus is a species of Spilicea (see under Apple Scab) (I.L.C.).

PYRUS

Fire Blight (Erwinia amylovora) was sev. on a single ornamental pear tree at Altona, Man. (J.E. Machacek).

QUERCUS

Powdery Mildew (Microsphaera alni). A tr. of the conidial stage was seen on Q. garryana at Thetis L., near Victoria, B.C. (H.N.W. Toms). The disease was present on every small tree of Q. borealis in the undergrowth in woods in Queens and Shelburne counties, N.S., causing little apparent damage (D.W. Creelman).

Leaf Blister (Taphrina coerulescens) was tr.-sev. on Q. borealis in Kings, Annapolis, Colchester, Antigonish and Queens counties; its occurrence is sporadic in N.S., the last collections being made in 1947 (D.W.C.). A specimen was collected on Q. borealis at New Carlisle, Que. (D. Leblond, D.B.O. Savile).

RHAMNUS

Rust (Puccinia coronata). A hedge of R. cathartica at the Sutherland Nursery near farm fields was more heavily rusted than for several years. No aecia were found on 3 hedges in the middle of Saskatoon, Sask. (T.C. Vanterpool). Volunteer bushes on the Farm, Brandon, Man., carried a few spent aecia on 15 July (W.L. Gordon). Escaped bushes of R. cathartica on the College property of Ste. Anne de la Pocatiere were heavily infected (A. Payette). A sl. infection was seen on R. cathartica at the Station, and on the numerous bushes about the O'Dell estate, Fredericton, N.B. A sl.-mod. infection also occurred on R. frongula at the Station (P.N. Grainger). Aecia were abundant on R. cathartica at Town Plot but only a tr. at Wolfville, both in Kings Co., N.S. (D.W.C.). A hedge at the Station, Charlottetown and one near Summerside, P.E.I., were mod. rusted. A sl. infection was present on nearly every bush in a typical

colony of R. alnifolia near O'Leary (D. Erskine, J.E. Campbell).

SALIX - Willow

Scab (Fusicladium saliciperdum) sev. affected all trees at St. Simeon, Saguenay Co., Que. (H. Genereux). Specimens affected by F. saliciperdum and the Gloeosporium state of Physalospora miyabeana were received from St. Luc de Matane (I.L. Conners).

Anthracnose (Marssonina kriegeriana) caused considerable damage to ornamental plantings of S. babylonica at Comox and Sidney (W. Jones) and at Chilliwack, B.C. (I.C. MacSwan).

Rust (Melampsora epitea (bigelowii). Heavy or potentially heavy infections were found on S. bebbina, the main arborescent willow in the area covered, when it was found growing in association with Larix occidentalis (q.v.) as follows: on the e. slope of Monashee Pass, 3100-3500 ft.; 5 mi. n. of Grand Forks at ca. 3000-4000 ft.; between Rossland and Cascade; and near Moyie. Scattered infections were seen elsewhere but it was nowhere serious except where the alternate hosts were growing together (D.B.O. Savile).

Powdery Mildew (Uncinula salicis). Mod. infections near Edmonton and at Carstairs, Alta. (T.R. Davidson).

Die-Back (Valsa leucostoma) was observed on S. laurifolia at Edmonton, Alta. (W.P. Campbell).

SAMBUCUS

Leaf Spot (Septoria sambucina). Mod. infection on S. canadensis at Upton, Queens Co., P.E.I. (J.E. Campbell).

SORBUS - Mountain Ash

Rust (Gymnosporangium cornutum). Pycnia and aecia were abundant on native mountain ash (Pyrus decora (Sarg.) Hyland.) grown as ornamentals at Clearwater Bay, Ont. Juniperus communis var. depressa growing some 20 yards distant was heavily infected, killing some branches (W.L. Gordon).

ULMUS - Elm

Dutch Elm Disease (Ceratostomella ulmi). Of the samples from elm trees received for culturing at Ottawa 37/57 from Ont. and 181/360 from Que., yielded C. ulmi. The 218 samples from which the organism was isolated were all from counties where the disease was previously reported except one from New Sarum in Elgin Co., Ont. Although no general survey was made, there appeared to be some increase in Kent Co. No new serious outbreak, however, was reported (Ruth Macrae).

Leaf Spot (Gnomonia ulmea) partially defoliated the odd plant in a hedge

of U. pumila in Lincoln Co., Ont. (G.C. Chamberlain). Affected specimens received from Brantford and Galt (C.B. Kelly).

Coral Spot (Tubercularia ulmea) caused sl. damage in a garden at Burnaby, B.C., and reported to be sev. on all 10 plants in a hedge at Vancouver (I.C. MacSwan, W. Jones). The disease was reported from Bracebridge, Ont. as follows: " I seem to be losing quite a few Chinese elm. They dry up and die and I attribute this to the red disease on the trunk and limbs of the trees". Specimens were also received from Palmerston, Stratford, Ripley, and Bracebridge in 1952 (C.B. Kelly). Specimens of Chinese elm were received from Kings, York, and Carleton counties, N.B. Infection was mod.-sev. in the individual cases. The destructiveness of the disease may be enhanced by winter injury (J.L. Howatt). Coral spot destroyed about 10% of a hedge at Summerside, P.E.I. (J.E. Campbell).

Leaf Spot (Phleospora ulmi) caused heavy defoliation of U. americana growing along the streets of Liverpool, N.S. The disease first observed on 14 Aug., had caused 80% defoliation by 10 Oct., the first killing frost being the night before. Defoliation was estimated as follows: 7 trees, nil; 9 trees 1/3 defoliated; 18 trees 2/3 defoliated; and 66 trees completely defoliated (M.A. Stillwell, J.A. Parmelee).

Chemical Injury (2,4-D). Specimens submitted from Picton, R.R. 4, Ont., were sev. injured (C.B. Kelly).

VI. DISEASES OF ORNAMENTAL PLANTS

ACONITUM - Monkshood

Yellows (Callistephus virus 1) affected 75% of the plants in a garden in Fredericton, N.B. (D.J. MacLeod).

ALTHAEA - Hollyhock

Rust (Puccinia malvacearum) was very sev. on plants of A. rosea grown from seed in a commercial crop near Victoria, B.C.; it was of general occurrence on Vancouver Is. (W. Jones). The rust was also noted on Malva neglecta at Saanichton (W.R. Orchard). Specimens received from home gardens in the Vancouver area (H.N.W. Toms). The rust was general and quite sev. in the Okanagan valley (G.E. Woolliams). Reported to be sev. in 3 plantings in Edmonton, Alta. (T.R. Davidson, A.W. Henry). Rust reported to be already showing at Oshawa, Ont. on 7 April and specimens submitted 23 April were heavily rusted (I.L. Conners). Rust heavy on specimens submitted from Ottawa (H.S. Thompson). Diseased specimens received from 2 places in Que. (D. Leblond). Sl. infected sample received from Salisbury, N.B. (S.R. Colpitts). Infection was sl.-sev. throughout P.E.I. (J.E. Campbell).

ANTIRRHINUM - Snapdragon

Rust (Puccinia antirrhini) was sev. on Golden Monarch, Red Emperor and Royal Rose causing a wilting and death of almost all the leaves in the Univ. plots, Vancouver, B.C., whereas infection was light on Avalanche, Evensong, Dawn of Day, Fair Lady and Twilight, causing only some yellowing of the leaves (H.N.W. Toms). Rust sev. affected overwintered plants in a home garden at Osoyoos (G.E. Woolliams). The disease sev. affected Golden Queen in the Laboratory gardens, St. Catharines, Ont. (W.G. Kemp).

Wilt (Pythium sp.). A few plants were destroyed in a planting in Fort Garry, Man. Pythium, as well as Fusarium spp., was isolated from roots and crowns of the wilted plants (W.E. Sackston).

Yellows (Callistephus virus 1) affected sev. 10% of the plants in a garden at Fredericton, N.B. (D.J. MacLeod).

AQUILEGIA - Columbine

Powdery Mildew (Erysiphe polygoni) was quite general about Summerland, B.C. in August (G.E. Woolliams).

BEGONIA

Grey mould (Botrytis cinerea) sev. blighted 4 tuberous begonias in a garden in Charlottetown, P.E.I. (R.R. Hurst).

Powdery Mildew (?Erysiphe cichoracearum) was sev. on the leaves of about half the tuberous begonias in a garden at Lethbridhe, Alta. (M.W. Cormack). Diseased specimens of tuberous begonias being grown as house plants were received from Millbank, R.R. 1, Ont. (C.B. Kelly). Powdery mildew rapidly became sev. in a garden in Ottawa on tuberous begonia plants, which were already infected when purchased. Although flower production had nearly ceased when spraying with zineb began, the plants largely recovered by putting out new growth, which was kept free from infection (I.L. Conners). Affected specimens were received from Quebec, P.Q., where it was reported the disease was noticed first in 1952 (H.S. Thompson).

Bacterial Blight (Xanthomonas begoniae). Affected leaves from a house plant in Ottawa were submitted. The organism was isolated and its pathogenicity proved by inoculation of a young plant. Typical leaf symptoms developed (I.L. Conners, M.D. Sutton).

BERBERIS

Rust (Puccinia graminis). A mod. infection was observed on escaped B. vulgaris in a neglected garden at Ste. Anne de la Pocatiere, Que.; sl. infections were noted on other barberry plantings at St. Roch, L'Islet Co.; Ile d'Orleans; and Champlain (A. Payette). Infection was mod. on escaped bushes at the Station, Fredericton, N.B. (P.N. Grainger) and sl. on B. vulgaris in a nursery at Southport, P.E.I. (J.E. Campbell).

CALENDULA

Yellows (Callistephus virus 1) was very conspicuous on Calendula, Petunia and Schizanthus in the Univ. plots, Saskatoon, Sask., according to Dr. C.F. Patterson, Professor of Horticulture. Yellows was also sev. on Callistephus (as usual) and carrots. The year 1953 was a 'yellows year' (T.C. Vanterpool). Yellows was sev. in gardens in and about Fredericton, N.B.; percentage of infected plants was 17-60% (D.J. MacLeod).

CALLISTEPHUS - China Aster

Wilt (Fusarium oxysporum f. callistephi). Several plants of the variety Princess were brought in by a home gardener in Lincoln Co., Ont. The plants showed the typical symptoms of wilt and the fungus was isolated from the discoloured vascular tissue (W.G. Kemp).

Yellows (Callistephus virus 1) was very common about Edmonton, Alta. In one planting 90% of the plants were affected. The disease was also noted on Zinnia, Petunia, Helichrysum, Daisy (?Chrysanthemum maximum), Tagetes, and the weeds, dandelion and Descurainia sophia.(T.R. Davidson). Yellows was sev. on Callistephus and was observed on Calendula, Tagetes and Zinnia in gardens at Lethbridge (M.W. Cormack). About 10% of the plants were affected in a planting in St. Catharines, Ont. (G.C. Chamberlain). Yellows was sev. in gardens in Fredericton, N.B., affecting 19-62% of the plants. Asters maintained under cloth-covered cages in one garden remained free from yellows throughout the season (D.J. MacLeod). Yellows was sev. in one garden at Charlottetown, P.E.I. (R.R. Hurst).

CAMELLIA

Cork Spot (non-parasitic) was observed in a garden at Sidney, B.C. (W. Jones).

CENTAUREA

Rust (Puccinia cyani) affected a few plants in a garden at Saanichton, B.C. (W.R. Orchard).

CHEIRANTHUS - Wallflower

Downey Mildew (Peronospora cheiranthi) systemically infected a few plants at Sydney, B.C. (W. Jones).

Foot Rot (Phytophthora sp.) killed 50% of the plants in 2 flower beds in a low area on heavy soil at the Station, Saanichton, B.C. (W.J.).

CHRYSANTHEMUM

Crown Gall (Agrobacterium tumefaciens). All 5 plants of Paris daisy, C. frutescens, in a window box, which had held infected plants in 1952 (P.D.S. 32:112), were affected at Vancouver, B.C.; the plants were unthrifty (H.N.W.Toms).

Leaf Nematodes (Aphalenchoides ritzema-bosi). Affected specimens of C. morifolium received on 2 occasions from G.R. Thorpe, Prov. Horticulturist, from New Westminster, B.C. (J.E. Bosher).

Stem Rot (Fusarium sp,). Samples of affected C. morifolium var. Indianapolis received from London, Ont. A Fusarium sp. was isolated from the stem tissue. Grower reported that other varieties were also showing symptoms (W.G. Kemp).

Rust (Puccinia chrysanthemi) was sl. on a few benched plants of C. morifolium and somewhat heavier on plants in the propagating beds at Sarnia, Ont. (W.G. Kemp, I.L. Conners).

Stunt (virus) symptoms were observed on a few plants of Seagull and Memorial in a cloth house at Brampton, Ont. (W.G. Kemp). The disease affected 2% of the plants in a commercial greenhouse in York Co., N.B.(D.J. MacLeod).

Topple (cause unknown). A disorder resembling topple in lily and tulip was found affecting plants of Christmas Cheer in a greenhouse at Alberni, B.C. (W.R. Foster).

COTONEASTER

Dark Berry (Phytophthora cactorum) was observed in several gardens in Victoria, B.C.; damage tr.-mod. (W.R. Foster).

CYCLAMEN

Grey Mould (Botrytis cinerea). A mod. infection was seen on the leaves and blooms of plants at a florist's at Sarnia, Ont., on 30 Oct.; there was very little heat in the greenhouse (W.G. Kemp).

Soft Rot (Erwinia carotovora). Sev. affected 6/24 plants in a greenhouse at Charlottetown, P.E.I. (R.R. Hurst).

DAHLIA

Crown Gall (Agrobacterium tumefaciens) sev. affected one plant of Radiance in a garden at Charlottetown, P.E.I. (R.R. Hurst).

Mosaic (virus) was sev. on many varieties in gardens in Queens and Prince counties, P.E.I. (R.R. Hurst).

DELPHINIUM

Powdery Mildew (Erysiphe polygoni) was sev. on a few plants in the Univ. plots, Edmonton, Alta. (T.R. Davidson). Traces were seen on several varieties in Queens Co., P.E.I. (R.R. Hurst).

Bacterial Blight (Pseudomonas delphinii). Traces were present on mixed varieties in a garden at Charlottetown, P.E.I. (R.R. Hurst).

Winter Injury. On account of deep frost penetration and poor snow coverage, biennial and perennial plants especially delphiniums suffered considerable frost damage in N.B. (J.L. Howatt).

DIANTHUS

Leaf Spot (Heterosporium echinulatum) was common on outdoor D. caryophyllus at Comox, B.C. (W. Jones).

Rust (Uromyces caryophyllinus) caused sl. damage on Virginiana Rose and the Northland varieties in a commerical greenhouse at St.Catharines, Ont. It was also noticed on Olivette at Brampton (W.G. Kemp).

Mosaic (carnation mosaic virus). Specimens of carnation variety Midas was received from a commercial grower at Brampton, Ont. This virus was transferred to local lesion indicator plants by mechanical inoculation with expressed sap from the samples (W.G. Kemp).

DIEFFENBACHIA

Bacterial Leaf Spot (Xanthomonas dieffenbachiae (McCull. & Pirone) (Dowson). Diseased specimens were received from a grower in Toronto, Ont. through the District Inspector, Plant Protection Division. Yellow spots up to 1.0 cm in diameter occur on the leaves; if the spots are numerous the leaves

yellow, wilt and die. The disease was first reported by Pirone (Phytopath. 29(1):19. 1939) from New Jersey greenhouses. The present report appears to be the first of its occurrence in Canada. (J.A. Parmelee, D.B.O. Savile). A detailed description of the disease and pathogen are given by McCulloch and Pirone (Phytopath. 29(11):956-962. 1939).

FICUS

Grey Mould (Botrytis cinerea). In a shipment of 24 plants of F. elastica, from Belgium to Ste. Therese, Que. 15 were found infected upon inspection. Large water-soaked lesions were present on the leaves and stem. The fungus was fruiting abundantly on the lesions and sclerotia were present on the stem. The common fig, F. carica, suffers from a fruit rot caused by B. cinerea, but this report is apparently the first of grey mould on the rubber plant (J.A. Parmelee).

GLADIOLUS

Leaf Spot (Curvularia lunata). The pathogen was isolated from the leaves of plants growing in a field near Montreal, Que.; affected corms produced on the same field were received last year (P.D.S. 32:113). (H.S. Thompson). A survey tour of the principal gladiolus growers in the Montreal district revealed that another grower in the district is well acquainted with the disease. An account of our present knowledge of the disease in Canada has been published in the U.S.D.A. Plant Dis. Reptr. 38(7):515-517. 1954.(J.A. Parmelee)

Yellows (F. oxysporum f. gladioli race 2) was very common in Man. in 1953 (J.E. Machacek). About 3/4 of the plants in a commercial greenhouse at St. John's, Nfld. were affected (G.C. Morgan).

Penicillium Corm Rot (P. gladioli). Every corm in a 10 lb. sample grown in Queens Co., P.E.I., was sev. affected (R.R. Hurst). Mod. infection on corms grown at Torbay, Nfld., and stored over winter (G.C. Morgan).

Scab (Pseudomonas marginata) was common in many gardens in Kings Co., N.S., but the disease was not seen in one large commercial planting where the grower regularly treats his corms (J.F. Hockey). Scab was sev. on a sample of corms grown in Queens Co., P.E.I., brought in for diagnosis (R.R. Hurst).

Core Rot (Sclerotinia draytoni) was found sev. affecting 8% of the corms intended for forcing in the greenhouse at Sidney, B.C., in January. These corms were discarded and the remainder were treated with Ceresan and planted. On 12 March about 10% produced plants showing neck rot symptoms or had failed to grow (J.E. Bosher). Leaves and flowers apparently affected by the core rot organism were received 21 Sept. from Montreal, Que. (H.S. Thompson). This disease affected about 10% of the plants of several varieties in a large garden at Truro, Colchester Co., N.S.; it was also observed on a few plants in Kings Co. (J.F. Hockey). Core rot was sev. on corms brought in for examination from Queens Co. P.E.I., in April (R.R. Hurst).

Mosaic (Phaseolus virus 2) infected tr.-5% of the plants in 5 gardens examined in Fredericton, N.B. (D.J. MacLeod). Two affected plants were brought in from a garden in Queens Co., P.E.I. (R.R. Hurst).

Yellows (cause unknown) caused extensive damage in many plantings about Medicine Hat, Lethbridge, and Calgary, Alta., causing the death of 10% of the plants. The symptoms resembled those of Fusarium yellows (q.v.) but the pathogen was not isolated (M.W. Cormack).

HELLEBORUS

Leaf Spot (Coniothyrium hellebori) was general on christmas rose, H. niger, in 2 private gardens in the Vancouver area, B.C. (H.N.W. Toms, J.W. Groves).

HYACINTHUS

Soft Rot (Erwinia carotovora) caused the failure of several plants being forced at Lethbridge, Alta., from bulbs imported from Holland (M.W. Cormack).

HYDRANGEA

Powdery Mildew (?Erysiphe cichoracearum) caused mod. infection on plants in a commercial greenhouse at Hamilton, Ont.; the damage was sl. (W.G. Kemp).

ILEX - Holly

Decline (Pratylenchus sp.). Plants of I. aquifolium at Victoria, B.C. showed decline in vigour and premature leaf drop. Pratylenchus in large numbers present on the roots, but cultural conditions were also poor (J.E. Bosher).

IRIS

Leaf Spot (Didymellina macrospora) affected 35% of the iris plantings inspected on Vancouver Island, B.C., in varying degrees; it was not observed in the 3 small plantings examined on the mainland (N. Mayers). It was common in home gardens at Comox (W. Jones). Sl. infections were observed in some gardens in Edmonton (T.R. Davidson) and in a planting at Barons, Alta. (M.W. Cormack). A mod. infection was noted in a private garden at Deep River, Ont.

Mosaic (virus) is now rarely observed in B.C. in Wedgewood iris, the only variety entered for inspection. Most growers have one of the two strains of Wedgewood that are immune to mosaic. The rest of the growers have rogued their plantings so thoroughly that the disease is of little ecomonic importance (N. Mayers).

LATHYRUS

Streak (Erwinia lathyri) caused mod. damage to L. odoratus in a garden at Lethbridge, Alta. (M.W. Cormack). The disease was sev. in several gardens about Neepawa, Man. (J.E. Machacek).

Root Rot (Fusarium sp.). A mod. infection was general in a planting at

Neepawa, Man. Roots were brown and badly decayed; the plants were wilted and bleached (J.E. Machacek). Several cases of wilt were reported in Charlottetown, P.E.I. Young plants, 6-10 inches high, turned yellow and died, but no organism could be isolated from the rust system. Later in the season, Fusarium sp. was isolated from the roots of larger wilted plants (J.E. Campbell).

Root Rot (Thielaviopsis basicola). The pathogen was isolated from roots of a greenhouse crop, specimens of which were received from Sydney, N.S. (J.F. Hockey).

LILIUM

Blight (Botrytis elliptica). A mod. infection causing a blackening of the buds and upper part of the stem was observed in a garden at Winnipeg, Man. (J.E. Machacek).

Stem Rot (Phytophthora sp.) affected 3-4 plants in a home garden in Guelph, Ont. (C.B. Kelly).

MAHONIA

Rust (Cumminsiella mirabilissima (Peck) Nannf. in Lundell & Nannf.). was general on M. aquifolium in a garden at Parkersville, B.C. (W. Jones). Affected specimens received from Kelowna (D.L. McIntoch). Sev. shipments of M. aquifolium from Europe to firms in Ont. were refused entry in Canada upon inspection because the plants were more or less heavily rusted (H.S. Thompson). The above name for the pathogen replaces C. sanguinia previously used in these reports.

MATHIOLA - Stock

Leaf Spot (Alternaria rhaphani Groves & Skolko) was heavy in stocks in flower beds at St. Charles de Caplan, Que. The pathogen is reported on M. incana from Denmark, England and California, but not previously in Canada (D. Leblond, D.B.O. Savile).

Grey Mould (Botrytis cinerea) caused considerable damage as a blight and die-back on overwintered plants of M. incana being grown for seed at Keating, B.C. (W. Jones).

NARCISSUS

Nematode (Ditylenchus dipsaci). One planting in B.C. was rejected on account of this nematode; it is not generally encountered in fields entered for certification (N. Mayers). This nematode caused sev. damage in a planting in Victoria, B.C.; Magnificent was wiped out, the planting of King Alfred showed some large gaps and Princeps and Golden Spur, although generally infected, were less sev. injured (J.E. Bosher).

Decline (Pratylenchus penetrans). A field of about 4 acres in tulips and 10 acres in narcissus at Cloverdale, B.C., were examined 23 May. Decline

in production due to root injury and early maturity was stated by grower to be very severe. Both crops, as well as the cover crops rye and red clover were affected by this nematode (J.E. Bosher). Losses on this farm have been very heavy for the last 5 years. Small scale trials with the soil sterilant, M.C.2 gave an estimated increase of about $900 per acre in yield and grade (N. Mayers).

Basal Rot (Fusarium bulbigenum) was not observed in B.C.; again, cool temperatures during the growing season may have held the disease in check as several stocks with a history of basal rot appeared healthy. (N. Mayers).

Neck Rot (Sclerotinia narcissicola) and Scorch (Stagonospora narcissi) were present in all plantings on the mainland of B.C. and to a lesser extent on Vancouver Island, but no sev. losses occurred. Several growers sprayed with a copper fungicide (N. Mayers).

White Streak and associated virus diseases have been and still are responsible for heavy losses in yield and grade of daffodils in B.C. Affected plants are difficult to detect as they generally do not show any foliage symptoms until late in the season. These diseases appear to be more prevalent on Vancouver Island than on the mainland (N. Mayers).

Mosaic (virus) was observed in all plantings inspected in B.C. but it occurred mostly in trace amounts. Most of the narcissi entered for certification are the King Alfred variety, in which mosaic symptoms are very distinct when the plants are 4-6 inches high. The highest infection ever recorded in this variety was 5%, in contrast to 100% in Treverse and nil in Cheerfulness (N. Mayers).

PAEONIA - Peony

Blight (Botrytis paeoniae). Infection was tr.-mod. in gardens at Edmonton and general but sl. at the Station, Lacombe, Alta. (W.P.C.). About half the buds were blighted in a planting at Vulcan (M.W. Cormack). Infection was sl. in one garden and mod. on the buds in another at Winnipeg, Man. (J.E. Machacek). A sev. outbreak occurred in the gardens at Kentville, N.S., following the bloom period; the weather was wet (J.F. Hockey).

Ring Spot (virus) sev. affected 3 plants in a planting of 300 at the University, Edmonton, Alta. (T.R. Davidson). Two per cent of the plants in the Station border at Fredericton, N.B., showed striking symptoms (D.J. MacLeod).

Stunt (cause undetermined). Ten per cent of the plants in a test plot at the Station, Fredericton, N.B., showed a sev. rolling of the leaves and stunting (D.J. MacLeod).

PARTHENOCISSUS

Powdery Mildew (Uncinula necator) was recorded on Virginia creeper at one location in Edmonton, Alta. (A.W. Henry).

PELARGONIUM - Geranium

Grey Mould (Botrytis cinerea) caused a basal rot destroying, depending on the variety, 5-25% of the cuttings made in the fall for propogation at Summerland, B.C. (G.E. Woolliams). A mod. infection was observed at Lethbridge, Alta., in 2 lots of cuttings imported from California (M.W. Cormack). The disease caused a blight of 17% of the plants in a greenhouse in Queens Co., P.E.I. (R.R. Hurst).

Mosaic (virus). A marked mosaic was showing in 2% of the plants in a greenhouse at the Station, Fredericton, N.B. (D.J. MacLeod).

PERESKIA

Mosaic (virus). A plant of P. aculeata showing a marked veinal mottle was sent to laboratory at Fredericton, N.B., for examination. The virus was transmitted by grafting to a Pereskia source believed to be free from virus (D.J. MacLeod).

PETUNIA

Yellows (Callistephus virus 1) was common at Saskatoon, Sask., and affected plants were received from Maple Creek (T.C. Vanterpool).

PHILADELPHUS - Mock Orange

Powdery Mildew (Phyllactinia corylea) was heavy on the leaves of a shrub in the laboratory grounds, Summerland, B.C. (D.L. McIntosh). Weiss and O'Brien (Index on Pl. Dis. in U.S. p. 1073) report its occurrence in Mont. and Wash. but the above report appears to be the first for Canada (I.L.C.).

PHLOX

Powdery Mildew (Erysiphe cichoracearum) caused some defoliation of the lower leaves of P. paniculata in a border at Vancouver, B.C. (H.N.W. Toms). A mod. infection was observed in the gardens at Rideau Hall, Ottawa, Ont. (H.S. Thompson). Powdery mildew was common and sev. everywhere around Quebec, P.Q. (D. Leblond).

Leaf spot (Septoria phlogis). A mod.-sev. infection was observed at the Provincial School, Deschambault, Que. (D. Leblond, D.B.O. Savile).

Blight (virus) affected a few plants in the border at the Station, Fredericton, N.B. (D.J. MacLeod).

RHODODENDRON

Leaf Blister (Exobasidium vaccinii) was observed on azalea in a garden in Victoria, B.C. (W.R. Foster). A mod. infection occurred on the

leaves of a bush in a garden at Chilliwack (I.C. MacSwan).

ROSA - Rose

Leaf Spot (Coryneum microstictum Berk. & Br. var. foliae Dearn. & Overh.) caused large spots on leaflets of wild Rosa submitted from La Trappe, Que., Sept. 1952. Spores 4-celled, brown, clavate to ellipsoid or irregular, 11-18 x 4.5-5.7 microns. Described in Dearness, Mycologia 20:243. 1928, from N.Y. As the spores in this specimen cover the range of both the species and the variety, the distinction between the two appears doubtful. A canker caused by C. microstictum is reported from B.C. (P.D.S. 17:83) but the leaf spot has not been reported previously in Canada (D.B.O.S.).

Black Spot (Diplocarpon rosae) was common in North Saanich, B.C. on 25 May (W. Jones). It was sev. on the lower leaves of hybrid teas in a garden at Magrath, Alta. (M.W. Cormack). Black spot was prevalent causing much premature defoliation in many gardens about St. Catharines, Ont.; it was also heavy in the public gardens at Niagara Falls (G.C. Chamberlain). Black spot was sev. on rose hedges at Gifford, near Quebec, P.Q., on 13 Aug. (D. Leblond). Black spot was very prevalent on hybrid teas, causing defoliation in a nursery at Centreville, N.S. None observed were immune; rugosa varieties showed only a trace (J.F. Hockey). Of the several varieties observed at Southport, P.E.I., Capt. Hayward and Mrs. John Long were the only ones affected on 23 July (J.E. Campbell).

Leaf Spot (Mycosphaerella rosicola). Mod. infection on wild bushes along roadside at East Point, Kings Co., P.E.I. (J.E.C.).

Rust (Phragmidium spp.) was found on several varieties in the rose beds at the Station, Summerland, B.C. (G.E. Woolliams). Rust was found on wild and cultivated roses at Edmonton, Alta (T.R. Davidson). Phr. mucronatum was found on a shipment from Holland inspected at Edmonton (I.L.C.). Infection was sev. on young stems and leaves in a planting at Spring Coulee (F.R. Harper). An affected specimen of hybrid tea was received from a nursery at River Canard R.R.1, Ont. (H.S. Thompson). A heavy infection was noted on several bushes at a private home in St. Charles de Caplan, Que. (D. Leblond). A mod. infection of Phr. mucronatum was present on cultivated roses at the Station, Charlottetown, P.E.I. (J.E. Campbell).

Anthracnose (Sphaceloma rosarum) was sev. on the foliage, causing premature defoliation in a garden at Comox, B.C. (W. Jones).

Powdery Mildew (Sphaerotheca pannosa) was sev. on the leaves of a planting at Vulcan, Alta. (M.W. Cormack). The disease was sev., causing stunting and distortion of the foliage of Crimson Rambler plants at St. Catharines, Ont. (G.C. Chamberlain). Powdery mildew was observed on a few roses at St. Chrysostome and Rougemont, Que. (L. Cinq-Mars) and on polyantha roses causing some damage in three gardens at Ste. Anne de la Pocatiere (L.J. Coulombe). A mod. infection at La Trappe (Fr. M. Claude) and on several climbers, which received no treatment, at Charlottetown, P.E.I. (J.E. Campbell).

Mosaic (virus) was found on a few plants of Peter's Briar and Orange Sweetheart at Brampton, Ont. Chlorotic areas appeared on the leaves, a few of which were distorted (W.G. Kemp).

SAINTPAULIA - African Violet

Root Knot (Meloidogyne sp.) was found on a specimen from the U.S.A. and intercepted at Edmonton by E.C. Reid (J.E. Bosher).

SCHLUMBERGERA

?Crown Gall (Agrobacterium tumefaciens). Specimen of Christmas cactus, S. russelliana, showing galls on leaves received from Script, Sask.(T.C. Vanterpool).

SCINDAPSUS

Root Knot (Meloidogyne sp.). A destructive root rot of the variegated ivy, S. aureus, was observed in a greenhouse at London, Ont. About 60% of some 2000 potted plants were affected. A nematode identified by Dr. A.D. Baker as Meloidogyne sp. was found in the roots. A more complete account has appeared in U.S.D.A. Plant Dis. Reptr. 37(11):545-546. 1953 (W.G. Kemp).

SINNINGIA - Gloxinia

Boron Deficiency. About 15 of a lot of 50 gloxinias were affected in a greenhouse in Queens Co., P.E.I. The symptoms agreed well with the description given in "Diseases of Ornamental Plants" Col. A. & M. College 1946, pp. 75-76 fig. 52 (R.R. Hurst).

SYRINGA - Lilac

Powdery Mildew (Microsphaera alni) was common at St. Catharines, Ont., in September (G.C. Chamberlain).

Bacterial Blight (Pseudomonas syringae). Mod. infection on several bushes at Vulcan, Alta. (M.W. Cormack).

TULIPA - Tulip

Fire (Botrytis tulipae) the most serious tulip disease in B.C., was observed in all plantings inspected, but losses were less than expected. On Vancouver Island, where most of the tulips are grown, only 4% of the plantings were sev. affected. On the mainland the percentage was somewhat higher (N. Mayers). Fire was sev. on plants sent in from Maple Creek, Sask. (T.C. Vanterpool). Fire was quite prevalent causing spots on leaves and flowers in the laboratory gardens, St. Catharines, Ont. (W.G. Kemp). Sev. affected specimens were received from Chateau d'Eau, near Quebec, P.Q.; the disease was reported to have been sev. for the last 3 years (D. Leblond). The disease was quite prevalent and destructive in Kings Co., N.S.; weather was wet during blooming (J.F. Hockey).

Break (virus) was present in most plantings inspected in B.C., but systematic roguing is practised and with rare exceptions it is of little importance (N. Mayers).

Decline (Pratylenchus penetrans). See under Narcissus.

VIOLA

Rust (Puccinia violae). Heavy infection on overwintered crop of V. tricolor var. hortensis grown for seed in the Saanich district, B.C. (W.R. Orchard).

Powdery Mildew (Spaerotheca humuli) was found on a few pansy plants in a garden at Summerland, B.C. (G.E. Woolliams). The oidial stage was heavy here and there in the Saanich district (W.R. Orchard).

ZINNIA

Blight (Alternaria zinniae) caused heavy leaf, stem and flower infection in zinnia in the laboratory gardens, St. Catharines, Ont. About half the Polar Bear plants were sev. infected (W.G. Kemp). Diseased plants apparently affected by blight were brought in from 2 gardens in Ottawa. In one almost all the plants were killed (H.S. Thompson).

Yellows (Callistephus virus 1,western strain) was found affecting 3 plants in a garden at Maugerville, York Co., N.B. (D.J. MacLeod).

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