4 May 1952.

CANADA

DEPARTMENT OF AGRICULTURE

SCIENCE SERVICE

BOTANY AND PLANT PATHOLOGY DIVISION

THIRTY-SECOND ANNUAL REPORT OF THE CANADIAN PLANT DISEASE SURVEY 1952

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Published by Authority of the Rt. Hon. James G. Gardiner, Minister of Agriculture,
Ottawa, 1953.

New or Noteworthy Diseases

Stem rust (Puccinia graminis) was present on wheat throughout southern Man. and southeastern Sask. and even to some extent west and north of the 'rust area' at harvest. Damage to durum wheat in the area was considerable. Most of the wheat stem rust consisted of race 15B to which durum wheat is susceptible. Leaf rust (P. triticina) was even more widespread than stem rust on wheat in the Prairie Provinces. The loss in yield from rust in common wheat in Man. was estimated at 15%, about two thirds caused by leaf rust and one third by stem rust. Stripe rust (P. glumarum) was unusually prevalent on wheat and barley in southern Alta. Leaf rust (P. secalina) of rye was widely distributed across the southern part of the Prairie Provinces. Stem rust and crown rust (P. coronata) occurred on oats late in the season.

Little information is available on the occurrence of the cereal rusts in Eastern Canada, but to judge from the rust nurseries located in the east these rusts were heavy in some areas. Race 15B of wheat stem rust was widely distributed for the first time in Ont. and Que. Rye stem rust was heavy on barley at Fredericton, N. B., and Merrickville, Ont. Its occurrence at these two places may well be correlated with the presence of barberries in the areas. Rye stem rust was the predominant variety isolated from aecia of Puccinia graminis on barberry. Aecia of P. coronata from buckthorn were similarly studied. From 25 collections of aecia from Rhamnus cathartica, P. coronata var. avenae was isolated from 24, a variety which it is proposed to name P. coronata var. secalis from 6, and var. festucae from 3 collections. From 2 collections of aecia from R. frangula, P. coronata var. agrostidis was isolated.

The cereal diseases, speckled leaf blotch and glume blotch, caused by Septoria spp., were unusually prevalent in Canada. Scald (Rhynchosporium secalis) and net blotch (Helminthosporium teres) were prevalent on barley in Alta. and northern Sask.

Dwarf bunt (Tilletia brevifaciens G. W. Fischer) was found for the first time in Ont. After it was discovered in the field, examination of seed samples revealed its presence in samples from three other localities in Ont. Common bunt caused by T. foetida was also heavy in many of the samples. The name T. brevifaciens has been adopted for the dwarf bunt organism because the morphology of its spores and its effect on the wheat plant set it off from the common bunt species. Streak mosaic (virus) was recognized for the first time in Canada when it was found on winter and spring wheat in southern Alta.

Bacterial wilt (Corynebacterium insidiosum) has been very prevalent on alfalfa in the last two years in Alta., probably on account of the abundant soil moisture. Crown bud rot (Rhizoctonia solani, Fusarium spp., etc.) spread even more rapidly in southern Alta. than in 1951. Leaf spots were also unusually prevalent in Alta. and Sask. Anthracnose caused by Colletotrichum destructivum was found on red clover at Ottawa, Ont., but the disease was due to C. graminicola at Ste. Anne de la Pocatiere, Que.

Digitalis lanata being grown as a drug plant in B. C. was found affected for the first time in Canada by a leaf spot (Colletotrichum fuscum Laubert) and by a crown rot (Pythium sp.). Flax rust was epidemic in Sask., but only a few fields were heavily rusted in Man., where resistant varieties were mostly grown. Rhizoctonia seedling blight was severe in flax on summer fallowed land. It was demonstrated experimentally that pod and stem blight (Diaporthe phaseolorum var. sojae) may cause appreciable reductions in the soybean yield in southwestern Ont. Rust (Puccinia helianthi) caused little damage to sunflower, because reduced production permitted most fields to be planted away from fields in sunflowers the previous year. Wilt (Sclerotinia sclerotiorum) was rarely severe and head and neck rot (S. sclerotiorum and Botrytis cinerea) was not found in farmers' fields. Net blotch (Helminthosporium dictyoides) moderately affected meadow fescue variety Ensign in the seed-increase plots at Ottawa, Ont.

The prevalence of bacterial ring rot (Corynebacterium sepedonicum) of potato showed little change in the last year. The disease has yet failed to gain a foothold in B. C. and its occurrence was at a very low level in P. E. I. and probably in N. S. Ring rot was reported less frequently in Que. than in any year since it became widespread. The suggestion was made that its lower incidence in Que. is in part on account of the replacement of used jute bags by new bags made of paper.

Black leg (Erwinia phytophthora) was unusually prevalent in the B. C. interior, over much of Alta. and Sask., and in parts of Que. The disease was severe because the soil was nearly saturated with moisture and, in some areas, cold during the period of early growth.

For the first time since the Survey was published, late blight (Phytophthora infestans) was reported simultaneously from every province in Canada. The abundance of soil moisture in the spring and the absence of drying winds during the summer over most of Alta. and Sask. allowed late blight to appear on the foliage at some places. However, conditions at harvest were favourable and little tuber rot developed. Late blight was present, although rarely severe, on the foliage from Ont. eastward, but vine growth continued through the fall, particularly in Que. and N. S., with the result that tuber rot was severe. The occurrence of races of P. infestans to which the new varieties Canso, Keswick, and Kennebec are susceptible has already demonstrated that these varieties cannot be safely grown in the larger centres of potato production without protecting them with a fungicide. The dry weather that prevailed during much of the growing season in N. S. and P. E. I. clearly favoured the development of common scab (Streptomyces scabies) to a degree rarely observed in these provinces. On the other hand in Ont., where scab is a problem in some areas, the value of scab-resistant varieties has been amply demonstrated. The acreage of the variety Ontario has rapidly expanded in the last two years although it is not an attractive variety in many other respects.

In recent trials in Nfld., Kennebec proved to be highly resistant to wart (Synchytrium endobioticum) and also appeared to be one of the best potato varieties for Nfld. conditions. In earlier trials was discovered the highly resistant mauve-flowered strain of Sebago, which growers in one important section are now planting in place of a susceptible variety.

The finding of nematodes on potatoes in B. C. in a garden where nematode-infected bulbous iris had been grown the previous year led to cross-inoculation experiments and a morphological study of the nematodes on the two plants. It was concluded that only one nematode was involved and that it was none other than the potato rot nematode (Ditylenchus destructor). Although the bulbous iris was found infected by nematodes in B. C. as early as 1932, the nematode has declined in importance with the development of practical control measures. Moreover, the principal potato growing areas are mostly well removed from those devoted to growing of bulbs.

Only a few diseases of vegetables warrant mention. Observations made this year again emphasized the importance of using seed free from the pathogens causing anthracnose (Colletotrichum lindemuthianum and halo blight (Pseudomonas phaseolicola) in the production of beans. Violet root rot (Rhizoctonia crocorum) was found attacking celery as well as carrot and potatoes in the Thedford Marsh in Ont. ; its occurrence on celery seems not to have been reported previously in North America. Additional cases of brown spot (Cephalosporium apii) were found in Ont. on the green pascal varieties of celery. Powdery mildew (Erysiphe cichoracearum) has become a problem in growing the fall crop of cucumbers under glass in south-western Ont. The mosaic-resistant Burpee hybrid, which showed high resistance to Cucumis virus 1 for several years, has recently exhibited little resistance to the strains of the virus now present. Improved Bay State appears to be the only variety of greenhouse tomato that still shows resistance to leaf mould (Cladosporium fulvum) in southwestern Ont. Verticillium wilt (V. albo-atrum) was prevalent in the B. C. interior. A careful survey revealed that 55% of the plants were affected in varying degree and the estimated loss in yield was 6. 6% or 2, 725 tons of tomatoes. Verticillium wilt was found on several other vegetable crops in B. C. and other provinces. These crops include lima bean, cucumber, eggplant, melon, pepper and potato. Blossom-end rot and skin cracking were prevalent in tomato in southwestern Ont. and in Nfld. as a result of dry weather in the early part of the season followed by heavy rain during the harvest period. Mosaic (turnip virus 1) has proved very destructive in recent years to swede turnip in an important seed-producing area in N. S.

The outbreak of fire blight (Erwinia amylovora) of pear in the Creston Valley, B. C. , is still serious, but winter pruning and inspection have reduced its intensity in most orchards to the level occurring before the 1948-51 epidemic. The severe damage caused by this disease to apples at Brooks, Alta. , is typical of outbreaks in prairie orchards, where in search for winter hardiness very susceptible parents have been used in breeding suitable hybrids. Apple scab (Venturia inaequalis) was fairly heavy in B. C. and from Ont. eastward unless the trees were well sprayed. In eastern Que. , N. B. , and N. S. , the early part of the season was wet, favouring infection and making the application of spray difficult. In N. S. many commercial growers used eradicant fungicides to supplement their regular protectant schedules with excellent results. Heavy loss from pear scab

(V. pirina) occurred in some orchards in the Niagara Peninsula, Ont. Surveys in the Okanagan Valley, B. C., confirm the general view that sweet cherry trees are resistant to crown rot (Phytophthora cactorum); 33 trees out of 4615 were found infected. Virus diseases of stone fruits continue to cause concern. In the Niagara Peninsula, the percentage of trees affected by one or more virus diseases in the sweet cherry orchards surveyed has increased from 60.7 in 1951 to 70.2 in 1952; the corresponding figures in the sour cherry orchards were 43.4 in 1951 and 56.6 in 1952. Brown rot (Monilinia fructicola) caused in Ont. considerable loss of fruit during shipment and subsequent sale. Verticillium wilt (V. albo-atrum) attacked young stone fruit trees and raspberry plantings; in some instances its occurrence was associated with diseased vegetable crops. Two new virus diseases were found on raspberry in B. C.; severe leaf curl appears to be a new disease, but the other appears to be vein chlorosis described originally from Scotland.

A number of mostly minor tree diseases new to Canada are reported for the first time. These are: Leaf spot (Cladosporium humile J. J. Davis) on Acer rubrum in N. S.; leaf spot (Ramularia ?alnicola Cooke) on Alnus crispa var. mollis in N. S.; leaf blight (Taphrina tosquinetii (West.) Tul.) on the same host in Nfld. in 1951; leaf spot (Phyllosticta innumerabilis Peck) on A. intermedia and A. stolonifera in N. S.; leaf blister (Taphrina carnea Johans.) on Betula glandulosa at Chesterfield Inlet, Dist. of Keewatin in 1950 and on B. pumila at St. Anthony, Nfld., in 1951; witches' broom (T. nana Johans.) on B. glandulosa at Great Whale River, Que., in 1949; leaf blight (Monilinia johnsonii (Ell. & Ev.) Honey on leaves of Crataegus macrosperma in N. S.; shoot hypertrophy (Taphrina flavorubra Ray) on Prunus besseyi (cult.) in N. S., as well as specimens previously collected on the same host in Ont., N. B., and P. E. I., and checked by Dr. A. J. Mix; leaf spot (Ascochyta wisconsina J. J. Davis) on Sambucus canadensis in N. S. Crown rot (Phytophthora cactorum) was severe on Cornus nuttallii in one garden in B. C. Willow blight (Physalospora miyabeana) and scab (Fusicladium saliciperdum) reached the western limits of Que.; however, the fungi are unknown on native willows.

New or rare diseases on ornamental plants observed in 1952 were: Downy mildew (Peronospora antirrhini) on seedlings of snapdragon in Alta.; leaf spot (Septoria armeriae Allesch.), a disease of cultivated thrift in England, on wild Armeria maritima var. labradorica at Great Whale River, Que.; yellows (Callistephus virus 1) on China aster from as far north as Ile a la Crosse in northern Sask.; rust (Puccinia chrysanthemi Roze) in a greenhouse at Montreal, Que., on chrysanthemum cuttings from Leamington, Ont., and also reported from B. C.; anthracnose (Colletotrichum himantophylli Kabat & Bubak) on Clivia miniata at Victoria, B. C.; leaf spot (Curvularia lunata (Wakker) Boed.) affecting gladiolus corms in the Montreal area, Que.; leaf spot (Phyllosticta hydrangeae Ell. & Ev.) on hydrangea, now known from Quebec, P. Q., and Winnipeg, Man.; rust (Chrysomyxa piperiana (Arth.) Sacc. & Trott.) on Rhododendron californicum in B. C.; root and stem rot (Rhizoctonia solani) on tulips at Saanichton, B. C.; leaf spot (Ascochyta violae Sacc. & Speg.) on pansy at Keating, B. C.; and blight (Alternaria zinniae) on zinnia at Kentville, N. S.

Maladies nouvelles ou d'importance notable

La rouille de la tige des céréales (Puccinia graminis) a affecté le blé dans le sud du Manitoba et dans le sud-est de la Saskatchewan et même, dans une certaine mesure, au temps des récoltes, à l'ouest et au nord de la région propice à la rouille. Le blé durum a souffert considérablement, puisque la race 15B, à laquelle il est susceptible, était prédominante. La rouille des feuilles (P. triticina) était encore plus répandue que la rouille de la tige dans les provinces des prairies. La diminution de rendement attribuée aux rouilles dans le blé commun est évaluée à 15%; les 2/3 de ces pertes sont dues à la rouille des feuilles et l'autre 1/3, à la rouille de la tige. La rouille striée (P. glumarum) était plus répandue que d'habitude sur le blé et l'orge dans le sud de l'Alberta. La rouille des feuilles du seigle (P. secalina) était très répandue à travers tout le sud des provinces des prairies. La rouille de la tige et la rouille couronnée de l'avoine ne sont apparues que tard dans la saison.

On possède peu de renseignements sur les rouilles des céréales dans l'Est du Canada, mais si les pépinières situées dans l'Est peuvent servir de critère, les épidémies de rouille furent graves en certains endroits. C'était la première année que la race 15B de la rouille de la tige du blé était abondamment répandue en Ontario et dans Québec. La rouille de la tige du seigle fut grave à Frédéricton, N. B., et à Merrickville, Ont. Il est possible que la présence de l'épine-vinette dans ces localités ait un rapport avec ces épidémies. La rouille de la tige du seigle fut la variété prédominante isolée des écidies de Puccinia graminis sur l'épine-vinette. On a fait des études similaires des écidies de P. coronata sur le nerprun. Vingt-cinq échantillons, récoltés sur Rhamnus cathartica, furent étudiés, et de 24, on a pu isoler P. coronata var. avenae, tandis que de 6, on a isolé une variété qu'on propose d'appeler P. coronata var. secalis et que de 3 autres, on a isolé la variété festucae. On a isolé P. coronata var. agrostidis de deux échantillons d'écidies récoltés sur R. frangula.

Les taches des feuilles et les taches des glumes des céréales dues à Septoria spp. ont été particulièrement graves au Canada. L'échaudage de l'orge (Rhynchosporium secalis), la tache réticulée (Helminthosporium teres) étaient très répandus en Alberta et dans le nord de la Saskatchewan.

C'est la première fois qu'on observe la carie naine du blé (Tilletia brevifaciens G. W. Fischer) en Ontario et cela dans quatres endroits. Plusieurs autres échantillons étaient contaminés de carie commune due à T. foetida. On a adopté le nom de brevifaciens pour l'agent causal de la carie naine parce que la morphologie de ses spores et ses effets sur l'hôte le séparent facilement de l'espèce commune. C'est la première fois qu'on observe la mosaïque striée au Canada; on l'a signalée et sur le blé de printemps et sur le blé d'automne dans le sud de l'Alberta.

La flétrissure bactérienne de la luzerne (Corynebacterium insidiosum) fut très répandue ces deux dernières années en Alberta, apparemment à cause de l'humidité élevée du sol. La pourriture des bourgeons de la luzerne (Rhizoctonia solani, Fusarium spp., etc.) s'est disséminée encore plus

rapidement qu'en 1951 dans le sud de l'Alberta. L'anthracnose du trèfle rouge, observée à Ottawa, Ont., était causée par C. destructivum, tandis qu'à Ste-Anne-de-la-Pocatière, la même maladie était due à C. graminicola. C'est la première fois qu'on observe au Canada que la Digitalis lanata, qu'on cultive comme plante médicinale en Colombie Britannique, est atteinte d'une tache des feuilles due à Colletotrichum fuscum Laubert et d'une pourriture de la couronne due à Pythium sp. La rouille du lin a pris des proportions épidémiques en Saskatchewan, alors que seulement quelques champs étaient gravement rouillés au Manitoba, où l'on cultive presque exclusivement des variétés résistantes. La brûlure des semis due au Rhizoctonia fut grave dans les champs de lin semés sur des jachères. On a prouvé par des méthodes expérimentales que la brûlure des gousses et des tiges de la soja (Diaporthe phaseolorum var. sojae) peut causer des diminutions appréciables de rendements dans le sud-ouest de l'Ontario. La rouille du tournesol (Puccinia helianthi) n'a causé que peu de dommage, vu que la diminution des étendues a permis de cultiver cette plante dans des champs assez éloignés de ceux où le tournesol avait été semé l'année précédente. La flétrissure du tournesol (Sclerotinia sclerotiorum) fut rarement grave, alors que la pourriture du capitule et du pédicelle (S. sclerotiorum et Botrytis cinerea) n'a pas été observée chez les cultivateurs. On a observé une infection modérée de tache réticulée (Helminthosporium dictyoides) de la fétuque des prés var. Ensign dans les parcelles de multiplication, à Ottawa, Ont.

La situation de la pourriture bactérienne du cerne de la patate (Corynebacterium sepedonicum) a varié très peu l'an dernier. Cette maladie n'a pas encore réussi à gagner la Colombie Britannique et est demeurée sans importance dans l'Ile du Prince-Edouard, de même qu'en Nouvelle-Ecosse. Dans Québec, on l'a signalée moins souvent qu'en toute autre année depuis qu'elle s'y est établie. On a suggéré que dans Québec, cette régression est en partie due à l'utilisation de sacs de papier au lieu de vieux sacs de jute.

La jambe noire (Erwinia phytophthora) a pris des proportions inusitées dans l'intérieur de la Colombie Britannique, dans la plupart des régions de l'Alberta et de la Saskatchewan et dans quelques régions du Québec. La gravité de la maladie est attribuable à ce que le sol fut presque saturé d'eau et que, dans certains districts, la température fut plutôt froide durant la première période de croissance.

Depuis le début de l'Enquête canadienne sur les maladies des plantes, c'est la première fois qu'on signale simultanément de toutes les provinces du Canada le mildiou de la patate. L'abondance d'humidité dans le sol au printemps et l'absence de vents desséchants au cours de l'été en Alberta et en Saskatchewan ont favorisé l'apparition de la maladie sur le feuillage en quelques endroits. Toutefois, lors de la récolte, le temps était favorable et il n'y eut que peu de pourriture des tubercules. Dans l'Est, y compris l'Ontario, le mildiou ne fut que rarement grave sur le feuillage, mais la croissance des fanes fut continue jusqu'aux gelées, particulièrement dans Québec et en Nouvelle-Ecosse, et la pourriture des tubercules fut grave. La présence de races de P. infestans, auxquelles les nouvelles variétés Canso, Keswick et Kennebec sont susceptibles, nous prouvent qu'il n'est pas possible

de cultiver ces variétés en toute sécurité sans les protéger par des arrosages adéquats, du moins dans les grands centres de production. La sécheresse qui a caractérisé la saison de végétation en Nouvelle-Ecosse et dans l'Ile du Prince-Edouard a favorisé le développement de la gale commune (Streptomyces scabies), à tel point qu'on avait rarement vu pareille situation dans ces provinces. D'autre part, dans certaines régions de l'Ontario où la gale commune constitue un problème, les variétés résistantes à la gale ont prouvé leur valeur. L'étendue ensemencée avec la variété Ontario n'a cessé de s'accroître au cours des deux dernières années en dépit du peu d'attrait qu'offre cette variété à bien des points de vue.

Au cours de récents essais à Terre-Neuve, la variété Kennebec s'est avérée très résistante à la gale verruqueuse (Synchytrium endobioticum) et semble être une des variétés les mieux adaptées aux conditions de Terre-Neuve. Dans des essais antérieurs, on avait découvert une lignée à fleur mauve de Sebago qui est également très résistante et que les producteurs d'une région substituent aux variétés susceptibles.

La découverte de patates infestées de nématodes provenant d'un jardin où l'on avait cultivé l'année précédente des iris bulbeux infestés de nématodes a amené une étude de la morphologie comparée des deux espèces et de la spécificité de chacun quant à leurs hôtes. On en est venu à la conclusion qu'une seule espèce attaque la patate et qu'il s'agissait bien de Ditylenchus destructor. Bien qu'on ait observé le nématode de l'iris bulbeux dès 1932, cette maladie n'a cessé de perdre de l'importance à mesure que les méthodes de répression furent connues. De plus, les principaux centres de culture de patates sont éloignés de ceux où l'on cultive l'iris.

Seules quelques maladies des légumes sont dignes de mention. Les observations consignées, cette année, démontrent une fois de plus l'importance d'utiliser une semence de haricots exempte des pathogènes qui causent l'anthracnose (Colletotrichum lindemuthianum) et la brûlure bactérienne (Pseudomonas phaseolicola). On a observé la pourriture violette des racines (Rhizoctonia crocorum) sur le céleri aussi bien que sur les carottes et les patates dans le Thedford Marsh, en Ontario; il ne semble pas que cette pourriture du céleri ait été signalée auparavant en Amérique du Nord. On a signalé d'autres cas de tache brune du céleri (Cephalosporium apii) sur la variété verte Pascal, en Ontario. Le blanc du concombre (Erysiphe cichoracearum) constitue maintenant un problème pour les producteurs du sud-ouest de l'Ontario qui cultivent ce légume en serre à l'automne. L'hybride Burpee, qui a montré pendant plusieurs années une résistance marquée au Cucumis Virus 1, est maintenant susceptible aux lignées qui prédominent aujourd'hui. La variété Bay State améliorée semble être l'unique variété de tomate de serre encore résistante à la moisissure (Cladosporium fulvum) dans le sud-ouest de l'Ontario. La flétrissure verticillienne de la tomate (V. albo-atrum) était répandue dans l'intérieur de la Colombie Britannique. Une enquête soignée a révélé que 55% des plants étaient atteints à des degrés divers et les pertes ont été évaluées à 6.6%, soit 2725 tonnes de tomates. En Colombie Britannique et dans d'autres provinces, la flétrissure verticillienne fut observée sur plusieurs autres espèces de légumes, savoir, la fève

de lima, le concombre, l'aubergine, le melon, le piment et la patate. La pourriture du bout du calice et le fendillement de la peau des tomates étaient très répandus dans le sud-ouest de l'Ontario et à Terre-Neuve, à cause de la sécheresse du début de l'été et de l'abondance des pluies au temps de la récolte. La mosaïque (virus 1 du navet) a causé des pertes considérables au cours des dernières années dans certains centres de production de graines du rutabaga en Nouvelle-Ecosse.

L'épidémie de brûlure bactérienne du poirier (Erwinia amylovora) est encore grave dans la vallée de Creston en Colombie-Britannique, mais, dans la plupart des vergers, la taille d'hiver et les inspections ont contribué à la ramener à son niveau d'avant l'épidémie 1948-1951. Les dommages causés par cette maladie aux pommiers à Brooks, Alta, paraissent typiques de ce qui doit arriver aux vergers des prairies où l'on a utilisé des parents susceptibles pour produire des hybrides rustiques. La tavelure du pommier (Venturia inaequalis) fut assez grave en Colombie-Britannique et dans l'Est du Canada lorsque les arrosages n'avaient pas été bien faits. Dans l'Est, du Québec, au Nouveau-Brunswick et en Nouvelle-Ecosse, le printemps fut pluvieux, ce qui favorisa l'infection et empêcha l'application efficace des fongicides. En Nouvelle-Ecosse, plusieurs pomiculteurs utilisèrent avec succès des fongicides éradicants en plus d'appliquer leur programme régulier d'arrosage. La tavelure du poirier (V. pirina) a causé des pertes considérables dans quelques vergers de la péninsule du Niagara. Les enquêtes poursuivies dans la vallée de l'Okanagan ont confirmé l'opinion générale que les cerisiers à fruits sucrés sont résistants à la pourriture de la couronne (Phytophthora cactorum): 33 arbres seulement sur 4615 étaient malades. Les maladies à virus des fruits à noyaux ne cessent de causer des inquiétudes aux intéressés. Dans la péninsule du Niagara, le pourcentage des arbres atteints d'une ou de plusieurs maladies à virus a passé de 60.7% en 1951 à 70.2% en 1952 pour les cerises sucrées, tandis que pour les cerises sûres, il a passé de 43.4% à 56.6%. La pourriture brune (Monilia fructicola) a causé des pertes considérables en transit et en entrepôt. Des jeunes arbres de fruits à noyaux et des framboisiers ont été atteints de flétrissure verticillienne (V. albo-atrum) et, dans quelques cas, on a pu établir une relation avec la présence antérieure de la même maladie sur des légumes. On a observé deux nouvelles maladies à virus du framboisier en Colombie-Britannique: l'enroulement grave des feuilles est apparemment une maladie nouvelle, tandis que l'autre est probablement la chlorose des veines, déjà signalée en Ecosse.

Un certain nombre de maladies des arbres, maladies d'importance mineure, mais nouvelles au Canada, ont été signalées; ce sont: la tache des feuilles (Cladosporium humile J. J. Davis) sur Acer rubrum en Nouvelle-Ecosse; la tache des feuilles (Ramularia (?) alnicola Cooke) sur Alnus crispa var. mollis, en Nouvelle-Ecosse; la brûlure des feuilles (Taphrina tosquinetti (West.) Tul.) sur le même hôte à Terre-Neuve en 1951; la tache des feuilles (Phyllosticta innumerabilis Peck) sur A. intermedia et A. stolonifera en Nouvelle-Ecosse; la cloque (Taphrina carnea Johans.) sur

Betula glandulosa, à Chesterfield Inlet, Dist. du Keewatin, en 1950 et sur B. pumila à St-Anthony, Terre-Neuve, en 1951; le balai-de-sorcière (T. nana Johans.) sur B. glandulosa à Grande-Rivière-à-la-baleine, Qué., en 1949; la brûlure des feuilles (Monilia Johnsonii (Ell. & Ev.) Honey) sur Crataegus macrosperma en Nouvelle-Ecosse; l'hypertrophie des brindilles (Taphrina flavorubra Ray) sur Prunus besseyi (cult.) en Nouvelle-Ecosse, de même que sur des spécimens récoltés auparavant sur le même hôte en Ontario, au Nouveau-Brunswick et dans l'Ile du Prince-Edouard (identification vérifiée par le Dr. A. J. Mix); la tache des feuilles (Ascochyta wisconsina J. J. Davis) sur Sambucus canadensis en Nouvelle-Ecosse; la pourriture de la couronne (Phytophthora cactorum) sur Cornus nuttallii, grave dans un jardin en Colombie-Britannique. La brûlure du saule (Physalospora miyabeana) et la gale (Fusicladium saliciperdum) ont atteint les limites ouest du Québec; toutefois, on n'a jamais observé ces champignons sur les saules indigènes.

On a observé en 1952, sur les plantes ornementales, quelques maladies nouvelles ou rares dont voici quelques-unes: le mildiou de l'antirrhinum (Peronospara antirrhini) sur des jeunes plants en Alberta; la tache des feuilles (Septoria armeriae (Allesch.), une maladie de l'armérie cultivée en Angleterre, sur Armeria maritima var. labradorica sauvage à Grande-Rivière-à-la-baleine, Qué.; la jaunisse (Callestephus Virus 1) sur la reine-marguerite, à l'Ile-à-la-Crosse dans le nord de la Saskatchewan; la rouille des chrysanthèmes (Puccinia chrysanthemi Roze) dans une serre à Montréal, sur des boutures provenant de Leamington, Ont., observée aussi en Colombie-Britannique; l'anthracnose (Colletotrichum himantophylli Kabat & Bubak) sur Clivia miniata à Victoria, C. B.; la tache des feuilles (Curvularia lunata (Wakker) Boed.) sur des bulbes de glaïeuls dans le district de Montréal, Qué.; la tache des feuilles (Phyllosticta hydrangea Ell. & Ev.) sur l'hydrangée, à Québec, P. Q., et Winnipeg, Man.; la rouille (Chrysomyxa piperiana (Arth.) Sacc. & Trott.) sur Rhododendron californicum en Colombie Britannique; la pourriture des racines et des tiges (Rhizoctonia solani) des tulipes à Saanichton, C. B.; la tache des feuilles (Ascochyta violae Sacc. & Speg.) sur les pensées à Keating, C. B.; et la brûlure du zinnia (Alternaria zinniae) à Kentville, N.-E.

The Weather and its Influence on Diseases

The season on Vancouver Island, B. C., was abnormally dry from June to November. Rainfall at Saanichton in September was 0.17 in. compared with the average of 1.35 in. A mild winter resulted in little or no injury to overwintering crops or to ornamental shrubs. It was cool in May and June, and some damping-off of slow-growing seedlings occurred. The dry summer and fall stimulated powdery mildews, notably that of strawberries, but curbed most other foliage diseases. Late blight of potatoes was not seen (W. Jones).

On the lower mainland, the spring and early summer were unusually cool and June, in addition, was very wet. The rest of the summer and the fall were extremely dry. There was no winter injury to small fruits. Phragmidium rubi-idai was heavy on Washington raspberries, and powdery mildew of strawberries became epidemic before the fruit was ripe. Late blight of potato, which has not been of significance since 1949, started to develop early in the summer in a few locations, but the scarcity of inoculum and the dry weather from July onward prevented serious losses (R. E. Fitzpatrick).

In the Okanagan Valley, April and May were drier than usual, which may account for the light blossom infection by fire blight. Unusually heavy rains in June resulted in heavy apple scab infections at Salmon Arm and Penticton and are believed to be partly responsible for heavy powdery mildew of cherry on the upper benches at Penticton. Little rain fell from July to October and losses from late scab and bull's-eye rot of apple, late blight of celery, and downy mildew of onion were negligible (H. R. McLarty).

In the Creston Valley, the weather conditions of winter and early spring were normal, causing no injury or predisposition to disease. Late spring was cloudy and with prolonged wet periods. From late June to November the weather was very dry. Early apple scab, peach leaf curl and blossom blight were severe; but late scab and brown rot of cherry fruit were almost completely absent (M. F. Welsh).

At Saskatoon, Sask., temperature, rainfall and sunshine were high in May and normal in June. July was cool with high rainfall and normal sunshine. In August and September, temperatures were normal and high, respectively, rainfall was low and sunshine high. Humidity was abnormally high and evaporation low in every month from May to September. The season was generally uniform, with no extremes of any factor. Flax rust and potato black leg were heavy. Septoria leaf spots were again heavy on cereals, and take-all continued to be a problem in areas where a strict rotation is not followed. All these diseases reflect the fairly abundant moisture (T. C. Vanterpool).

In many other parts of Sask., rainfall was low until late August, although the heaviest rains occurred in the periods 9-30 June and 14-21 July. Warm, dry weather in early May allowed harvesting of the residue of the 1951 grain crop in much better condition than anticipated. In most districts, the soil was moist at seeding time, but in central Sask., particularly, continued dry weather caused uneven germination. Widespread rains in June speeded growth and by the middle of the month the wheat crop was 10-14 days ahead of 1951.

Stem rust appeared in s. e. Sask. in the second week of July, but infection remained light in spite of ideal conditions for its spread. Leaf rust developed fast in the same area and occurred on 80-100% of plants by late August. Dry weather then hastened maturity. The crop was of high quality and was harvested under excellent conditions (R. C. Russell).

In Essex Co., Ont., June to August, the critical period for crop growth and disease development, was unusually hot and dry, as the following tabulation for records at Harrow shows:

July-Aug. (incl.)	1949	1950	1951	1952
Total Rainfall (in.)	10.01	8.27	8.73	4.89
Mean Daily Max. (°F.)	84.08	80.24	80.02	83.79

These conditions significantly reduced the incidence and severity of black root rot of tobacco, stem canker of soybean, Septoria leaf spot of tomato and blue mould of tobacco. They also appeared to favour certain diseases, notably rust of alfalfa, brown root rot of tobacco, powdery mildew of cucurbits, dry root rot of field bean, and root rot of corn (L. W. Koch).

In the Niagara Peninsula, the first discharge of apple scab spores occurred on 22 April, and the main discharge 10-15 May, during which a 30 hour rain occurred. Other marked infection periods occurred on 20 and 24-25 May. Primary infection was seen on 28 May. June, July and August were dry and little further scab development occurred.

The weather was generally fine during the bloom of stone fruits and little blossom blight occurred. A shower at the end of the bloom period of sour cherries caused some stem and green fruit rot. Five days of wet or humid weather during harvest of the mid-season peaches initiated brown rot infection, and delays in marketing resulted in heavy losses. Little brown rot was seen in adequately sprayed orchards (G. C. Chamberlain).

At Ottawa, the temperature for January to April, inclusive, was milder than average, notably February with a mean of 20.8°F. (8°F. above average). Precipitation was normal, and snow cover adequate, in January and February, but rainfall was heavy in March and, despite considerable snow, the ground became bare at the end of the month. April was relatively dry. From May to September, inclusive, the temperature remained near normal without conspicuously hot or cool spells; the maximum for the year was 91°F. on 6 July. May and August precipitation was nearly twice the normal rainfall and that of June and July slightly above average. From 22 to 30 Aug. was the only rainless period exceeding 6 days from May to September. Sunshine was about 1 hr./day above average in April, June, July and August, much below average in May and normal in September. Although the sunny weather and low humidity allowed conspicuous development of some powdery mildews, the frequent rains stimulated many other foliage diseases. October was cool, but virtually rainless after the 14th, which facilitated late harvesting operations. November and December were very mild and such snow as fell melted quickly. Damage from ice or standing water seemed likely to be serious (D. B. O. Savile).

In the Quebec and lower St. Lawrence districts, Que., heavy snow cover persisted from late November to the end of March, and there was no killing of alfalfa and clover; but about Montreal, several thaws in December and January resulted in serious damage to meadows. Seeding was early in the Montreal region, but late in eastern Que. May and early June were cold and wet at Ste. Anne de la Pocatiere, and orchard spraying was difficult. Primary apple scab infection was consequently heavy. July and August were warm and relatively dry, although with adequate rain to allow good growth of all crops. No diseases became epidemic and cereal rusts were virtually absent. Late September and October were wet and cold, favouring late blight of potatoes and interfering with harvesting (A. Payette).

At Fredericton, N.B., January, February, and March were mild and cloudy, with abundant, continuous snow cover. Snowfall in February was 56.5 in., the highest on record. About 8 in. of snow remained at the end of March. Rainfall in April was 3.07 in., the mean temperature was above average, the St. John River opened on 13 April, and work started on the land on the 21st. Early May was fine, allowing a good start in seeding and planting on some farms; but heavy rains delayed work for the rest of the month and the first three weeks of June. May was very cloudy and slightly cooler than average, but June was slightly warmer than average. July was very warm, and sunshine was 65 hr. above average. Of 2.05 in. of rain, nearly all fell on 19-20 July. August was warm but with slightly more rain better distributed. September was cooler, with well-distributed rains, and root crops made excellent growth. October was wet and November relatively dry. Ploughing continued until 30 Nov. and the St. John River froze on 2 Dec. December was mild with considerable rain, but little snow. Apple scab spore discharges occurred on 7, 12, 21 and 22 May and primary infection was seen on 5 June. Spraying was difficult and, where coverage was not achieved on schedule scab was heavy. Potato stands were very uneven. The sudden drought starting late in June was serious for all crops except hay of which a bumper crop was harvested in good condition. The August rainfall did not fully alleviate the effects of the drought (J. L. Howatt).

In N.S., a heavy snowfall (154.6 in. at Kentville) provided abundant moisture in spring. Rainfall for May and June was slightly below average, but dull weather favoured disease and several wet spells made spraying difficult. Wet spring weather favoured the development of late blight from infected potato sets. The disease was found on a cull pile on 8 July, the earliest date on record. July was too dry to permit much spread; but August, with 5.21 in. of rain on 14 days, including 2.59 in. on 17 Aug., allowed considerable development; and a repetition of the epidemic of 1951 was feared. Ten days of dry weather in early September checked the disease, and light frosts on 9 and 15 Sept. killed foliage in some fields. Rains 10-20 Sept. allowed further serious spread in frost-free areas. Late September was dry, but dews were heavy enough to allow some spread. Although spraying was general after mid August; growth was rank and, owing to late planting, vines were succulent and highly susceptible. Control was therefore sometimes disappointing (J. F. Hockey, K. A. Harrison).

Almost continuous wet weather from late May to mid June delayed planting in P. E. I. and aggravated the severity of apple scab and several other foliage parasites. The small amount of frost in the ground caused volunteer potato plants to be numerous, but hot, dry weather from mid June until late in the season prevented what might have been a severe epidemic of late blight. Seed-piece decay and black leg were negligible, but potato scab was unusually severe. Fusarium wilt was found in one potato field, a further result of the warm, dry soil. Cucumber scab was very light, in contrast to 1951, as were smuts of oats and barley and crown rust of oats. Several cases of blossom-end rot of tomato and one of black heart of celery were reported late in the season (J. E. Campbell).

Notes on Some Nematode Problems, 1952

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The cyst-forming nematodes, belonging to the genus Heterodera, are plant parasites that are difficult to control, and once populations of these species have established themselves in a field eradication is usually considered practically impossible. In such cases control measures are aimed at the reduction of the nematode population, chiefly by suitable crop rotations, and, to a lesser extent, by fumigation. The cost of fumigation must be balanced against the value of the crop, and, when the same measure of control may be obtained by less expensive cultural methods, it is not recommended. Many of these species are responsible for important crop loss, and this, coupled with the known difficulty of control, tends to focus a justified interest in new outbreaks of these pests and the status of those already established within our borders.

The sugar-beet nematode, Heterodera schachtii Schmidt, 1871, did not spread appreciably in Ontario in 1952, but in the Sarnia area the populations remained at a high level. Steps have now been taken to enforce recommendations for adequate crop rotation more thoroughly. New host records for this species from Sarnia, Ontario, were obtained by R. H. Mulvey in 1952. These were Swiss chard, Beta cicla., and horseradish, Armoracia lapathifolia. This species has not yet been recorded in Canada in any province except Ontario. The oat nematode, Heterodera avenae Lind, Rostrup, and Ravn, 1913, is more widely distributed in Ontario but does not occur in areas where the sugar-beet nematode is found. The indications are that this nematode is continuing to spread and continuing to cause crop loss of importance. The oat nematode is not found elsewhere in North America. The wheat nematode, Heterodera punctata Thorne, 1928, was named and described from specimens found in wheat in Saskatchewan and Alberta. The present status of this pest in the Western Provinces is unknown. The pea nematode, Heterodera goettingiana Liebscher, 1892, was identified from British Columbia in 1952, and possibly an additional form is present there; this may be Heterodera schachtii var. trifolii Goffart, 1932, although the host plants recorded make the situation somewhat obscure. In examinations of clover plants growing on the Central Experimental Farm at Ottawa

Miss G. L. Brown of the Ottawa laboratory discovered a few nematode cysts that have been tentatively identified as of the same variety, trifolii. Heterodera rostochiensis Wollenweber, 1923, has not been recorded in Canada, but an important interception of this pest was made recently by officers of the Canada Division of Plant Protection from soil containing ornamentals belonging to a passenger from Germany. Specimens of Heterodera cacti Filipjev and Schuurmans Stekhoven, 1941, were previously intercepted on cactus plants.

Nematodes belonging to the genus Ditylenchus include many species of important plant parasites. In the past the bulb and stem nematode, Ditylenchus dipsaci (Kühn, 1857) Filipjev, 1936, has been recorded from many plant hosts, but it is now rather generally recognized that a number of distinct species are involved, although most of them have not yet been named and described. In 1945 Thorne redescribed dipsaci from teasel and also a new species from potato that he named destructor. At the same time he recognized that several additional species remained in this complex and still awaited identification. Ditylenchus destructor Thorne, 1945, was reported from Prince Edward Island in 1946, and since that time considerable attention has been focused on this outbreak. However, the earlier apprehension in regard to this pest has greatly declined, and it has been difficult to find land sufficiently infested for experimental purposes. In addition, vigorous regulatory measures are proving effective. There are records of Ditylenchus dipsaci from Ontario, British Columbia, New Brunswick, and Alberta attacking a variety of plants. It is probable that these records represent the activities of more than one species. Ornamentals are not infrequently attacked, particularly in greenhouses, and a form of this species complex attacks alfalfa in Alberta.

During our experiments at the Ottawa laboratory it has been noticed that the populations of the potato-rot nematode in potato tubers exhibit a remarkably wide range of characters, and the possibility should be recognized that more than one species may be involved in these infestations. At least in other parts of the world it seems rather evident that more than one species of the dipsaci complex will feed and develop in potato tubers. The variation of morphological characters of what is presently called destructor, when the potato populations are transferred to other host plants, is referred to by Thorne in the Proceedings of the International Nematology Symposium held at Rothamsted, England, in 1951. The possibility of these variations representing a food response warrants careful consideration, but at least equal consideration of the possibility that more than one species is involved in these populations requires careful attention. It has been reported both from British Columbia and from England that evidence from reciprocal transfers of potato-iris nematode populations shows that the iris nematode is identical with Ditylenchus destructor from potato. This may be the case, but, until the identities of the potato populations and of the iris populations have been more clearly established, these reports should be accepted with these reservations.

Other injurious species of Ditylenchus in Canada are represented by Ditylenchus radicicola (Greeff, 1872) Filipjev, 1936, and Ditylenchus graminophilus (Goodey, 1933) Filipjev, 1936. There has been no report of the first species since it was first found in Saskatchewan by Vanterpool in 1948. Present indications are that the second of these species is rather widely distributed in the Province of Quebec, and there is one record of this pest from Manitoba.

Pratylenchus pratensis (de Man, 1880) Filipjev, 1936, in the past has been called the meadow nematode, but this is also a complex involving several species, not all of which attack meadow crops. These are now more accurately referred to as root-lesion nematodes, and the group is now undergoing considerable revision. Thorne redescribed Pratylenchus pratensis from specimens collected in the type locality. In 1952 this species was found causing damage to red clover on the Central Experimental Farm, Ottawa. Specimens of root-lesion nematodes were examined from tobacco and peach soil from Harrow, Ontario, and it is evident that these soils contain at least two species of Pratylenchus other than pratensis, although the latter may also be revealed with further collecting. Root-lesion nematodes appear to be rather prevalent in Ontario and have been previously recorded in Manitoba and British Columbia.

A grass nematode, Anguina agrostis (Steinbuch, 1799) Filipjev, 1936, is known to occur in both Nova Scotia and Saskatchewan but may be more widely distributed than these records indicate, as no special search has been made for this pest. During 1952 this species was intercepted on plants and seed coming from New Zealand and Germany.

Root-knot nematodes belong to the genus Meloidogyne. Until Chitwood made his revision of this group in 1949 all these forms were considered as a single species. The situation in regard to these new species is not yet completely clarified, and neither is there an adequate picture of the species of this genus that may be present in Canada. Meloidogyne hapla Chitwood, 1949, is present in Canada and may be the commonest species here, but sufficient records are not yet available to warrant a definite conclusion. Meanwhile, records continue to accumulate of "root-knot nematodes" from Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, and British Columbia. Interceptions of these pests on plants from foreign countries are made from time to time.

Aphelenchoides ritzema-bosi (Schwartz, 1911) Steiner, 1932, was identified in 1952 attacking chrysanthemums in a private garden at Sarnia, Ont. This pest is more frequently reported in Canada from greenhouse plants. Aphelenchoides fragariae (Ritzema Bos, 1891) Christie, 1932, had been previously recorded from Ontario and British Columbia, and Aphelenchoides parietinus (Bastian, 1865) Steiner, 1932, is probably rather widespread. The latter species appears to be another complex, and also Aphelenchus avenae Bastian, 1865, which is encountered very frequently. The importance of these two species is doubtful.

Probably because of their large size, specimens of mermithids and of gordians arouse the interest of collectors and are sent in to the Ottawa laboratory from time to time. Species of mermithids were received in 1952 from a number of localities in Ontario and from one in Nova Scotia. Gordians were received from Ontario and Quebec.

Phenological Data - 1952

The spring of 1952 was extremely early at Winnipeg and moderately early at Saskatoon and Edmonton. Toward the end of the growing season, some of the summer flowers bloomed at about the normal time, but the majority came into bloom somewhat early.

The development of the wheat recorded in the accompanying table was influenced by the time it was sown. At Winnipeg it was early throughout the growing season. At Saskatoon it was sown and matured a little late. At Edmonton it was sown rather early and emerged early but cool weather toward the end of the season appeared to delay its maturity (R. C. Russell).

Anthesis dates at Ottawa, with number of days departure from average, were as follows. Marker plants are shown by an asterisk.

*Acer saccharinum	12/4	1L	Bromus inermis	16/6	2E
Populus tremuloides	18/4	2L	Sambucus nigra	18/6	1L
*Ulmus americana	21/4	4E	Rhus typhina	21/6	3E
*Acer negundo	27/4	1E	Catalpa speciosa	4/7	6L
*Acer saccharum	8/5	N	Phleum pratense	24/6	N
Prunus pensylvanica	8/5	5E	*Tilia americana	6/7	1L
Smilacina stellata	26/5	7L	Cephalanthus occidentalis	16/7	3E
*Pinus sylvestris	27/5	1E	Solidago canadensis	28/7	3E
Anemone canadensis	4/6	1L	Cassia hebecarpa	13/8	14L
*Carya cordiformis	8/6	5E	*Hamamelis virginiana	19/9	6E

(I. J. Bassett)

SUMMARY OF PHENOLOGICAL DATA TAKEN AT WINNIPEG, SASKATOON, AND EDMONTON, IN 1952

Species	Winnipeg		Saskatoon		Edmonton	
Pulsatilla ludoviciana	15/4	6L	15/4	3E	22/4	?
Populus tremuloides	15/4	10E	18/4	6E	22/4	3E
Corylus americana	15/4	?	---	--	---	--
Phlox hoodii	---	--	25/4	2E	---	--
Salix petiolaris	---	--	24/4	9E	25/4	?
Acer negundo	21/4	15E	24/4	12E	25/4	7E
Betula papyrifera	---	--	27/4	12E	1/5	7E
Thermopsis rhombifolia	---	--	27/4	13E	---	--
Amelanchier alnifolia	28/4	18E	28/4	15E	7/5	8E
Prunus americana	26/4	17E	---	--	---	--
Prunus pennsylvanica	---	--	30/4	18E	10/5	7E
Viola rugulosa	---	--	10/5	11E	19/5	2E
Smilacina stellata	---	--	14/5	9E	22/5	5E
Prunus melanocarpa	3/5	20E	13/5	13E	19/5	8E
Crataegus sp. (hawthorn)	1/5	21E	12/5	15E	22/5	8E
Viburnum lentago	13/5	20E	---	--	---	--
Cornus sp. (dogwood)	---	--	14/5	15E	26/5	6E
Elaeagnus commutata	---	--	20/5	14E	26/5	9E
Lonicera glaucescens	---	--	25/5	13E	22/5	16E
Viburnum pubescens	23/5	17E	---	--	---	--
Viburnum trilobum	18/5	21E	---	--	---	--
Achillea lanulosa	---	--	2/6	7E	24/6	2E
Anemone canadensis	24/5	13E	16/6	6L	24/6	1E
Maianthemum canadense	---	--	---	--	2/6	?
Diholcos bisulcatus	---	--	29/5	13E	---	--
Galium boreale	---	--	3/6	10E	19/6	N
Rosa alcea	---	--	11/6	8E	---	--
Bromus inermis	12/6	8E	22/6	2E	18/6	9E
Chrysopsis sp. (golden aster)	---	--	18/6	12E	---	--
Spiraea alba	---	--	7/7	6L	---	--
Symphoricarpos occidentalis	17/6	7E	10/7	6L	4/7	N
Phleum pratense	---	--	---	--	4/7	3E
Lactuca pulchella	---	--	27/6	11E	---	--
Chamaenerion spicatum	---	--	27/6	7E	5/7	4E
Agastache anethiodora	---	--	---	--	15/7	4L
Solidago canadensis	---	--	---	--	22/7	3L
Grindelia perennis	---	--	13/7	10E	---	--
Aster conspicuus	---	--	---	--	22/7	?
Oligoneuron canescens	---	--	18/7	8E	---	--
Aster laevis	---	--	19/7	11E	1/8	1L
Wheat-sown	15/4	11E	2/5	4L	23/4	6E
emerged	---	--	15/5	4L	4/5	6E
headed	14/6	13E	1/7	N	---	--
ripe	23/7	13E	14/8	5L	28/8	12L

I. DISEASES OF CEREAL CROPS

WHEAT

ERGOT (Claviceps purpurea) infection was 27-tr./484 fields of spring wheat in Alta. (P. M. H., T. R. D.); a mod. infection was noted in a field at Winterburn, w. of Edmonton (A. W. Henry). Ergot was observed or reported from four places in Sask.; the disease was heavy at Unity. Many agriculturalists believe that ergot on wheat is increasing (T. C. Vanterpool). A trace of ergot was recorded in R. L. 2622 in the plots at Ste. Anne de la Pocatiere, Que. (L. J. Coulombe). Up to 1% of the heads were infected by ergot in a field of Cascade at Andover, N. B. Couch grass growing at the edges of the field as well as some plants in the field were also infected. Examination of rodrow trials of spring wheat at Jacksonville, near Woodstock, revealed up to 2% of heads of Cascade affected by ergot while Huron, Redman, Coronation and Acadia were free of ergot (S. F. Clarkson).

POWDERY MILDEW (Erysiphe graminis). Infection was 11-tr. 1-sl./30 fields of winter wheat in s. Alta. and 38-tr. 8-sl. 6-mod./484 fields of spring wheat in Alta. Powdery mildew was much more prevalent in southern than in central and n. Alta. (P. M. H., T. R. D.). Powdery mildew was observed only once in Sask., when a mod. infection was seen in a seed plot at Tisdale in late July (H. W. M.). A sl. infection was observed on Kharkov at Saskatoon, where I do not recall seeing powdery mildew on wheat before. The disease was common on several varieties of wheat and barley at Kylemore according to F. J. Greaney and D. McLean (T. C. Vanterpool). See also under Rust Nurseries.

HEAD BLIGHT (Fusarium spp.). In the 4 samples examined, only a few spikelets were infected in each; the following species of Fusarium were isolated: Elie, Man., durum wheat - F. culmorum; Pilot Mound, Man., common wheat - F. culmorum; Fredericton, N. B., Little Club - F. avenaceum; and Charlottetown, P. E. I., Marquis - F. poae and F. avenaceum (W. L. Gordon). Traces of head blight were observed in the plots at Ste. Anne de la Pocatiere, Que. (L. J. Coulombe).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Infection was 2-tr. 2-sl./30 fields of winter wheat in s. Alta., and 142-tr. 189-sl. 49-mod. 6-sev./484 fields of spring wheat in Alta. (P. M. H., T. R. D.). Common root rot was mod. to sev. in one replicate in a yield test of a Rescue x Golden Ball hybrid at Lethbridge. The disease was most pronounced in late-emerging plants (M. N. Grant).

Common root rot in wheat was less severe in Sask. in 1952 than in any year since 1942. The mean disease rating for 126 fields was 7.46 compared with 13.66 for 1951. Though data on actual losses in yield are not available, it is believed that the lesions on the roots had little effect on yield this year, when the temperature conditions were equable and moisture reserves in the soil were abundant. The crop was exposed to no adverse conditions except in a relatively small portion in the Saskatoon--North Battleford areas. Disease ratings for crop districts 1-6 and 9 respectively were 6.7, 4.3, 9.2, 9.3, 6.1, 8.0, and 10.6. Ratings for districts 7 and 8 were not available. Preliminary

estimates of wheat yields for the 9 crop districts were: 21.0, 26.3, 24.2, 24.3, 26.2, 24.8, 27.9, 26.1, and 27.1 bushels per acre.

A survey was also made in the three Prairie Provinces on the occurrence of common root rot in wheat. Two sets of data were taken in the field, (a) percentages of plants with severe lesions on the subcrown internodes, and (b) percentages of plants with lesions at or just above the crown. The former percentages were converted to disease ratings on the basis of laboratory examination of samples from every fourth field. The ratings normally give some indication of the reduction of yield caused by common root rot, but the yield appears to have been little affected this year because most of the crop was not subjected to adverse growing conditions.

Table 1. Disease ratings on subcrown internodes and percentages of plants with crown lesions compiled according to province and soil zone.

		Soil Zones				Provincial totals or means
		Brown	Dark Brown	Black	Grey	
Alta.	No. of fields	9	18	40	5	72
	Disease rating	9.0	7.5	5.5	5.2	6.4
	Crown lesions	32.8	42.8	31.0	23.0	33.6
Sask.	No. of fields	23	58	45	0	126
	Disease rating	9.2	6.7	7.6	--	7.5
	Crown lesions	32.8	39.7	35.6	--	37.0
Man.	No. of fields	0	0	51	0	51
	Disease rating	--	--	6.8	--	6.8
	Crown lesions	--	--	35.4	--	35.4
All Provinces	No. of fields	32	76	136	5	249
	Disease ratings	9.2	6.9	6.7	5.2	7.2
	Crown lesions	32.8	40.4	34.2	23.0	35.7

The disease ratings do not differ greatly from province to province and are influenced to a considerable degree by the proportions of the various soil types in each province (Table 1). The brown soil zone in s.w. Sask. and s.e. Alta. with an average disease rating of 9.2, was the most severely affected. The dark soil zone, which is largely confined to Alta. and Sask., shows a similar amount of disease to that found in the black soil zone, which extends across all three provinces. The grey soil zone was entered only briefly in Alta. and the 5 fields visited are insufficient for drawing conclusions. In Table 2, the disease rating was 7.2 in crops on fallow land compared with a rating of 6.3 on stubble; the difference in the ratings was consistent for the various soil zones. (B. J. Sallans).

Table 2. Disease ratings on subcrown internodes and percentages of plants with crown lesions compiled according to crop sequence and soil zone.

Place in rotation		Soil Zone: Brown	Dark Brown	Black	Grey	Totals or means
Fallow	No. of fields	18	59	112	3	192
	Disease rating	9.7	7.1	6.9	7.1	7.2
	Crown lesions	34.2	40.9	34.4	18.3	36.1
Stubble	No. of fields	14	17	24	2	57
	Disease rating	8.4	6.0	5.5	2.5	6.3
	Crown lesions	31.1	38.5	32.9	30.0	34.0

TAKE-ALL (Ophiobolus graminis) infection was 2-tr. 4-sl./30 fields of winter wheat in s. Alta. The disease was generally distributed through the winter wheat plots at Creston, B.C. (P.M. Halisky). Infection was 47-tr. 52-sl. 22-mod. 5-sev./484 fields of spring wheat examined in Alta. Take-all was unusually prevalent in 1952. In one sev. affected field of Canus at Nobleford, the damage was more pronounced in a third-year continuous wheat crop than in an adjacent second-year crop. (P.M.H., T.R.D.). The disease was more prevalent than usual in central Alta. Fields at Lacombe, Didsbury, and Blackie were sev. damaged. It was reported as far north as Hines Creek. The fungus fruited more commonly than usual (A.W. Henry).

Take-all was more prevalent and severe than usual, being present in s.e. and n.w. Sask. and on the Regina plains. It was reported in 17 out of 126 fields examined. Individual fields at Whitewood, Delmas, and Highgate showed 30, 15, and 10% of the plants diseased (H.W.M.). Take-all was present in a large number of fields and is still a problem in areas where a strict rotation is not followed (T.C. Vanterpool).

BASAL GLUME ROT (Pseudomonas atrofaciens). Trace infections were observed in two fields at Wellwyn and Hirsch in s.e. Sask. (H.W.M.). A sl. infection was observed in several localities in Man.; pathogenic isolates 4023 and 4063 were obtained (W.A.F. Hagborg).

STRIPE RUST (Puccinia glumarum). Infection was 1-tr. 2-mod./30 fields of winter wheat and 2-tr. 2-mod. 1-sev./124 fields of spring wheat in s. Alta. Stripe rust was prevalent on winter wheat in the Creston valley, B.C., in mid-July. By early August a mod. infection developed on some of the soft-wheat hybrids at Lethbridge, Alta. (P.M. Halisky). Stripe rust was not observed elsewhere in Alta. (T.R.D.). See also under Rust Nurseries.

STEM RUST (Puccinia graminis). Infection was 1-tr. 1-mod./30 fields of winter wheat observed in s. Alta. It was first observed on Kharkov and

Jones Fife in the Lethbridge plots on 5 August (J. E. Andrews). Infection was 17-tr. 4-sl. 4-mod. 1-sev./124 fields of spring wheat examined in s. Alta. Stem rust was generally distributed throughout s. e. Alta. It was prevalent in irrigated fields and caused sev. damage to a few late stands of Lehmi soft wheat (P. M. Halisky). Elsewhere infection was 2-tr. 2-sl. at widely scattered points in central Alta. (T. R. D.).

First reports of stem rust were from s. e. Sask. about 12 July. A survey of the area 15-18 July revealed a very light infection. In late July and early August stem rust was found in all fields between Moose Jaw and the Man. boundary via Weyburn, Estevan, and Carlyle, being present on 90% of stems in most fields. Later, stem rust was found west of Swift Current and as far north as Green Lake (H. W. M.).

Traces of stem rust were recorded on a few varieties in winter wheat plots at Ste. Anne de la Pocatiere, Que. (L. J. Coulombe). Only a tr. of rust was noted in York Co., N. B. (J. L. Howatt) and in Queens Co., P. E. I. (R. R. Hurst). For a general review of stem rust, and the races involved, see under Rust Nurseries and Physiologic Races. Since the former report was written, it has been estimated that the yield loss caused by leaf rust and stem rust to common wheat in Man. amounted to about 15% and that two-thirds of this loss was caused by leaf rust.

LEAF RUST (Puccinia triticina). Infection was 13-tr. 3-sl. 2-mod. 3-sev./30 fields of winter wheat in s. Alta., where it was first observed in mid-June. A sev. infection developed in late September on early-sown young stands (P. M. H.). Infection was 99-tr. 77-sl. 50-mod. 19-sev./484 fields of spring wheat examined in Alta. (P. M. H., T. R. D.). Leaf rust was not observed at the substation, Whitehorse, Yukon (G. B. Sanford). Leaf rust was found in all districts of Sask. but it was particularly sev. in s. e. Sask., where the stems also became sev. infected. Infection was 22-tr. 58-sl. 24-mod. 21-sev./168 fields. Although leaf rust was present on all fields of common wheat in the Elrose and Swift Current areas, it was not observed on durum wheat in these areas (H. W. M.).

Leaf rust was heavy on winter wheat in the plots at Ste. Anne de la Pocatiere, Que., infection being up to 50% on Rideau (L. J. Coulombe). A sev. infection of leaf rust was observed in wheat in Queens Co., P. E. I. (R. R. Hurst). See also under Rust Nurseries.

BROWNING ROOT ROT (Pythium spp.) Infection was sev. on a crop of wheat at the Station, Scott, Sask.; on this land the crop and fallow strips have been alternated since 1935, without the addition of manure or fertilizer containing phosphate in the interval according to H. Friesen. Its development under these circumstances is to be expected. The disease was also observed on Marquis, a slightly more susceptible variety than Thatcher, on summer-fallow at Kindersley. Cf. Sci. Agr. 32:443-452. 1952. (T. C. Vanterpool).

SNOW MOULD (Sclerotinia sp. indet.) Sev. damage was reported in fields of winter wheat near Vanderhoof, B. C. Specimens yielded only a low-temperature Sclerotinia identical with the fungus isolated from grasses damaged in the plots at Prince George in 1951 (P. D. S. 31:39). Additional damage was not observed in these plots in 1952 (M. W. Cormack).

SPECKLED LEAF BLOTCH (Septoria avenae f. triticea). Infection was 143-tr. 116-sl. 42-mod. 11-sev./484 fields of spring wheat examined in Alta. (P. M. H., T. R. D.). The disease was not observed at the Substation, Whitehorse, Yukon (G. B. Sanford). A mod. infection was noted in fields in the Lloydminster, Alameda and Meadow Lake areas in Sask.; it evidently caused some loss in yield because the kernels were shrunken (H. W. M.). Septoria diseases were again relatively severe in Sask. in 1952. Many of the leaf samples bearing spots even from fairly young plants proved to be caused by Septoria when the material was incubated. Although the moist season may account for the prevalence of these diseases in 1952, the evidence suggests their greater prevalence may be due to more inoculum being present, since more stubble is left on the surface of the soil with the introduction of the combine. In a sample from Wiseton received 25 June, perithecia were observed on one small piece of stubble although the ascospores were not fully delimited. Most of the infection was probably due to S. avenae f. triticea, but S. tritici was present on leaves of Kharkov winter wheat collected in the plots at Saskatoon on 29 July. (T. C. Vanterpool). See also under Rust Nurseries. T. E. Summers and D. H. Bowman (U. S. D. A. Pl. Dis. Reporter 37(3):142-147. 1953) report leaves of wheat severely affected by S. nodorum-like pycnidia and pycnidiospores in Mississippi, but S. tritici was not observed on the material examined. In fact S. nodorum was found on leaves, culms, and glumes of certain wheats. (I. L. C.).

NODE REDDENING. A conspicuous reddening of the lowest two or three nodes was reported by the Agricultural Representative from Colonsay, Sask. Isolations yielded two fungi, tentatively identified as Septoria sp. and Fusarium sp. No bacteria were observed (T. C. Vanterpool).

GLUME BLOTCH (Septoria nodorum). Infection was 108-tr. 75-sl. 26-mod. 18-sev./484 fields examined in Alta. As in 1951, the disease was much more prevalent than usual, especially in central Alta. (P. M. H., T. R. D.). A mod. infection was found in the Lloydminster and Alameda areas of Sask. Small samples of affected heads from 4 widely scattered points in Sask. The loss in yield is unknown (H. W. M.). See also under Rust Nurseries.

SPECKLED LEAF BLOTCH (Septoria spp.) Infection was 3-tr. 3-sl./30 fields of winter wheat examined in s. Alta. (P. M. H.). A sl. -mod. infection was noted in the winter wheat plots at Ste. Anne de la Pocatiere, Que. (L. J. Coulombe). See also under Rust Nurseries.

DWARF BUNT (Tilletia brevifaciens G. W. Fischer). A few plants were found affected in a field of Kharkov at Creston, B. C. No dwarf bunt was found in s. Alta. (P. M. Halisky). The disease is already known from the Armstrong-Enderby district in B. C. (P. D. S. 11:6 and 23:3-4).

Dwarf bunt was discovered in Ont. in 1952, when it was found in early August in a field of Cornell 595 at Keswick, York Co. A second infected field of the same variety was reported by Dr. Blair H. MacNeill, O. A. C., Guelph, in the same area. In the original field, infection was confined to the edge of the field, where it was estimated that 0.1% of the heads were affected.

Affected culms were 11-24 in., av. 18.7 in. in height and healthy culms were 24-45 in., av. 39.8 in. The bunt balls were noticeably weathered, resulting in large masses of spores being smeared on the glumes and rachis of the spike. These spore masses are readily wetted with water. In Shear's mounting fluid the gelatinous sheath about the spore is readily demonstrated. An examination of 144 samples of commercial and seed grades of winter wheat, 106 samples by us and the rest by Miss Jean E. Newman, Plant Products Division, Production Service, revealed spores of T. brevifaciens present on 4 samples as follows: one of Cornell 595 from Minesing, Simcoe Co., two of the same variety from Omemee, Victoria Co., and one of Rideau from Belleville, Hastings Co. The latter sample contained a bunt ball of dwarf bunt. A fuller account of this survey for dwarf bunt will appear in the Can. Jour. Agr. Sci. (I. L. Conners and A. J. Skolko).

BUNT (Tilletia caries and T. foetida). The data presented in Table 3 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 were again low and the figure for the previous crop year was also lower than was to be expected from the data for the first quarter (P. D. S. 31:4).

Table 3. Wheat bunt in Western Canada

Class of Wheat	Aug. 1, 1951 to July 31, 1952. Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty	Aug. 1 to Oct. 31, 1952. Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty
Hard Red Spring	239,964	101	0.04	63,506	60	0.09
Amber Durum	6,993	10	0.14	2,027	3	0.15
White Spring	314	0	0.00	72	0	0.00
Alberta Red Winter	373	9	2.41	191	4	2.09
Garnet	1,162	0	0.00	236	1	0.42
Mixed Wheat	306	0	0.00	56	0	0.00
All classes	249,112	120	0.05	66,088	68	0.10

Bunt infection was 5-tr./30 fields of winter wheat examined in s. Alta. (P. M. Halisky). Infection was 3-tr. 1-sl. and 2-mod./484 fields of spring wheat examined in Alta. The tr. infections were found in the Peace River District; the other infected fields were in s. Alta. (P. M. H., T. R. D.). Bunt was found in only 4 fields out of 175 examined in Sask. Infection was tr. in 2 and between 3-10% in 2 (R. C. Russell). A trace of bunt was found in one field out of 105 examined in Man. and e. Sask. (W. J. Cherewick).

When the samples of winter wheat of Ont. origin were being examined for dwarf bunt (q. v.), it was noted that most of the samples were contaminated with spores of T. foetida. Among the 94 commercial samples examined, only 12 were free of bunt spores and some 54 contained bunt balls as well as carrying a heavy spore load. T. caries was relatively scarce being present in but 12 samples of the 144 examined and then only in trace amounts.

When the Grain Inspection records for Eastern Canada were tabulated, it was found that for the first quarter of the current crop year (Aug. 1 to Oct. 31, 1952) 8.7% (121,000 bu.) of the white winter wheat and 6.0% (172,000 bu.) of all winter wheat inspected had graded smutty. Indeed, the losses have been high since 1945-46. (I. L. Conners, A. J. Skolko).

LOOSE SMUT (Ustilago tritici). Infection was 12-tr. 1-sl./484 fields of spring wheat examined in Alta. (P. M. H., T. R. D.). A tr. was found in 2 fields out of 175 examined in Sask. (R. C. Russell). Out of 105 fields of wheat examined in Man. and the e. half of Sask. loose smut infection ranged from 0 to 3.5%, av. 0.2%. Fields of Lee wheat accounted for most of the loose smut.

BACTERIAL BLACK CHAFF (Xanthomonas translucens). Infection was 1-tr. 1-mod./30 fields of winter wheat and 9-tr. 3-sl./124 fields of spring wheat examined in s. Alta. Exudate was apparent on leaf lesions in one field of spring wheat (P. M. Halisky). The disease was common around Edmonton and elsewhere in central Alta. in fields of Thatcher and Saunders; infection was tr-mod. (A. W. Henry). A sl.-mod. infection attributed to X. translucens was noted on the leaves of Kharkov in the plots at Saskatoon, Sask.; bacterial ooze was present on the lesions (T. C. Vanterpool).

STREAK MOSAIC (virus) was found on both winter and spring wheat in southern Alta. in 1952. The disease is apparently identical with the wheat streak that has caused damage in some winter wheat areas in the great plains region of the United States. The disease was originally described by H. H. McKinney (U. S. D. A. Circ. 442. 1937). The symptoms of the disease are greenish yellow to yellow, interrupted or fairly continuous, streaks in the leaves parallel to the veins. Entire leaves may become chlorotic. Affected plants are usually stunted, and the yield and quality of the grain is reduced.

Severe damage from streak mosaic was observed in several fields of winter wheat in the Cardston and Pincher Creek districts of Alta. and in some fields the crop was not worth harvesting. These latter fields were sown early in August 1951 near crops already infected. Other fields suffered reduction in yield, but the losses became progressively less the longer seeding was delayed. Some mosaic-infected plants were present in late fields, but the losses were negligible. Streak mosaic was also found in many fields of spring wheat in areas where winter wheat was grown. Infections sufficiently heavy to cause severe damage occurred only in spring wheat growing near infected winter wheat.

In the fall of 1952, streak mosaic occurred in many fields of winter wheat sown in August and early September. Volunteer wheat plants growing in either summerfallow or stubble fields have proven a real menace to the crop. These plants become infected with the disease in late summer or early fall and are the sources of infection of early-sown crops of winter wheat in the vicinity. The virus was readily transmitted mechanically in the greenhouse (J. T. Slykhuis).

CHLOROTIC BANDING (high temperature at soil surface) caused sl. damage in a field at Humboldt, Sask., about 21 May. The crop was also sown too deep; as a result, the seedlings were weak and emerged late, probably aggravating the trouble (T. C. Vanterpool).

HEAD DISCOLORATION (cause unknown). Some 10% of the glume area was darkened on 40 and 60% of the heads in two fields at St. Francois Xavier and St. Eustache, Man. (W. A. F. Hagborg).

NITROGEN DEFICIENCY was suspected in fields located on heavy clay at Kindersley and Estonia, Sask. The plants were yellow and growth poor. The condition was probably brought about by incorporation of too much trash. Following a year of heavy straw growth and a return to the land of practically all the straw in combine-harvesting, nitrogen deficiency might become a problem in fields where there is insufficient moisture to rot the straw fairly quickly. During the last 2 years wheat on stubble has given a good response to applications of 16-20-0 fertilizer in some localities in the brown soil zone in w. central Sask. (T. C. Vanterpool).

2,4-D DAMAGE. Severe damage was observed in fields of Saunders wheat that had been sprayed by aircraft with a mixture of 2,4-D in diesel fuel oil. In one field of Saunders, 98% of the culms were a pronounced purple colour. The pigmented stems usually bore bleached spikes with sterile florets and yields were greatly reduced (P. M. Halisky). Some 5 cases of 2,4-D injury in Sask. were brought to the writer's attention. In some instances, the yield would be reduced (T. C. Vanterpool).

WINTER INJURY. Several hundred acres of winter wheat in the Armstrong-Enderby district, B. C., showed injury in the spring. In some fields, the injury was so extensive they were plowed up and replanted to some other crop. Patches of wheat up to several acres in extent were completely wiped out. In others, the plants survived but produced only a few tillers with few secondary roots. Uninjured plants produced numerous tillers and roots. The injury appeared to be caused by heavy winter snows that did not completely disappear until 1 April. The fields were still under a foot or more of snow on 1 March and were still under snow during mild growing weather (G. E. Woolliams). The possibility that the injury was due to snow mould (q. v.) does not seem to have been investigated (I. L. C.).

OATS

ANTHRACNOSE (Colletotrichum graminicola). Mod. damage was reported in a 20-acre field at Buffalo Lakes, Alta. (A. W. Henry).

POWDERY MILDEW (Erysiphe graminis). Sl. infection was observed on Eagle in the University plots, Vancouver, B. C. (H. N. W. Toms). Tr. infection in 2 fields in Alta. (T. R. D.).

COMMON ROOT ROT (Fusarium spp.). Infection was 24-tr. 10-sl./303 fields examined in Alta. (P. M. H., T. R. D.).

LEAF BLOTCH (Helminthosporium avenae). Traces were observed in the plots at Ste. Anne de la Pocatiere, Que. (L. J. Coulombe).

HALO BLIGHT (Pseudomonas coronafaciens). Infection was 149-tr. 46-sl. 6-mod./303 fields examined in Alta. Halo blight was more prevalent and far more sev. in n. Alta. than elsewhere in Alta. The disease tended to decrease gradually in prevalence and severity from n. to s. with only one infected field seen in s. Alta. (P. M. H., T. R. D.). Halo blight affected a trace to 60% of the leaf surface in fields observed in Man. Pathogenic isolates 4017 and 4072 were obtained (W. A. F. Hagborg).

STRIPE BLIGHT (Pseudomonas striafaciens) affected 30% of the leaf area in a field at Pipestone, Man.; pathogenic isolate 4066 was obtained. A sample of sev. diseased plants were received from Nipawin, Sask.; isolates 4019 and 4058 were made (W. A. F. Hagborg).

CROWN RUST (Puccinia coronata) was heavy on M. C. 433 in the Quebec Seed Board plots at Ste. Anne de la Pocatiere on 8 Aug. and mod. plus on Abegweit and Vanguard at St. Flavien on 13 Aug. (D. Leblond). Infection was sl. -mod. in the plots at Ste. Anne de la Pocatiere (L. J. Coulombe). Only a few infected fields were noted in York, Carleton, and Victoria counties, N. B. (J. L. Howatt). Crown rust was very light at Kentville, N. S. (D. W. Creelman) and throughout P. E. I. (D. B. Robinson). See also Rust Nurseries and Physiologic Races.

STEM RUST (Puccinia graminis). A tr. of rust was observed on Eagle in the University plots, Vancouver, B. C. (H. N. W. Toms). Stem rust was widespread in Kings Co., N. S., infection ranging from tr. to 50% (D. W. Creelman). See also Rust Nurseries and Physiologic Races.

BROWNING ROOT ROT (Pythium sp.) was observed on 23 June at Nora, Sask. The damage to the roots was heavy for oats. P. debaryanum types were most commonly isolated (T. C. Vanterpool).

SPECKLED LEAF BLOTCH (Septoria avenae). Infection was 50-tr. 23-sl./303 fields examined in Alta. (P. M. H., T. R. D.). Speckled leaf blotch affected most varieties in the plots at Ste. Anne de la Pocatiere, Que., infection ranging up to 25-30% of the leaf area. (L. J. Coulombe). The disease was observed at 2 places in Kings Co. and in the plots at Nappan, N. S. Infection averaged about 20% (D. W. Creelman, K. A. Harrison). Speckled leaf blotch caused about 10% lodging in a field of Abegweit at New London, P. E. I. Most varieties are susceptible, but Abegweit is one of the more susceptible (G. W. Ayers). Stem symptoms were observed at Long River (D. N. Robinson). See Rust Nurseries.

SMUTS (Loose Smut, Ustilago avenae and Covered Smut, U. kolleri). Loose smut was found in one field of Winter Turf in N. Saanich, B.C. (W. Jones). Smut infection was 25-tr. 22-sl. 6-mod. 5-sev./303 fields examined in Alta. (P.M.H., T.R.D.). Only 3 fields were examined in Sask., but a tr. occurred in two (R.C. Russell). Of the 154 fields of oats surveyed in Man. and in the e. half of Sask., smut infection ranged only from 0 to 4.0%, and averaged 0.3% (W.J. Cherewick). A tr. of loose smut was found in a block of M.C. 2639 inspected at Macdonald College, Que. (H. Genereux) and this variety and several others were affected by smut in the plots at Ste. Anne de la Pocatiere (L.J. Coulombe). Tr. infections were noted in Carleton Co. and up to 3% of the heads affected in several other counties in N.B. (J.L. Howatt). Loose smut affected 10% of the heads in a field in Kings Co., N.S. (K.A. Harrison). A sl. infection of covered smut was recorded on Abegweit at Charlottetown, P.E.I. (D.B. Robinson).

BLAST (non-parasitic) was recorded as follows: Tr. on Victory and Eagle in the plots, Vancouver, B.C. (H.N.W. Toms); injury 146-tr. 114-sl. 26-mod. 1-sev./303 fields examined in Alta. (P.M.H., T.R.D.); sl. damage in all areas of Sask. as growth conditions were favourable for filling of the spikelets (H.W.M.). Mod. everywhere in the Q.S.B. plots; it was heavy on Abegweit and M.C. 433 at St. Flavien (D. Leblond).

GREY SPECK (manganese deficiency) was mod.-sev. in one field at St. Norbert, Man.; the yield reduction was estimated to be 25% (W.A.F. Hagborg).

BARLEY

ERGOT (Claviceps purpurea). Infection was 20-tr. 3-sl./377 fields in Alta. (P.M.H., T.R.D.). A tr. infection in one field at Yorkton, but only 12 fields were examined in Sask. A light infection was common on many varieties in the plots at Saskatoon, Scott, and Melfort. (H.W.M.). A sl. infection was recorded on barley at Charlottetown, P.E.I. (J.E. Campbell).

POWDERY MILDEW (Erysiphe graminis). Tr. on Olli in the University plots, Vancouver, B.C. (H.N.W. Toms); mod. plus on Mensury and O.A.C. 21 in the Q.S.B. plots at Notre Dame du Lac, Que. (D. Leblond). See also Rust Nurseries.

STRIPE (Helminthosporium gramineum). Infection was 4-tr. 1-sl. 1-sev./319 fields examined in central and n. Alta. (T.R.D.).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Infection was 77-tr. 119-sl. 40-mod. 5-sev./377 fields examined in Alta. The disease was more severe than in 1951. Compana was mod. infected in most of fields of this variety examined (P.M.H., T.R.D.). No root rot was observed on barley at the Substation, Whitehorse, Yukon (G.B. Sanford). Infection was 1-sl. 4-mod. 4-sev./9 fields examined in Sask. (H.W.M.).

NET BLOTCH (Helminthosporium teres). Infection was 115-tr. 85-sl. 22-mod. 7-sev./377 fields examined in Alta. It was more common and severe than usual, but it was not as prevalent as scald (q. v.). Net blotch was present in 57% of the fields in s. Alta. and in 63% of those in central and n. Alta. (P. M. H., T. R. D.). Net blotch was present in 8 fields out of 12 examined in Sask. Barley was sev. infected in the plots at Scott and Melfort and in most farmers' fields in n. e. Sask. The disease killed many of the leaves and mod. infected the heads. Frequent showers favoured the disease (H. W. M.).

BROWN STRIPE (Pseudomonas sp.), apparently an undescribed disease, was observed on barley in Man. It is characterized by long stripes on the leaves. The central area of the stripes are amber-coloured and translucent, bordered by light to dark brown margins (W. A. F. Hagborg).

STRIPE RUST (Puccinia glumarum). Sl. infections were found in 2 fields of late-sown barley in s. Alta. (P. M. Halisky).

STEM RUST (Puccinia graminis). Infection was 4-tr. 1-sl./58 fields examined in s. Alta.; infection appeared in late August (P. M. Halisky). A tr. infection was found in one field at Gull Lake, s. w. Sask.; light infections were noted on all common varieties in the plots at Indian Head and Saskatoon. (H. W. M.). A sl. infection was observed on barley at Charlottetown, P. E. I. (J. E. Campbell). See Rust Nurseries.

LEAF RUST (Puccinia hordei). See Rust Nurseries.

SCALD (Rhynchosporium secalis). Infection was 111-tr. 85-sl. 54-mod. 38-sev./377 fields in Alta. The disease was extremely prevalent and more severe than usual. It was found in 67% of the fields examined in s. Alta. and in 75% of those in central and n. Alta. (P. M. H., T. R. D.). Infection was 2-sl. 1-mod./12 fields examined in Sask. Scald was mod-sev. on some 200 lines of Velvon barley at Scott and mod. on all varieties at Melfort. There is little evidence of varietal resistance (H. W. M.). See Rust Nurseries.

SPECKLED LEAF BLOTCH (Septoria passerinii). Infection was 81-tr. 58-sl. 19-mod. 5-sev./377 fields examined in Alta. Although the disease was found in only 3 fields in s. Alta., it was much more prevalent than usual in central and n. Alta. (P. M. H., T. R. D.). Speckled leaf blotch destroyed 25% of the leaf area in one field at Poplar Point, Man. (W. A. F. Hagborg). It was general in the Lake St. John region, Que. (D. Leblond). Small amounts were observed in the plots at Ste. Anne de la Pocatiere (L. J. Coulombe). See also Rust Nurseries.

COVERED SMUT (Ustilago hordei). Infection was 21-tr. 26-sl. 4-mod. 1-sev./377 fields examined in Alta. The disease was slightly less prevalent than in 1951 (P. M. H., T. R. D.). Tr.-sev. infection was noted in 3 out of 10 fields examined between Edmonton and Barrhead. In one field, 30% of

heads were affected by covered smut and 20% by loose smut (A. W. Henry). A sl. infection was found in a barley field at the Substation, Whitehorse, Yukon. (G. B. Sanford). Infection was 1-2% in 2 fields out of 12 examined in Sask. (R. C. Russell). Covered and false loose smut (U. nigra) were noticeably less prevalent than in 1951 in the 199 fields examined in Man. and in the e. half of Sask. Infection ranged from 0 to 22.0%, av. 1.5% (W. J. Cherewick).

LOOSE SMUT (Ustilago nuda). Infection was 74-tr. 41-sl. 10-mod. 3-sev./377 fields examined in Alta., with its prevalence unchanged from 1951. (P. M. H., T. R. D.). Infection was sl.-sev. in 8 fields out of 10 examined between Edmonton and Barrhead. My impression was that loose smut was more severe than usual, with some fields with 30-40% of the heads infected (A. W. Henry). No loose smut was observed at the Substation, Whitehorse, Yukon (G. B. Sanford). Infection was tr. in 1 field, 1-2% in 4, 3-10% in 1 and over 10% in one out of 12 fields examined in Sask. Germination tests of spores from 10 collections of loose smut from the above fields and other sources revealed U. nuda only in 6 samples, U. nigra in one and both smuts in 3 samples (R. C. Russell). In contrast to covered and false loose smut, true loose smut was more prevalent in Man. and in the e. half of Sask. than during the last 6 years; in the 199 fields examined infection ranged from 0-38%, av. 4.5% for all fields (W. J. Cherewick). Tr. was seen in a block of Montcalm at Macdonald College, Que. (H. Genereux) and in Fort and Vantage in the plots at Ste. Anne de la Pocatiere (L. J. Coulombe).

BACTERIAL BLIGHT (Xanthomonas translucens). Infection was 25-tr. 9-sl. 2-mod./377 fields examined in Alta. (P. M. H., T. R. D.). In Man. 1-25% of the plants were found infected; pathogenic isolates 4081 and 4082 were obtained (W. A. F. Hagborg).

FALSE STRIPE (virus). Infection was 5-tr. 3-sl./58 fields examined in s. Alta. (P. M. H.). In field experiments conducted at Winnipeg in 1952, a marked reduction in yield and kernel weight was found in plots artificially inoculated with the virus. The plants of both wheat and barley were dwarfed; other symptoms of the disease became obscure as the plants approached maturity. In further experiments on seed transmission it was found that nearly 73% of the seed from the inoculated plots produced diseased seedlings and only 12% developed healthy plants whereas 92% of the seed from the uninoculated plots produced healthy seedlings and less than 1% of seedlings showing false stripe. Observations in Man. suggest that although false stripe may be endemic on experimental plots of barley, it is a comparatively rare disease in farmers' fields (W. A. F. Hagborg).

RYE

ERGOT (Claviceps purpurea). Infection was 10-tr. 9-sl. 3-mod./34 fields examined in Alta. (P. M. H., T. R. D.). Infection was sev. near edge and sl. plus over the rest of a field at Langham, Sask. (T. C. Vanterpool). A sl. infection was noted on rye in the rust nursery and on barley in

experimental plots at the Station, Fredericton, N.B. (J.L. Howatt). A sl. infection was seen at Charlottetown and Kensington, P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe graminis) A tr. was found in a field of winter rye near Jefferson in s. Alta. (P.M.H.). Powdery mildew heavily infected a field of winter rye at Berwick, N.S. Lower leaves were completely yellow and wilted and all the leaves of most plants were attacked. The perfect stage was abundant. Whereas this field of rye was heavily attacked, a nearby field of winter wheat and timothy in an adjacent hayfield were unaffected and Agropyron repens on the roadside showed only a tr. infection (D.W. Creelman). See under Rust Nurseries.

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp). Infection was 4-tr. 8-sl. 4-mod. 3-sev./22 fields examined in central and n. Alta.; it was unreported from s. Alta. (T.R.D.). A specimen received from Kindersley, Sask. (T.C. Vanterpool).

LEAF BLOTCH (Helminthosporium sativum). The lower leaves on 75% of the plants were infected in a 4-acre field at Kentville, N.S.; damage was mod. (D.W. Creelman).

TAKE-ALL (Ophiobolus graminis). Infection was a tr. in a field near Brownvale and sl. in one at Sexsmith in the Peace River District, Alta. (T.R.D.).

STEM RUST (Puccinia graminis). Tr. infections were observed in 2 fields near Medicine Hat, Alta., on 13 August (P.M. Halisky). See also Rust Nurseries.

LEAF RUST (Puccinia secalina). Infection was 5-tr. 4-sl. 1-mod./12 fields examined in s. Alta.; it was not noted elsewhere (P.M.H., T.R.D.). See under Rust Nurseries.

SPECKLED LEAF BLOTCH (Septoria secalis). Infection was 5-tr. 3-sl. 1-mod./34 fields examined in Alta. (P.M.H., T.R.D.). A sl.-mod. infection was observed at Saskatoon, Sask. (H.W.M., T.C.V.).

STEM SMUT (Urocystis occulta). A sl. infection was noted in patches in a field at Seven Sisters, Man. (H.A.H. Wallace, A.M. Brown). Some 10-15% of the plants were affected in 5 fields visited at St. Thomas, Joliette Co., Que. (E. Lavallee). Specimens have been deposited in the Herbarium from both provinces (I.L.C.).

BACTERIAL BLIGHT (Xanthomonas translucens). Infections involving a small part to 60% of the leaf area were observed in Man. Pathogenic isolates 4020, 4024, 4025, 4059, and 4064 were made and all proved to be X. translucens f. sp. secalis. On the other hand, isolates from rye in recent years have been X. translucens f. sp. cerealis. (W.A.F. Hagborg).

PARTIAL STERILITY (2,4-D injury suspected). In a crop of fall rye in the plots at Saskatoon, Sask., the lower, centre, or upper third of the heads bore sterile florets; the rest of the head was normal. (T. C. Vanterpool).

RUST NURSERIES IN CANADA IN 1952

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

In this report (issued November 1952) are presented the results of the examination of varieties of wheat, oats, barley, rye, and flax, grown in 34 places in Canada, for the presence of rusts and some other fungous diseases. (Detailed observations on the incidence of some of the diseases were given in eight tables but only the summary presented in the nineth table is reproduced here in Table 4).

Twelve varieties of wheat, seven of oats, five of barley, one of rye and three of flax were grown in the nurseries. The varieties were: wheat - McMurachy, Lee, Carleton, Little Club, Marquis, Mindum, Thatcher, Yaroslav Emmer, Norka, Redman, Exchange, and Frontana; oats - Bond, Trispernia, Ajax, Vanguard, Garry, Clinton, and Landhafer; barley - Montcalm, Wisconsin H. 106, Vantage, Peatland, and Univ. Manitoba 43-1020; rye - Prolific; and flax - Dakota, Bison, and Rocket.

Cereal Rusts in the Prairie Provinces in 1952

Wheat stem rust (Puccinia graminis var. tritici) began its northward spread, this spring, from very small beginnings owing to scanty overwintering in the southern United States and Mexico. Its spread was thereafter limited for some time by dry weather and low temperatures with the result that by mid-May there was less stem rust than usual in northern Texas. Later stem rust found rather favorable conditions for increase in northern Oklahoma and Kansas, and from this area a northward spread into the spring wheat region took place in June. Dry weather, in June, in the Dakotas and Minnesota was undoubtedly a factor militating against any rapid increase of stem rust in that area. In consequence, the drift of spores northward was relatively light until early in July.

Wheat stem rust was first collected near Winnipeg on 30 June and could be found, a week later, in most wheat fields in the Red River Valley. Further spread was rather slow but by 24 July it was present on wheat and barley throughout southern Manitoba and in southeastern Saskatchewan. At harvest appreciable stem rust infection had spread westwards and northwards to a boundary definable by a line drawn from Swift Current, Sask., northeast to Saskatoon and east from there to Kelvington, Sask., and Swan River, Man. In the western and northern part of this area (west of Regina and north of Yorkton) infection was too light to cause appreciable damage. On common wheat and barley, heavy stem-rust infection was largely limited to the Red River Valley and adjacent interlake district. In this region, late-maturing crops were subject to considerable loss although the bulk of the crop escaped with slight damage. Damage to durum wheat extended over a considerably greater area owing to its later maturity and the fact that most of the stem rust consisted of race 15B to which durum wheat is highly susceptible.

This crop was severely damaged in Man., and southeastern Sask., especially the later fields..

Beyond the area outlined above, i. e., west of the Regina-Saskatoon line, stem rust infection was of little significance although the rust became generally distributed throughout the eastern part of southern Alta., by mid-August. There (according to information supplied by Dr. M. W. Cormack) it was most prevalent in irrigated fields and caused severe damage in a few late-sown stands of Lemhi soft wheat. Farther north, a few light infections were found in the vicinity of Edmonton and at Clandonald some 130 miles farther east.

Leaf rust of wheat (P. triticina) was first found in Alta., about the middle of June and in Man., on 20 June. Its northward and westward movement took place somewhat in advance of stem rust and extended farther west and north. The area of heavy infection included all the agricultural part of Man., and eastern Sask., as far north as Yorkton. In Alta., leaf rust developed rapidly after mid-June and was found in most stands examined in the southern part of the province. A severe infection occurred in late September on early sown stands of winter wheat.

Infection by stem rust of oats (P. graminis var. avenae) and crown rust of oats (P. coronata var. avenae) did not occur until late in the season and, for this reason, these rusts did very little damage.

Leaf rust of rye (P. secalina) was widely distributed in the southern parts of the Prairie Provinces. In Alta., it occurred commonly in maturing stands of rye and was also very prevalent in young stands in late September.

Stripe rust (P. glumarum) was prevalent on Hordeum jubatum and other grasses in southern Alta., and also developed to an unusual degree on late-sown stands of wheat and barley. In the third week of August it was found to occur commonly on H. jubatum in the vicinity of Findlater and Kenaston, Sask.

Cereal Rusts in the Rust Nurseries

Wheat stem rust was more conspicuous in the rust nurseries than for several years past. Infection was heaviest at Brandon and Winnipeg, Man., but stem rust was found in all of the 14 nurseries in Ont., and Que., and moderately heavy infection occurred on some varieties in 9 of them. Little infection was found in nurseries in the Maritime Provinces and, except for Creston, B. C., in those located in Alta., and B. C. The amount of stem rust infection on varieties such as Lee, Carleton, Thatcher, Yaroslav Emmer, and Redman, and race isolation studies from the rust present on them, show that race 15B gained a wide distribution in Ont. and Que.

Leaf rust of wheat was found in all nurseries examined for its presence except those at Saanichton, B. C., and Beaverlodge, Alta., and from a study of rust behaviour of the various wheat varieties it is evident that certain varieties showed a different response to leaf rust in different localities. For example, Redman, highly susceptible in the Prairie Provinces, showed high resistance at Agassiz, B. C., and at several places in Eastern Canada. Conversely, Carleton and Mindum showed very little leaf rust infection in the Prairie region but carried a much higher percentage of infection at Creston, B. C., and at several points in Eastern Canada. Studies on race

determination indicate that these results are due to differences in regional distribution of races rather than to environmental differences. The varieties Lee, Exchange, and Frontana were highly resistant in all the rust nurseries.

Stem rust of oats was scarce in Western Canada but considerable infection by this rust occurred in several of the nurseries in Eastern Canada. The rather heavy infection on the variety Clinton which was resistant prior to 1950, reflects the presence in considerable amounts of race 7 which appears now to be widely distributed except perhaps in the Maritime Provinces and B. C.

Crown rust of oats, not found in any nursery west of Man., produced heavy infection in several of the nurseries in Eastern Canada. The varieties Bond and Clinton were rusted rather severely at Mindemoya, Ont., but they appeared to be rather highly resistant in most of the nurseries, a fact indicating that the races pathogenic to them are by no means uniformly distributed. Trispernia was subject to considerable infection at Ottawa, and Williamstown, Ont., but the reaction was moderately resistant and the infection was evidently caused by races not highly pathogenic to it. The variety Landhafer showed high resistance at all points.

Infection by stem rust on barley was heavy in only two localities, Fredericton, N. B., and Merrickville, Ont. In the former place, it may be presumed that infection was caused entirely by rye stem rust (P. graminis var. secalis) as no wheat stem rust was present on the wheat varieties grown in the nursery. In the latter place, both rusts were present but the infection appeared to be caused chiefly by rye stem rust. The relatively greater susceptibility of the varieties H. 106, Vantage, Peatland and U. M. 43-1020 to rye stem rust than to race 15B of wheat stem rust is demonstrated by a comparison of the percentage infections at Brandon, Man., with those at Fredericton, N. B. At Brandon an intense epidemic of race 15B caused infection of 5, 5, 8, and 15% respectively. At Fredericton rye stem rust caused infection of 60, 50, 40, and 60% respectively.

Infection by leaf rust of barley (P. hordei) was observed in the western nurseries only at Winnipeg and Brandon. In Eastern Canada the rust was present in six of the nurseries examined, but infection was very light except at Charlottetown, P. E. I.

Stem rust of rye occurred in most of the nurseries in Eastern Canada but was found, in slight amounts, in only two of the ten nurseries in the Prairie Provinces. Leaf rust of rye was present in all the nurseries except two in Alta., and one in B. C.

Table 4. The incidence of certain pathogenic fungi on wheat, oats, barley and rye grown at 34 localities in Canada in 1952.

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*	*Erysiphe graminis*
Saanichton, B.C.	0	0	-	0	0	0	0	0	-	0	0	0	0	-
Agassiz, B.C.	1	4	0	2	0	-	0	0	4	0	0	2	4	0
Creston, B.C.	3	4	0	1	0	0	2	0	0	-	-	2	2	0
Beaverlodge, Alta.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edmonton, Alta.	1	2	-	0	0	0	1	0	-	0	4	0	4	-
Lethbridge, Alta.	1	3	3	0	0	0	0	0	0	0	0	0	0	0
Lacombe, Alta.	1	4	1	0	0	0	0	0	0	4	3	0	2	1
Scott, Sask.	1	4	0	0	0	0	1	0	0	0	4	0	3	0
Melfort, Sask.	0	2	0	0	0	0	0	0	0	3	4	0	2	0
Indian Head, Sask.	2	4	0	0	0	0	1	0	0	2	0	0	3	0
Brandon, Man.	4	4	0	2	2	0	3	1	0	1	1	1	4	0
Dauphin, Man.	2	4	-	0	0	0	1	0	-	1	-	0	3	-
Morden, Man.	4	4	0	3	1	0	2	-	0	-	-	-	-	0
Winnipeg, Man.	4	4	0	4	2	0	2	2	0	1	0	2	4	0
Ft. William, Ont.	3	4	0	2	2	3	2	1	0	2	0	0	2	0
Kapuskasing, Ont.	3	4	0	2	1	3	1	-	0	4	0	1	2	0
Mindemoya, Ont.	2	4	2	4	3	3	1	-	3	0	0	0	4	0
Guelph, Ont.	3	3	4	3	0	3	2	1	1	0	-	2	3	0
St. Catharines, Ont.	1	2	4	0	0	-	0	0	4	-	-	0	3	-
Appleton, Ont.	3	4	3	3	1	-	2	-	1	-	-	3	-	0
Ottawa, Ont.	2	4	0	2	2	-	1	-	0	-	-	2	3	0
Merrickville, Ont.	3	4	-	4	3	-	3	2	-	-	-	3	3	-
Kemptville, Ont.	2	4	4	2	4	-	1	1	3	-	-	2	2	-
Williamstown, Ont.	-	2	-	-	4	-	-	-	-	-	-	-	-	-
Macdonald Coll., Que.	2	4	-	0	1	-	1	1	-	-	-	1	2	-
L'Assomption, Que.	3	4	0	2	3	2	2	-	0	0	0	2	3	0
Lennoxville, Que.	3	4	1	3	1	2	1	0	0	-	-	2	3	0
Normandin, Que.	3	4	0	3	1	3	2	0	0	4	0	1	3	0
Ste. Anne de la Poc., Que.	4	4	1	3	4	4	2	0	0	1	2	3	2	0
Fredericton, N.B.	0	4	0	1	4	3	4	-	0	0	0	4	-	0
Kentville, N.S.	0	4	1	2	2	-	2	0	0	0	0	2	3	0
Nappan, N.S.	0	3	3	1	2	-	0	-	0	0	0	0	3	0
Pictou, N.S.	2	3	0	2	3	4	0	-	0	0	0	1	2	0
Charlottetown, P.E.I.	1	3	-	2	1	2	1	3	-	0	0	0	2	-

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

Other Diseases

Powdery mildew (Erysiphe graminis) was observed on wheat in 11 of the rust nurseries but heavy infection was noted at only St. Catharines, Guelph, and Kemptville, Ont. On barley, mildew was found only at Agassiz, B. C., and in five nurseries in Ont. No mildew was found on oats in any of the nurseries, but trace infection was seen on Prolific rye at Lacombe, Alta.

Infection by several species of Septoria was noted. Glume blotch (Septoria nodorum) was rather severe on wheat at Fredericton, N. B. Elsewhere, it was noted only as very light infection at Charlottetown, P. E. I. S. tritici caused heavy infection of speckled leaf blotch of wheat at Lacombe, Alta., and lighter infection at Lethbridge. S. avenae f. sp. triticea occurred on wheat in most of the nurseries in the Prairie Provinces, Ont., and Que., and was particularly conspicuous on the variety Lee.

Speckled leaf blotch of oats (S. avenae) was not found in any nursery in Western Canada but occurred in all the nurseries in Eastern Canada that were examined for its presence. Speckled leaf blotch of barley (S. passerinii) occurred in 10 of the 24 nurseries that were examined for its presence. Scald (Rhynchosporium secalis) was heavy on barley at Edmonton, Alta., Scott, and Melfort, Sask., and moderately heavy at Lacombe, Alta. Elsewhere, it was found only in trace amounts at Brandon, Man., and as a light infection at Ste. Anne de la Pocatiere, Que.

Flax varieties were included in the rust nurseries for the first time this year. Rust (Melampsora lini) infection was rather severe at Brandon, Morden, and Dauphin, Man., and moderate at Winnipeg, Man., and Fort William, Guelph, and Mindemoya, Ont. Traces only developed at Edmonton, Alta., and Indian Head, Sask. No rust was observed on the rust-resistant variety, Rocket.

PHYSIOLOGIC RACES OF CEREAL RUSTS IN CANADA IN 1952

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

The original report (issued January 1953) gives a brief account of the development of the cereal rusts in Canada in 1952, which will not be included here as the subject has been covered in the report on the Rust Nurseries (q. v.). However, the report records the distribution of the physiologic races of 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). This information will be summarized, but the tables will be omitted. The authors also include a record of the isolations from collections of aecia from barberry and buckthorn in Eastern Canada.

Distribution of Physiologic Races

Puccinia graminis var. tritici

In 1952, the stem-rust survey comprised 307 isolates. The following races were isolated (with the number of isolates of each race in brackets):

race 2 (4); race 11 (1); race 15B-1 (255); race 15B-2 (16); race 34 (1); race 48 (2); race 56 (25); race 139 (1). The two strains of race 15B, designated 15B-1 and 15B-2, were differentiated by means of the reaction of the durum wheat variety Golden Ball, which is distinctly more susceptible to the latter strain.

Race 15B appeared to have a wider distribution in 1952 than in the preceding year. It occurred in collections from all provinces except P. E. I. Its greatest concentration was in Man. and Sask., where it occurred almost to the exclusion of other races. The extent of the predominance, in this region, of race 15B may be judged from the isolations from wild barley (Hordeum jubatum) which, owing to its susceptibility to many races, might be expected to yield other races as well as race 15B. Thirty-four collections from this host yielded no race other than 15B. From such results, it seems justifiable to conclude that stem-rust infection in Man. and eastern Sask. was caused almost entirely by this one race.

In Alta., race 56 was the prevailing race, as it was in 1951, while race 15B was second in order of frequency. Two other races, 34 and 139, were collected in that province. Collections from B. C. were limited to the vicinity of Creston in the southeastern corner of the province. Race 15B was isolated from this area for the first time but race 56 appeared to be the race of most common occurrence. Races 2 and 48, which occurred in that area in 1951, were again collected there in 1952.

The significance of the two strains of 15B, distinguished from each other by the reaction of Golden Ball, is not clear beyond the certainty that the one designated 15B-2 is more virulent to Golden Ball and certain hybrid lines derived from crosses with it. Such tests as have been made do not indicate that this strain is more virulent to varieties of common wheat than other cultures of race 15B.

Puccinia graminis var. secalis on Barley

Stem rust of rye was less common in the Prairie Provinces in 1952 than in the preceding year, being isolated only once from barley, as against 29 times in 1951. In Eastern Canada, this rust occurred more frequently on barley, 2 isolates being obtained from New Brunswick, 2 from Quebec, and 6 from Ontario. Of these 10 isolates, 7 came from the supposedly stem-rust resistant varieties, Vantage, Peatland, U. M. 1020, and H. 106 (Wisc.).

Puccinia triticina

The physiologic races of leaf rust of wheat are recorded according to the "Unified Numeration" (U. N.) of the key agreed on, in 1948, by American and Canadian investigators of this rust, in which the races are grouped into the classes that they would fall if the differential hosts consisted of only Malakof, Webster, Loros, Mediterranean, and Democrat. Race identification was carried out by means of these hosts with the addition of the variety Brevit, and the further addition of the variety Renown which separates certain biotypes otherwise not readily distinguishable. In the enumeration below, the races

are classified not only under their U.N. numbers, but also under their old race numbers. The biotypes are also listed separately.

All rust collections, after initial multiplication on the susceptible wheat Little Club, were inoculated to a "screening set" composed of the resistant varieties, Exchange, Gabo, Lee and Frontana. Any large pustules produced on the screening varieties were used to initiate cultures that were later used for the determination of the races involved.

The 278 isolates studied were identified as follows (number of isolates in brackets) UN 1 = races 1 (2) and 1a (13); UN 2 = races 15 (9) and 15a (72); UN 3 = races 3 (3), 58 (65), and 141 (1); UN 5 = races 5 (3) and 5a (60); UN 6 = races 126 (21) and 126a (13); UN 9 = race 9 (3); UN 10 = races 11 (9) and 38 (1); UN 11 = race 93 (1); and UN 14 = race 128a (2). Races bearing the suffix "a" as 1a, 15a, are virulent to seedlings of Renown and many other derivatives of H 44 and Hope.

The survey shows that race distribution in 1952 was very much the same as in the three preceding years. In Man. and Sask., the prevailing races were 15a, 5a, and 126 or 126a, in descending order of frequency. In Eastern Canada, race 58 was the predominant race. In B.C., (most of the collections came from the Creston area) race 1a was the predominant race, but races 11 and 128a were collected there as in the preceding year.

Most of the isolates from the Prairie Provinces as noted above, were virulent to Hope and H 44 derivatives whereas most of the isolates from Eastern Canada showed only moderate or slight ability to attack such varieties.

Puccinia graminis var. avenae

The following races were identified in a study of 171 isolates of oat stem rust (number of isolates of each race in brackets): race 1 (9); race 2 (28); race 5 (3); race 6 (9); race 7 (57); race 7A (2); race 8 (30); race 10 (15); race 11 (15); race 12 (1) and race 13 (2).

Owing to the scarcity of stem rust on cultivated oats in Man. and Sask. until late in the summer, a large proportion of the collections was made on wild oats. As wild oats are susceptible to all races of oat stem rust, the survey is considered to give a rather accurate picture of race distribution in this area. The most noticeable feature of the survey is the very common occurrence of race 7 which was collected more frequently than in any previous year and was, in fact, the predominant race in this part of the country.

The 38 isolates from Eastern Canada came from cultivated oats. As 19 of these isolates belong to the race group 8, 10, 11, it seems that these races are the ones most generally distributed. It is worth noting that races 6 and 13, which can attack all generally cultivated oat varieties, accounted for 10 of the 38 isolates studied. As these races were found in 3 provinces (Ont., N.B., and N.S.), they appear to be widely distributed and, as suggested in last year's report, are apparently on the increase.

The discovery of a biotype of race 7, designated race 7A, is of some interest. It was found in an increase field of the new variety R.L. 2123 near Winnipeg. It cannot be distinguished from ordinary race 7 on the regular differential hosts but attacks R.L. 2123 and Canuck, which are highly resistant to race 7. The fact that the variety Garry is highly resistant to it, shows

that Garry possesses a resistance factor (or factors) not present in Canuck or R. L. 2123. Previously, it had been assumed that these three varieties possessed identical stem-rust resistance derived from a common origin. As the biotype was found near the beginning of the survey, it was possible to test for its presence in nearly all stem rust collections by the inclusion of R. L. 2123 among the differential hosts. It is apparently quite rare as there was no evidence for its presence except in the one locality mentioned above.

Puccinia coronata var. avenae

In 1951, the following workers, H. C. Murphy, Marr D. Simons, H. A. Rodenhiser, T. R. Stanton, and H. R. Rosen in the United States and B. Peturson in Canada agreed to adopt a new revised set of ten differential oat varieties for identification of physiologic races of crown rust in Canada and the United States. It was further agreed that all races identified with the new revised set of differential hosts should be numbered, starting at no. 201. The numbers from 1 to 200 were left for those who wish to continue using the old set of differential hosts. In the new set, are included eight oat varieties currently used by plant breeders in the breeding for resistance to crown rust; Bond, Bondvic, Landhafer, Santa Fe, Saia, Trispernia, Ukraine, and Victoria.

The races here reported were all identified by means of the new revised set of ten differential hosts. They were assigned numbers after consultation with Dr. H. C. Murphy, and Dr. Marr D. Simons, who are in charge of the crown rust survey in the U. S. A.

From 115 cultures of crown rust established from uredinial collections obtained on wild and cultivated oats in Eastern Canada and the Prairie Provinces, 15 distinct physiologic races were identified. All the 15 races had been isolated previously in Canada. The designation of the 15 races identified, followed by the former designations of each race, is as follows: 201=34; 202=45 and 57; 203=45a; 209=1948-1; 210=1947-1; 211=34a; 228=2a; 229=2b; 231=3a; 232=3b; 234=2c; 235=3c; 237=1 and 6; 239=2 and 38; and 240=3.

The number of isolates of each race identified is indicated in brackets after the number of the race: 201 (24), 202 (15), 203 (5), 209 (1), 210 (1), 211 (6), 228 (7), 229 (2), 231 (7), 232 (3), 234 (1), 235 (3), 237 (7), 239 (13), 240 (20).

Of the races identified, six (201, 202, 203, 209, 210 and 211) are capable of attacking Bond and its derivatives. These six races comprised 28.1% of all isolates originating from collectionsobtained in Eastern Canada and 62.1% of those originating in the Prairie Provinces. Races 239 and 240 declined somewhat in prevalence in Eastern Canada. They are, however, still the most prevalent races there and comprised 36.8% of all isolates from that area.

The varieties Santa Fe, Landhafer, Victoria, Vicland and Trispernia proved highly resistant to all the isolates studied.

Isolations from Aecia Collected on Barberry and Buckthorn

During a survey carried out from Ottawa to determine the distribution of common barberry and European buckthorn in eastern Ontario, many collections of aecia from these two hosts were made and forwarded to Winnipeg for study. Specimens were also received from collectors located at Kemptville, Ont., and in Que., N. B., and P. E. I.

Isolations from Aecia collected on Barberry

Aeciospores from the collections studied were inoculated to wheat (Little Club), oats (Victory), rye (Rosen), and barley (Montcalm). As no grasses were inoculated, the studies were confined to the cereal-inhabiting varieties of stem rust. All cultures of wheat stem rust and oat stem rust were analysed for the physiologic races present. Out of 44 collections tested, 23 produced infection on the cereals.

Rye stem rust was the predominant rust variety. It occurred in 18 of the 23 collections studied while oat stem rust occurred in 10 collections and wheat stem rust in 5. That other varieties of stem rust were present in some of the collections, was indicated by the presence on Rosen rye of small (type 1) uredinia with urediniospores of a size suggestive of var. agrostidis. Such uredinia were noted particularly in collections no. 12 (Hawkesbury, Ont.), no. 13 (Camden East, Ont.), and no 30 (Cobourg, Ont.). Collection no. 40 (Shediac, N. B.) failed to infect wheat, oats, and rye but produced type 1 uredinia on barley with spores corresponding in size and shape to those of var. agrostidis.

Oat stem rust was isolated from collections from Ont., Que., and P. E. I. Race 2 was most frequently isolated (7 isolates) followed by race 8 (2 isolates) and race 1 (1 isolate).

The cultures of wheat stem rust, all from collections in Ont., produced no less than 6 races; i. e. races 16, 27, 69, 88, 179, and 185. Not one of these races is at present of common occurrence in uredinial collections from cereals.

Isolations from Aecia collected on Rhamnus cathartica and R. frangula

Twenty-five aecial collections from Rhamnus cathartica and 2 from R. frangula were received from Eastern Canada. But owing to extremely dry weather in the Prairie Provinces during all of May and early June, practically no aecial infections occurred on buckthorns there, and only 3 aecial collections were received from that area.

Spores from each aecial collection originating on Rhamnus cathartica were transferred to oats, rye, Festuca elatior, Holcus lanatus and Lolium perenne and the spores from R. frangula were transferred to Agrostis tenuis as well.

Three varieties of crown rust, Puccinia coronata var. avenae, P. coronata var. secalis* and P. coronata var. festucae were isolated from the aecia collected on R. cathartica, and one variety, P. coronata var. agrostidis, from aecia collected on R. frangula.

*In previous reports this variety was designated as Puccinia coronata var. bromi. Recent tests have shown that it differs from var. bromi and it is now proposed to name it P. coronata var. secalis nov. var.

The var. avenae was isolated from all but one of the 25 eastern collections studied, the variety secalis from 6 collections, and the var. festucae from 3 collections. The variety avenae alone was recovered from 13 collections and it was recovered along with either one of the other two varieties from 9 collections. In one instance, the variety secalis alone (Tecumseh, Ont.) was isolated. This collection consisted of many heavily infected leaves and seemed to be a pure culture of the var. secalis. In collections where the variety avenae occurred with one or the other of the other two varieties, it was the predominant one present. Apparently, in 1952, the majority of aecial infections which occurred on R. cathartica in Eastern Canada were of the variety avenae.

The three aecial collections obtained in Manitoba yielded only the variety secalis and appeared to be pure cultures of this variety.

The variety agrostidis was isolated from both of the collections of Rhamnus frangula studied. The presence of other varieties in this material was not observed. It is of interest to note that aecial infections occurred on R. frangula at Kentville, N.S. Hitherto aecial infections have not been observed on this host anywhere in North America except in a rather restricted area around Fredericton, N.B.

The following 12 physiologic races of Puccinia coronata var. avenae were isolated from the aecial collections (old designation of races given in brackets): 226(1a & 6a), 228(2a); 229(2b); 230(4a & 5a); 231(3a); 234(2c); 235(3c); 236(6b); 238(4 & 5); 239(2 & 38) and 240(3). The races isolated from the aecial collections corresponded fairly closely to those isolated from the uredinial collections.

II. DISEASES OF FORAGE AND OTHER FIELD CROPS

ALFALFA

BLACK STEM (Ascochyta imperfecta). A specimen received from Fort St. John, B.C., was severely infected; some of the current season's shoots were killed and bore an abundance of pycnidia (E. J. Hawn). Infection was 42-tr. 20-sl. 7-mod. 2-sev./159 fields examined in w. central and n. Alta. (J. B. Lebeau). Black stem was of minor importance in the irrigated area of s. Alta.; infection was 29-tr. 8-sl./60 fields examined. Tr.-sl. infection was observed in the plots at Lethbridge (E. J. Hawn). Early infection of the leaves was observed in the Big River and White Fox areas in Sask. on 25 June. Infection on leaves and stems built up at a mod. rate so that by 15 July over 90% of plants in the 48 fields examined were infected. Killing of the first growth was mod., but less than in 1951 (H. W. Mead).

WINTER CROWN ROT (low-temperature basidiomycete). Infection was 26-tr. 61-sl. 27-mod. 7-sev./159 fields examined in n. and w. central Alta. and 11-tr. 24-sl. 17-mod. 3-sev./68 fields in the Clover Bar district east of Edmonton (J. B. Lebeau). The disease was found in 15 of the 22 fields examined in the Hudson Bay, Pas Trail and Big River areas in Sask. In most fields, single plants were infected, but in some, 80% of the plants were killed in large patches. Average infection was about 10%, slightly higher than in 1951 (H. W. Mead).

ANTHRACNOSE (Colletotrichum destructivum) was first isolated from alfalfa in a field at Ottawa, Ont., in July 1951. Affected plants showed smooth sunken lesions on the lower stems which were not unlike those of black stem. This year it was destructive to red clover (q. v.) (R. J. Baylis). See reports from Que. in 1950 and 1951 (P. D. S. 30:26 and 31:21).

BACTERIAL WILT (Corynebacterium insidiosum). Infection was 1-tr. 2-sl. 1-mod./159 fields examined in n. and w. central Alta. and was 9-tr. 7-sl. 4-mod. 6-sev./68 fields in the Clover Bar district. The greater prevalence and intensity of the disease is attributed to the more abundant moisture during the last 2 years (J. B. Lebeau). The progress of infection in representative fields of different ages in s. Alta. is shown in the tabulation below:

Year Observed	Percentage of Infected Plants Year of Planting			
	1951	1950	1949	1948
1951	--	4.0	23.6	33.7
1952	1.7	8.3	25.0	65.3

Infection was abnormally severe in 2 fields seeded in 1951 in the Brooks and Lethbridge districts. It was especially evident in the vascular tissues of the previous season. Wilt development was also unusually rapid in recently

established variety plots in which the resistant varieties Ranger and Buffalo are already showing symptoms. The disease was apparently favoured by the abnormal amount of moisture in the soil in the fall of 1951 (E. J. Hawn, M. W. Cormack).

Wilt was found affecting 0.1% and 0.5% of plants in two fields at Hudson Bay and Snowden, Sask., respectively (H. W. Mead). Bacterial wilt was prevalent in Essex and neighboring counties in Ont.; 90% of the fields, 2 or more years old, were infected; damage ranged from 5 to 75%, increasing with the age of the stand (W. G. Benedict). A sl. infection was again observed at the Station and the School of Agriculture, Ste. Anne de la Pocatiere, Que., but it was rarely seen in other districts surveyed -- St. Jean, Iberville, St. Hyacinthe, Chateauguay, Joliette, Three Rivers, Quebec, Sherbrooke, and the Eastern Townships (R. O. Lachance).

STEM NEMATODE (Ditylenchus dipsaci). A tr. infestation was found in 2 fields out of 60 examined in Alta., one near Turin and another near Lethbridge. Tr.-sl. infestations were present in 3 experimental stands at Lethbridge. (E. J. Hawn).

CROWN ROT (Fusarium spp.). In July, single plants or groups of plants in 8 fields at Saskatoon and at other points in n. Sask. turned yellow, wilted and the affected stems died. Regrowth from the affected plants was vigorous. Portions of the affected tissue from the base of the stems and from the crowns were plated on agar. Fusarium oxysporum was the predominant isolate (H. W. Mead).

STAGONOSPORA LEAF SPOT (Leptosphaeria pratensis). Infection was 4-tr./159 fields in n. and w. central Alta. and 2-tr./60 fields examined in s. Alta. (J. B. L., E. J. H.).

DOWNY MILDEW (Peronospora aestivalis) A sl. infection was recorded on Grimm at Cowichan, B. C. (R. Turley). Infection was 4-tr. 1-sl./60 fields examined in s. Alta. and sl. in the plots at Lethbridge (E. J. Hawn). A sl.-mod. infection was observed at Edmonton and Barrhead (A. W. Henry). A tr. infection was seen at St. Gregoire, Nicolet, Co., Que., where downy mildew was severe in 1951 (P. D. S. 31:22) (R. O. Lachance).

ROOT ROT (Plenodomus meliloti). Some 11 varieties including Grimm were sev. damaged at the Substation, Whitehorse, Yukon. Medicago falcata was only slightly affected (G. B. Sanford).

ROOT ROT (cause various). Infection was 2-sl. 2-mod./159 fields in n. and central Alta. (J. B. Lebeau).

BACTERIAL STEM BLIGHT (Pseudomonas medicaginis). Sl. infection was found on a specimen from Fort St. John, B. C. (M. W. Cormack).

YELLOW LEAF BLOTCH (Pseudopeziza jonesii). A tr. infection was observed in 2 fields at Brooks, 2 at Lethbridge (E. J. Hawn) and in one near

Nampa, Alta. (J. B. Lebeau). Infection was tr. -mod. in the 6 fields found infected in Sask. Blotch appears first in mid-July, increasing in severity as the growing season progresses; it causes some defoliation (H. W. Mead). Yellow leaf blotch was found in all 10 fields examined in Essex Co., Ont.; about 3% of leaves were destroyed (W. G. Benedict). Infection was 5-tr. 4-sl. 1-sev./47 fields examined in Que. (R. O. Lachance).

COMMON LEAF SPOT (Pseudopeziza medicaginis). Infection was 40-tr. 55-sl. 17-mod. 2-sev./159 fields examined in n. and w. central Alta. and 14-tr. 10-sl. 2-mod. 1-sev./60 fields in s. Alta. This leaf spot was much more common than in 1951 and infection was fairly general in the affected fields. Damage was mod. -sev. on the lower leaves of alfalfa in the laboratory plots at Lethbridge (J. B. Lebeau, E. J. Hawn). Infection was sl. -mod. throughout the n. alfalfa growing area of Sask. Up to 50% of the leaves may be destroyed (H. W. Mead). A sl. infection was found on Variegated in the plots at Ottawa, Ont. The usual amount of the leaf spot was present; there was no defoliation except in fields that had not been cut in June or July (R. J. Baylis). Infection was 10-tr. 36-sl. 1-mod./47 fields examined in Que. (R. O. Lachance). A mod. infection was seen at Fredericton, N. B. (S. R. Colpitts).

CROWN BUD ROT (Rhizoctonia solani, Fusarium spp., etc.). Both development and progress of infection were more rapid in stands one and two years old this year than in 1951. The tabulation below indicates the difference in the two years:

Year Observed	Percentage of Infected Plants Year of Planting			
	1951	1950	1949	1948
1951	--	50.7	93.6	100.0
1952	80.1	98.9	99.3	--

Field plot studies on one-year-old stands showed that most of annual disease build-up occurred between 5 May and 2 June. During this period the average area of crown per plant destroyed rose from 2.0% at the beginning of the period to 27.1% at the end (E. J. Hawn).

STEM ROT (Sclerotinia sclerotiorum) was found affecting a heavy stand at Hudson Bay, Sask. Mycelium and sclerotia were present on the outside and within the stems 1-2 ft. above the ground. The weather had been showery and the lower parts of the plants were wet (H. W. M.).

WILT and ROT (Sclerotinia trifoliorum). An occasional plant with sclerotia at the base was found in fields at Oka and Lennoxville, Que.; the damage was nil (R. O. Lachance).

RUST (Uromyces medicaginis) affected half the fields examined for rust in Essex Co., Ont. In one, the foliage had a distinct yellow cast noticeable from the edge of the road; damage was estimated to be 5% (W.G. Benedict).

WITCHES' BROOM (virus). Infection was 2-tr. 1-mod./159 fields examined in w. central and n. Alta.; a tr. was also observed in the plots at Edmonton (J.B. Lebeau).

WINTER INJURY was 2-sl. 1-mod./159 fields examined in n. and central Alta. (J.B. Lebeau). Winter injury was observed in 15 out of 20 fields examined in n. Sask. Single plants or groups of plants were affected especially in exposed locations, where snow cover had been light (H.W. Mead). Damage was severe in several counties s. of Three Rivers, Que., but winter killing was almost nil about Quebec and along the Lower St. Lawrence, where there was no rain and a heavy snow cover persisted throughout the winter (R.O. Lachance).

YELLOWS (cause undetermined). Symptoms were rated 3-tr. 13-sl. 5-mod. 2-sev./159 fields examined in n. and w. central Alta. (J.B. Lebeau).

YELLOWS (boron deficiency). Out of 47 fields examined in Que., 24 were supporting a crop of alfalfa deficient in boron. These fields were in several counties and significently were almost exclusively located on light gravelly or sandy soils (R.O. Lachance).

COMMON CLOVER

WINTER CROWN ROT (low-temperature basidiomycete). Infection was 3-tr. 1-sl. 1-mod./22 fields of red clover examined in n. and central Alta. (J.B. Lebeau).

LEAF SPOT (Cercospora zebrina). Infection was sl. on white clover in the laboratory plots, Lethbridge, Alta. (E.J. Hawn).

ANTHRACNOSE (Colletotrichum destructivum). Infection was sev. and the symptoms were unusually prominent on red clover in the Forage Division plots at Ottawa. There was no evidence of Kabatiella caulivora. The organism is quite distinct from the next (R.J. Baylis).

ANTHRACNOSE (Colletotrichum graminicola) caused sev. damage to Siberian red clover in the experimental plots, Ste. Anne de la Pocatiere, Que., killing much of the above ground parts of the plants. Other varieties were not severely affected (R.O. Lachance, Ruth Mackay).

SOOTY BLOTCH (Cymadothea trifolii). Infection was sl. on alsike clover in the plots at Lethbridge, Alta. (E.J. Hawn). The disease was common on alsike clover in fields in Kings Co., N.S.; 50% of the leaves were affected (D.W. Creelman).

POWDERY MILDEW (Erysiphe polygoni) was observed on red clover several times in the Lillooet district, B.C. (G.W. Woolliams). Infection was 4-sl. 9-mod. 2-sev./22 fields of red clover examined in n. and w. central Alta. (J.B. Lebeau). A mod. infection was general in a field of Altaswede red clover at Brooks (M.W.C.); sl. infection was noted on red clover at Upton, P.E.I. (J.E. Campbell).

ANTHRACNOSE (Kabatiella caulivora). Infection was 6-tr. 5-sl. 2-mod./22 fields of red clover examined in n. and w. central Alta. (J.B. Lebeau). The disease was widespread and destructive on red clover throughout Kings Co., N.S. (D.W. Creelman.)

DOWNY MILDEW (Peronospora trifoliorum). A sl. infection was found in one field near Sylvan Lake, Alta. (J.B. Lebeau).

LEAF SPOT (Pseudopeziza trifolii). Infection was 3-tr. 1-sl./22 fields of red clover examined in n. and w. central Alta.; a sl. infection was also seen in one field of alsike (J.B. Lebeau). The disease causes sl. defoliation of red clover in midsummer in Kings Co., N.S. (D.W. Creelman).

ROOT ROT (Sclerotinia sp.) destroyed about 3% of plants in four-fifths of the fields of red clover examined in Huron Co., Ont., but the disease was not seen in Essex Co. (W.G. Benedict).

LEAF SPOT (Stemphylium sarcinaeforme). A sl. infection was found in red clover at Upton, P.E.I. (J.E. Campbell, I.L. Conners).

RUST (Uromyces spp.). Rust (U. fallens) sl. infected the foliage of red clover in rod rows at Saanichton, B.C. (W. Jones); 60% of the leaves of alsike were injured by rust (U. trifolii) in a field in Essex Co., Ont. (W.G. Benedict); a sl. infection occurred on red clover in fields at the Station, Kentville, N.S. (D.W. Creelman); and in a field at Upton, P.E.I. (J.E. Campbell).

MOSAIC (virus). Infection was 2-tr. 2-sl./8 fields of alsike clover examined in central and n. Alta. (J.B. Lebeau). Mosaic (Trifolium virus 1) ranged from a tr. to 2% in 7 fields of clover examined in York, Carleton, Sunbury and Queens Counties, N.B. (D.J. MacLeod).

WITCHES' BROOM (?virus). A tr. infection was found in a field of clover in York Co., N.B. (D.J. MacLeod).

YELLOWS (virus) was common in clover fields in Carleton, York, Sunbury, Queens and Victoria counties, N.B.; infection was tr.-4% (D.J. MacLeod).

WINTER INJURY was less severe in Alta. than in 1951 (G.B. Sanford). Damage was severe in the Montreal district, Que., while it was nil about Quebec and along the lower St. Lawrence. See under Alfalfa (R.O. Lachance).

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

BLACK STEM (Ascochyta meliloti). Infection was mod. on plants bordering an irrigation ditch near Brooks, Alta. (E.J. Hawn), and sl. in a field near Fort St. John, B.C. (J.B. Lebeau). In n.e. Sask. sweet clover is grown to be ploughed down during the first year and also as a seed crop. Black stem was found on all second year stands causing mod. defoliation and relatively sev. lesions on the stems (H.W. Mead).

ROOT ROT (Cylindrocarpon sp.) affected 2% of the plants of yellow blossom sweet clover in a 30-acre field in Essex Co., Ont.; damage sl. (W.G. Benedict).

ROOT ROT (Phytophthora cactorum) caused sl. damage in a field near Lethbridge, Alta. (M.W. Cormack). Some 55-85% of plants were affected in all the fields surveyed in Essex Co., Ont., and about 50% were destroyed in some fields. The acreage for hay, silage, and seed has been much reduced. This disease was also found in Huron Co., The symptoms were visible as early as 26 April (W.G. Benedict).

ROOT ROT (Plenodomus meliloti) caused sev. to sl. damage to white and yellow blossomed varieties at the Substation, Whitehorse, Yukon. The decumbent type of the yellow blossomed species appeared to be most resistant (G.B. Sanford).

LEAF SPOT (Stagonospora meliloti). Tr. infection was seen in two fields, one near Onoway and the other near Peace River, Alta. (J.B. Lebeau).

2,4-D INJURY was observed at Saskatoon, Sask. It resulted in sterility in older plants, and dwarfing and curling of the leaves, intensification of the chlorophyll and reduced flowering in younger plants (T.C. Vanterpool).

VETCH

ANTHRACNOSE (Colletotrichum viciae) caused mod. damage to the lower leaves and stems in a block of hairy vetch at Kentville, N.S. (D.W. Creelman). First reported in Canada in 1951 (P.D.S. 31:26).

BUCKWHEAT

YELLOWS (Callistephus virus 1) was found on tartarian buckwheat in N.B. as follows; Carleton Co., 4 fields, 1-14% of plants infected; Sunbury Co., 3 fields, tr.-22%; York Co., 4 fields, 3-41% (D.J. MacLeod).

CORN

EAR ROTS (Diplodia zeae, Fusarium graminearum and F. moniliforme). Infection caused by these pathogens in hybrid corn in Essex Co., Ont., was 5, 3, and 10% respectively; damage was sl.-mod. (N. J. Whitney).

ROOT ROT (Fusarium graminearum isolated) severely infected hybrid corn in Essex, Kent, and Lambton counties, Ont.; damage was mod. (N. J. Whitney).

STALK ROT (Fusarium graminearum isolated) affected up to 5% of the stalks in hybrid corn in Essex Co., Ont.; damage was sl. (N. J. Whitney).

LEAF SPOT (Helminthosporium turcicum). Infection was up to 10% in some fields of hybrid corn in Essex and Kent counties, Ont., but it was 75% in one field of White Cap in Elgin Co., causing mod. damage. Infections of 1-2% were found also e. of Brantford and at Guelph (N. J. Whitney).

RUST (Puccinia sorghi). Infection was about 5% in hybrid corn in Essex, Kent, and Lambton counties, Ont. All the rows of inbreds were heavily rusted at the Harrow Station. Rust was found at least 2 weeks earlier on corn in 3 widely separated marshes than on corn on high ground. The marshes were located e. of London, at Thedford and between Thamesville and Highgate. The corn on the fine granular muck of the Thedford Marsh was short, with poor ear development, which suggested a lack of available nitrogen (N. J. Whitney). A tr. of rust was seen in Queens Co., P. E. I. (R. R. Hurst).

SMUT (Ustilago maydis) affected up to 10% of the plants in fields of hybrid corn in Essex, Kent, and Lambton counties, Ont. (N. J. Whitney).

DIGITALIS

LEAF SPOT (Colletotrichum fuscum Laubert) caused considerable damage and loss of commercial value to the leaves of a drug planting of D. lanata at Keating, B. C. Spores 14-20 x 2.8-3.7 microns; setae to 90 microns long by 5-7 microns wide at base, 1-2.5 microns at rounded apex. Lesions small but very numerous, brown with deep purple border. Agrees reasonably well with the lengthy but vague original description (R. Laubert. Die Gartenwelt 31:674-675. 1927). Reported by Weiss (U. S. D. A. Pl. Dis. Reptr. 33:56. 1949) from Conn., Mass. and Ore. on D. purpurea (W. Jones, D. B. O. Savile).

CROWN ROT (Pythium sp.) destroyed 1-10% of the plants, usually scattered, in 3 plantings of D. lanata at Keating, B. C. Leaves of affected plants became brown and necrotic and thus were worthless for picking and drying. This drug plant has been grown successfully for some time by this grower (W. Jones).

FLAX

Prof. T. C. Vanterpool, University of Saskatchewan, contributed a special study on "Flax Diseases in Saskatchewan in 1952", which is summarized below.

Flax rust was epidemic in 1952 in Sask. However, the heavy infections appeared in most instances to have reduced yields only slightly. Rhizoctonia seedling blight on fallow crops was the only other flax disease of any importance. Diseases caused by seed-borne fungi were unimportant as might be anticipated from last year's report that the 1951 seed was carrying an unusually low percentage of these fungi (P. D. S. 31:28).

The 1952 growing season was not typical for the Prairie Provinces. A striking difference was the above normal atmospheric humidity (low evaporation rate) throughout the growing season. At the same time mid-summer temperatures were normal or below normal. In consequence, the crops were able to make full use of the available soil moisture, which was average in most areas. Hence some 4,300,000 bushels of flax were reported on 379,700 acres, giving an average yield of 11.3 bu. per acre, which is good for this province.

RUST (Melampsora lini) infection was mod.-sev. despite the fact that good rust-resistant varieties are available. Heavily rusted fields were widely distributed, occurring even in the brown soil zone at such places as around Leader and Kindersley and from Eston to Elrose. The growing of the susceptible Royal is no longer recommended and Rocket and Victory have been substituted.

For the last two years in cooperation with Dr. B. Peturson, attempts to transmit flax rust to the crop from bits of rusted straw sown with the seed have been made in a small field test at Saskatoon. In both years the weather was dry for some time after seeding and the attempts failed.

RHIZOCTONIA SEEDLING BLIGHT (Rhizoctonia solani) was widespread in the large plots of the Field Husbandry Department, Saskatoon, affecting 10-25% of the plants in most varieties. No outstanding or consistent differences in resistance were found among the common commercial varieties. The general, uniform distribution of the blight was striking. This disease has been present in the flax tests at Saskatoon in other years, but it has never been quite so conspicuous or destructive. As the plots are on fallowed land, it has been recommended on several occasions that the trials be conducted on cereal stubble land. On 30 May, there was found at Saskatoon a flax field that was affected by a slight amount of blight generally distributed over the field except at one end, where the disease was much lighter. Enquiry revealed that this end of the field was on sweet clover stubble, while the rest of the field had been in fallow. These observations provide further evidence that rhizoctonia seedling blight is more severe on flax on fallow than on flax on stubble land. No farm survey was conducted for seedling diseases.

WILT (Fusarium oxysporum f. lini) and ROOT ROT (Rhizoctonia solani and F. spp.). Every year isolations are made from the roots of flax plants in the 'Wilt Nursery'. These plants die about 3 weeks before the rest of the crop is mature. It has been found that Rhizoctonia solani and Fusarium spp. are isolated more frequently than F. oxysporum f. lini from these older plants. Late Root Rot was lightly, but generally, distributed in most flax fields. No true wilt was observed in farm fields.

LATE SEASON STEM BROWNING. Alternaria linicola was obtained more frequently than usual from lesions on stems and leaves. The fungus was also the one most commonly associated with telia of Melampsora. In the absence of rust, the point of infection is commonly a leaf scar. A. tenuis can be isolated from practically any flax plant at harvest, but it has never proved pathogenic. Fusarium spp. were rarely associated with rust lesions this year and when they were found the lesions were confined to the lower part of the stem.

BROWNING and STEM BREAK (Polyspora lini). No survey was made in n. Sask., where the disease is usually found. It was not observed in fields around Saskatoon. Polyspora-infected seed from the 1951 crop sown at Saskatoon developed sl. stem break, but no brown lesions were observed on stems, leaves, or balls. A dry period when the cotyledons were green probably prevented the disease from becoming established.

PASMO (Septoria linicola). In late August, a trip was made from Regina to Estevan, Sask., and then on to Minot and Fargo, N. D., and St. Paul, Minn. No pasmo was observed in Sask., but the disease was found in some fields in e. N. D. and in Minn. Its severity increased from West to East.

ALKALI BURNING. Every year low lands with a pH well above 7.0 are ploughed up and sown to flax. This year, two such areas, one at Asquith and another at Grandora, showed severe leaf-tip burning (1/3 to 1/2 of leaf affected) from mid-season on. Growth was good although the plants were a pale green on 30 July. Moderate yields were obtained because of the relatively cool and moist conditions.

MISCELLANEOUS. After a few years' absence, Selenophoma linicola was collected again in tr. amounts on the peduncles and finer branches of flax here and there in the Saskatoon area. In two fields, where wireworms and seedling blight had caused severe thinning of the stands, Wind Injury was conspicuous. Abnormal enlargement of the stems occurred at ground level followed by snapping off of the many-branched plants towards the end of the season. One report of Heat Canker was received from Marengo in the brown-soil zone on 5 July.

Dr. W. E. Sackston has also summarized his observations in a special report, "Flax Diseases in Manitoba 1952".

The flax crop in Man. in 1952 was retarded by drought in May and June, but weather conditions during the rest of the growing season and at harvest were sufficiently favourable that the yield for the province averaged 9.6 bushels per acre. The drought caused irregular emergence, and stands were patchy in many fields until after the late June rains. Cutworm damage was general, and in some cases severe. Sixty-nine fields were examined during an intensive survey made 6-13 August in Man. and south-eastern Sask. Flax diseases were of minor importance.

RUST (Melampsora lini) was fairly well controlled in Man. by the widespread use of resistant varieties. There was no rust in 36 fields, traces in 22, and 5-10% in 3. The light infections occurred in most cases on admixtures of susceptible varieties in fields of rust-resistant flax, and in fields of Victory, which contains some rust-susceptible lines, but which does not suffer sev. damage. A 25% infection was found in 2 fields, 50% in 1, 75% in 4, and 100% in 1 field, all Dakota flax. The heavy infections on Dakota indicated the losses that might have been experienced if resistant varieties had not been so widely grown. Farm fields and experimental plots of Sheyenne, Redwood, and Rocket flax near heavily rusted Dakota remained free of rust.

PASMO (Septoria linicola). Tr. infections were seen in 6 fields, and 1-5% in 3 at widely separated points in Man. and Sask. Pycnidia of the pathogen were numerous on affected stems in a field of Victory flax on 7 August. Despite this early development, the spread of pasmo later in the season was apparently hindered by unfavourable weather conditions. Pycnidia were found on flax stubble n. e. of Lake Dauphin in October. As flax is not grown generally in the area, the presence of pasmo there indicates that it is coextensive with the flax crop in Man.

BOLL BLIGHT (cause unknown). Many of the flax fields examined during the survey were not sufficiently advanced for boll blight to be observed, but it was found in 25 fields. Trace to 10% blight was seen in 20 fields, 20% in 4, and 50% in one, in which the loss of bolls was caused by sev. rust infection on the pedicels. The observed low incidence of the disorder again seems to fit the hypothesis that non-parasitic blighting of bolls is induced by unfavourable environmental conditions following weather that favours the formation of numerous flowers.

MISCELLANEOUS. Seedling Blight was present, but not important, in six fields examined in mid-June. Rhizoctonia solani was isolated from affected plants. Traces of Heat Canker were seen in several fields, and one field with 30% heat canker was reported from the Carman area. Traces of Wilt (Fusarium oxysporum f. lini) were found in 1 field in s. e. Sask. Hail Damage was severe in one district s. w. of Winnipeg. Some striking symptoms of 2,4-D Injury were seen in a number of fields. Stunting, chlorosis, and necrosis of leaves and growing points of stems were seen on some soils, which were found to contain extremely high concentrations of salts.

Other Observations

RUST (Melampsora lini). Infection was 18-tr. 5-sl. 5-mod. 1-sev./ 56 fields examined in Alta. Rust was more prevalent and more sev. in s. Alta. than elsewhere (P. M. H., T. R. D.). Rust was prevalent in several fields in the Tisdale district late in July (H. W. M.). See also Rust Nurseries.

BROWNING and STEM BREAK (Polyspora lini). A tr. infection was observed in one field near Spirit River, Alta. (T. R. D.); and a mod. infection was reported from Grande Prairie (A. W. Henry).

MANGEL

MISCELLANEOUS DISEASES observed in Queens Co., P. E. I., included: Single roots received at the laboratory, one sev. affected by Crown Gall (Agrobacterium tumefaciens), and a second with a tr. of Scab (Streptomyces scabies); a mod. infection of Leaf Spot (Cercospora beticola); a 0.5% infection of Damping-Off and tr. -10% of Strangle, the affected plants being severely injured presumably by a soil-borne organism (R. R. Hurst).

RAPE

DOWNY MILDEW (Peronospora ?parasitica). Distorted heads of Polish rape (Brassica ?campestris) received from Shellbrook, Sask., were found to contain oospores in the affected tissues; the severity of infection is unknown (H. W. M.). Examination of the material revealed oogonia 37-65 microns in diameter, wall 1.3-2.0 microns, smooth, hyaline, irregularly folded. Oospores 32-55 microns in diam., globose, wall of 3 yellowish layers, innermost clear, middle radially striate, outer clear with large hemispheric warts. The fungus seemed closer to P. parasitica than P. brassicae (D. B. O. Savile).

SAFFLOWER

RUST (Puccinia carthami). Infection was sev. in most varieties in the plots at Lethbridge, Alta. Sl. resistance to rust was recorded in the Nebraska varieties N-3, N-6, N-10 and N-852. Infection was sl. -mod. in the plots at Brooks, Rosemary, and Taber (F. R. Harper).

ROOT ROT (Pythium sp.). Damage varied from 0 to 100% in different varieties in the irrigated plots, Lethbridge, Alta. The susceptible variety N-852 was mod. damaged on irrigated land at Rosemary, but was not infected in a similar planting at Taber. Dry land plots at Lethbridge were free from infection (F. R. Harper).

HEAD BLIGHT (Sclerotinia sclerotiorum). Tr. -sl. infections were noted on the different varieties at Lethbridge and Rosemary, Alta. (F. R. Harper). After the 1951 epidemic of head rot on the safflower varieties at Saskatoon, Sask., (P. D. S. 31:32), not a single infected head was found this year (T. C. Vanterpool).

SOYBEAN

Dr. A. A. Hildebrand has prepared a special report on "Diseases of Soybeans in southwestern Ontario in 1952".

As in previous years, observations were made on the disease situation in soybeans in s. w. Ont., not only in commercial plantings but also in the experimental plots of the Harrow laboratory, where the plants were artificially inoculated or the organisms had been introduced into the soil.

STEM CANKER (Diaporthe sp.) continues to be the most important disease of soybeans in Ont. This year, the disease was somewhat less widespread in its occurrence and the resulting losses less serious than for several seasons. However the variety Lincoln, when grown on highly fertile soil, was especially susceptible to the disease, and, in three representative fields, yield losses were estimated at 30%. Reduced incidence and severity of stem canker this year may be attributed to prolonged periods of extremely dry weather in many parts of s. w. Ont.

Varietal test plots, located near Port Alma, Woodslee, and Paquette, were inspected on 11 Sept. and a comparison was made of the relative susceptibility to stem canker of five leading varieties. The results of the examination are as follows:

Percentage Incidence of Stem Canker

Variety	Port Alma	Woodslee	Paquette
Harman	8.7	---	---
Harosoy	5.7	3.7	3.5
Lincoln	18.5	2.2	2.0
Hawkeye	26.1	3.7	4.5
Blackhawk	54.7	9.2	7.0

It will be noted that Harman and Harosoy were the least susceptible, Lincoln intermediate, and Hawkeye and Blackhawk the most susceptible to stem canker. These varieties occupied the same relative position last year (P. D. S. 31:34). The higher disease incidence at Port Alma over that at Woodslee and Paquette is attributed to the nature of the soil. At Port Alma the soil is a porous, gravelly type whereas at the two other locations it is a clay of the Brookston series.

On 15 Aug. healthy plants of the variety A. K. Harrow growing in an outdoor plot were inoculated with four Diaporthe isolates, three of which had been obtained in Ont., the fourth in Indiana, from plants affected with stem canker. By 29 Sept. mortality of plants inoculated with the three Ont. isolates had reached 66.6, 55.5, and 47.0%. The high mortality caused by two of the Ont. isolates was correlated with a high incidence of unproductive pods, and a 30% reduction in the yield of seed, which was of small size and poor quality. The Indiana isolate was virtually non-pathogenic. Clearly the

organism is comprised of strains that may differ widely in their pathogenic capabilities. This fact is of importance in breeding for resistance to the disease. The writer is also of the opinion that the isolates mentioned above differ morphologically from that of Diaporthe phaseolorum var. batatatis, which is commonly regarded as the causal agent of stem canker. It is postulated that the disease as it occurs in Ont. and possibly elsewhere, is caused by an undescribed species of Diaporthe.

POD AND STEM BLIGHT (Diaporthe phaseolorum var. sojae). To date only the imperfect (Phomopsis) state of the pathogen has been found in Canada. In recent literature, the causal agent is described as a weak parasite which can attack plants only shortly before maturity, and the view is expressed that the disease is of negligible economic importance. Observational evidence accumulated by the writer was not in agreement with this view. Accordingly experiments were undertaken last summer to determine the effect of the pathogen on the productivity of the soybean.

At four different dates during August and September, plants of A. K. Harrow were inoculated under field conditions with isolates of Phomopsis which had been obtained locally from plants affected by pod and stem blight. Over 18% of the plants inoculated on 15 Aug. became severely infected and their yield, as compared with that of corresponding checks, was reduced by 12.4%. Plants inoculated on 29 Aug. showed 39.1% mortality and a yield reduction of 11.0%. Mortality of plants inoculated on 9 Sept. with 4 different isolates was 26.3-73.6% and yield losses were 11.2-14.5%. Only one isolate caused an appreciable reduction in yield, viz. 11.2%, in the final inoculation series of 17 Sept.

It will thus be seen that reductions of yield of 10-15% resulted when the plants were inoculated on various dates between 15 Aug. and 17 Sept., 2-6 weeks before the average maturity date of the variety. Moreover natural infection has been observed as early as 3 Aug. It is concluded that pod and stem blight may be regarded as a factor of some importance in the production of soybeans under Ont. conditions.

BROWN STEM ROT (Cephalosporium gregatum). In the laboratory experimental plots where the soil is now heavily infested with the causal organism, symptoms of the disease were detected on plants as early as 1 Aug. In commercial stands, the disease did not become conspicuous until early in September, and then only in a few widely scattered fields, particularly of the Blackhawk, Lincoln, and Adams varieties.

Other diseases noted this year included: Downy Mildew (Peronospora manshurica), Sclerotinia Stem Rot (Sclerotinia 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). They were relatively unimportant. Lightning Injury and Sun Scald (non-parasitic) were encountered as usual.

Other Observations

POD and STEM BLIGHT (Diaporthe phaseolorum var. sojae). Only a single plant of Capital was found affected in all the plantings observed at Ottawa, Ont. (R. J. Baylis).

BACTERIAL BLIGHT (Pseudomonas glycinea). Infection was tr. -sl. in the plots at Ottawa, Ont. Blight appeared in June on young plants, which, however, appeared to outgrow the infection by July with no further spread later in the season (R. J. Baylis).

MOSAIC (virus) occurred only in tr. amounts this year in the plots at Ottawa, Ont. (R. J. Baylis).

SUNFLOWER

A special report on "Sunflower Diseases in Manitoba in 1952" was contributed by Dr. W. E. Sackston.

Less than 5,000 acres were sown to sunflowers in Man. in 1952 as the result of unfavourable seasons from 1949 to 1951, and heavy losses caused by rust in 1951. The growing season in 1952 was the most favourable since 1948. The average yield was estimated at 670 pounds per acre, compared to the 1951 estimate of 300 lb. Twenty-six fields were examined 11-13 Aug., when most of the fields were in or a few days past full bloom, and 29 fields were examined 8-12 Sept., when most fields were still 5-10 days from maturity. Mr. I. Toews, Cooperative Vegetable Oils Ltd., assisted in the early survey.

RUST (Puccinia helianthi) caused relatively little damage in most of the fields examined. In the early survey, no rust was found in 7 fields, traces in 14, light rust(tr. -30% infection on the lower leaves, tr. on the upper leaves) in 4, and heavy rust (lower leaves killed, 50% on the middle leaves, 35% on the upper leaves) in one 2-acre field. The heavily rusted field was surrounded on three sides by trees. It was open on the side nearest to fields where sunflowers were grown in 1951. Pycnia of rust were found on a few plants in this field on 12 June. A 30-acre field 300 yards away, on the same farm, on the other side of the trees and the farmstead, had about 10% rust on the lower leaves of plants nearest the heavily-rusted field, and traces of rust at the far end of the field.

In the late survey, traces of rust were seen in 11 fields, traces on the upper leaves and 5-10% on the lower leaves in 6, tr. -15% on the upper leaves and 15-25% rust on the lower leaves in 7, 25% on the upper leaves and 35-50% on the lower leaves in 3, 50-75% on the upper leaves, and the lower leaves dead, in 1 field, and all leaves killed by rust in 1 field. Rust killed the plants in the 2-acre field where rust was heavy in August. The other very heavily rusted plants were at the Brandon Experimental Farm in a plot where sunflowers had been grown in 1951, but had shown only traces of rust.

The relative freedom from rust in 1952 may be attributed to the lack of inoculum in most areas when the new crop was emerging. Warm weather in April may have induced early germination of rust teliospores before susceptible new host plants emerged. The drought in May and early June delayed emergence of the sunflower crop, and may have terminated much of the teliospore germination. The small acreage devoted to sunflowers in 1952 made it fairly easy for most growers to sow the crop away from fields where sunflowers were grown in 1951. Heavy infections in the few fields where rust inoculum was plentiful, and extremely heavy rust in inoculated plots at Winnipeg, indicated that the rust outbreak might have been severe if inoculum had been as plentiful as in 1951.

WILT (Sclerotinia sclerotiorum). No wilt was seen in 15 fields and traces of wilt in 9 in the early survey. There was 20% wilt in a 50-acre field which was sown to flax in 1951 and was fallowed in 1950. In one 10-acre field there was 50% wilt in a portion which was manured heavily in 1950, and only 2% wilt in the rest of the field. In the late survey, no wilt was seen in 8 fields, traces in 17, and 5-10% in 2. There was 50% wilt in the field where 20% wilt was seen in August, and 75% in the small field where the infection was 50% in August. All the infections observed seemed to have originated at or near the soil line.

STALK ROT (cause unknown). The stalk rot recorded in 1949 and 1951 was not observed in 1952. Browning of stalks was seen in 13 fields during the late survey. Less than 1% of the plants were affected in 8 fields, 20-50% in 4, and 100% in one. The pith was clean and white in plants with brown stalks in most fields, and the external browning did not seem to be directly correlated with severity of stalk-borer infestation. The 100% stalk browning occurred in the field killed by rust. The stalks were hollow, but the pith seemed to have dried out rather than rotted away.

MISCELLANEOUS. Powdery Mildew (Erysiphe cichoracearum) was present in trace amounts in 7 fields, and on 50% of the leaves in one in the late survey. Leaf Mottle (cause unknown) was suspected on only one plant in a farm field. Frost Damage was seen on plants in a number of fields early in the season. 2,4-D Injury ranged from trace to sev. in several fields. Head Drop (cause unknown) was seen in two fields, with one plant affected in each. A high percentage of head drop was reported in certain of the genetic lines in Dr. E. D. Putt's nursery at Altona. Conspicuous distortion of the cotyledons and the first few leaves, in some cases associated with stunting of the plants, was observed in the greenhouse at Winnipeg and also in experimental plots and some farm fields. The symptoms were similar to those induced by 2,4-D, but occurred on some plants which could not have been exposed to 2,4-D fumes. It is possible that the disorder was caused by frost injury of ripening seed in the fall of 1951. Head and Neck Rot (Sclerotinia sclerotiorum and Botrytis cinerea) was not seen in farm fields. Some natural infections by S. sclerotiorum was found in heads of uninoculated, unwounded plants in plots at Winnipeg, where inoculations were made with Sclerotinia, Botrytis and other organisms. Downy Mildew (Plasmopara halstedii) affected a few plants in nursery plots at Altona, but it was not seen in farm fields.

Other Observations

WILT (Sclerotinia sclerotiorum) destroyed about 5% of the plants in small plantings at Lethbridge and Brooks (F.R. Harper, M.W. Cormack).

SUGAR BEET

BLACK ROOT (various fungi) was found in 42 representative fields examined in a pre-thinning survey in s. Alta. In samples from these fields, an average of 65% of the plants were infected and 2% were sev. damaged or killed. Thinning operations removed most of the infected plants and no further development was observed during the growing season. Phoma betae, the predominant isolate, was obtained from 86% of the fields. Aphanomyces cochlioides was obtained from only 17% of the fields compared with 51% in 1951, a year of moist conditions. A survey of beets in storage piles in November showed only a tr. of root rot, which was of no economic importance (F.R. Harper).

LEAF SPOT (Phomae betae). Tr. infection was found on the outer leaves in 8 fields out of 14 examined in s. Alta. (F.R. Harper).

ROOT ROT (Rhizopus sp.) caused sev. damage in a poorly drained area in one field near Lethbridge, Alta. (F.R. Harper).

BLACK HEART (boron deficiency) was reported by the grower to have affected about 2% of his crop, as well as that of his neighbors. The specimens were from Beloeil, Chambly Co., Que. (H.N. Racicot).

CULTIVATED and OTHER GRASSES

AGROPYRON - Wheat Grass

Ergot (Claviceps purpurea): Tr. infection on A. trachycaulum recorded in the plots, Lethbridge, Alta. (E.J. Hawn); heavy infection on A. repens at New Minas, N.S. (C.L. Lockhart).

Powdery Mildew (Erysiphe graminis). Heavy infection of the oidial stage on A. repens at Kentville, N.S. (D.W. Creelman).

Stripe Rust (Puccinia glumarum) caused sev. damage to the leaves of A. cristatum in the plots, Lethbridge, Alta. (E.J. Hawn).

Stem Rust (Puccinia graminis). Mod.-sev. infection on about 10% of the plants of A. trachycaulum in the plots, Lethbridge, Alta.; the rust was determined as race 56 at Winnipeg (M.W. Cormack, E.J. Hawn).

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

Head Smut (Ustilago bullata). Infection estimated at 5% on A. trachycaulum in the plots at Lethbridge, Alta. (E.J. Hawn).

Stem Smut (Ustilago hypodytes) was quite general on A. repens in a small area near Trout Creek Point, B.C. When first observed 2-3 years ago, only a few plants were affected; it seems to be on the increase, spreading from the first point of infection (G.E. Woolliams).

Bacterial Blight (Xanthomonas translucens f. sp. cerealis) sev. infected a patch of A. repens near Oak Lake, Man.; pathogenic isolates 4021 and 4060 were obtained (W. A. F. Hagborg).

AGROSTIS

Tar Spot (Phyllachora graminis) sev. infected A. palustris at Brooklyn, N.S. (D. W. Creelman).

Stem Rust (Puccinia graminis). A 50% infection was seen on A. scabra in one field at Hortonville, N.S. (D. W. Creelman).

Leaf Rust (Puccinia rubigo-vera). A 75% infection was observed at Prospect, N.S.; the small size of the spores suggests that this collection is P. rubigo-vera var. impatientis. The rust was also collected at Pembroke (D. W. Creelman).

BROMUS - Brome Grass

Leaf Rust (Puccinia rubigo-vera) was heavy on B. ciliatus at Lennoxville, Que., 29 July (D. Leblond).

CALAMAGROSTIS

Leaf Gall Nematode (Ditylenchus graminophilus). Traces were seen on C. canadensis at Petawawa, Ont., in June 1952. Infection was mod. on a small colony at Rupert, Gatineau Co., Que. in July. It was widespread and sometimes mod.-sev. at St. Anthony, Nfld., in 1951 (D. B. O. Savile).

Crown Rust (Puccinia coronata) was observed on C. canadensis at Casey's Corner, Kings Co., and at Pembroke, Yarmouth Co., N.S. (D. W. Creelman).

DACTYLIS GLOMERATA (Orchard Grass)

Powdery Mildew (Erysiphe graminis). Sl. infection in the rod rows at the Station, Saanichton, B. C. (W. Jones).

Purple Leaf Spot (Mastigosporium rubricosum) was common at North Saanich, B. C., on 20 April (W. Jones).

Brown Stripe (Scolecotrichum graminis) was common in the rod rows at the Station, Saanichton, B. C. (W. Jones). Heavy infections were noted in the fall of the year in many fields and orchards in Kings Co., N.S. (D. W. Creelman).

ELYMUS

Smother (Epichloe typhina) was collected on E. innovatus in good fruit at Christopher Lake, Sask. (T. C. Vanterpool).

FESTUCA - Fescue

Net Blotch (Helminthosporium dictyoides). A mod. infection was observed on F. elatior variety Ensign growing in rows in seed increase plots at Ottawa, Ont. Sl. damage was noted only after the seed was set, causing only the tips of leaves to die back. The pathogen proved to be seed-borne, some 12% carrying the fungus (R. J. Baylis).

Root Rot (Helminthosporium spp.). A tr. infection was observed in a field near Sexsmith, Alta. (J. B. Lebeau).

Brown Stripe (Scolecotrichum graminis). Sl. infection on creeping red fescue at the Station, Lacombe, Alta. (E. J. Hawn).

HOLCUS LANATUS

Crown Rust (Puccinia coronata). All clumps of this grass, which is widely distributed in s. w. N. S., were heavily infected wherever examined in Digby and Yarmouth counties (D. W. Creelman).

HORDEUM JUBATUM

Stripe Rust (Puccinia glumarum). Tr. -sl. infections were found in many locations from Edmonton to Lloydminster, Alta. (G. B. Sanford).

PANICUM

Tar Spot (Phyllachora punctum (Schw.) Orton). A tr. infection was found on P. subvillosum at Canning, N. S., where it was also collected in 1951 (D. W. Creelman).

PHLEUM PRATENSE

Rust (Puccinia graminis var. phlei-pratensis). A mod. infection was recorded at Wolfville and a sev. one at Acadia, N. S. (D. W. Creelman).

Brown Stripe (Scolecotrichum graminis). A mod. -sev. infection was present in one field at the Farm, Ottawa. For the third year the disease has developed in the same planting. It does not appear to be sev. until after the crop blossoms. As the plants mature, however, the discoloration caused by the coalescing stripes becomes very conspicuous. The disease was sev. in 1950, but it was less prevalent in 1951 than this year. The fungus was obtained from a large proportion of the 1950 seed by routine plate test after surface disinfecting with 2% chlorine solution. However when the seed was sown in soil in the greenhouse, only 1% of the seed gave rise to diseased seedlings (R. J. Baylis).

SPARTINA

Rust (Puccinia sparganioides) was observed on both S. patens and S. pectinata in Kings, Annapolis, Digby, and Yarmouth counties, N. S. (D. W. Creelman).

Rust (Uromyces acuminatus) was also collected on S. pectinata at Canning, Kings Co., N. S. (D. W. Creelman).

LAWNS

Fairy Rings (Marasmius oreades). Several fairy rings are present every year on one lawn of the University campus, Vancouver, B. C. (H. N. W. Toms).

Spot Blight (Pythium sp.). A new private lawn in Edmonton, Alta., showed 50% of its surface affected (A. W. Henry).

III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

RUST (Puccinia asparagi). Infection was tr. to sev. in plantings of Mary and Martha Washington in the Armstrong area, B. C. Rust appeared to be least prevalent in fields where air drainage was good, but most severe, causing premature death of the top growth, in fields surrounded by trees (G. E. Woolliams). Rust was heavy in a garden at Corkery, Ont. (J. W. Groves).

BEAN

GREY MOULD (Botrytis cinerea) infected 1-2% of the pods of Golden Wax in a 4-acre field at Berwick, N. S. Because sufficient grey mould showed on the pods to cause the crop to be rejected for canning purposes, the grower estimated a 50% loss of revenue (D. W. Creelman).

ANTHRACNOSE (Colletotrichum lindemuthianum). Tr. infections were found in test plots and occasional garden plots at Edmonton, Alta. (L. E. Tyner). Mod. infection was seen on the pods in a garden at Saskatoon, Sask.; the disease is not often reported in Sask. (T. C. Vanterpool). Infection was sl., but generally distributed in fields of white beans in Essex and Kent counties, Ont. (N. J. Whitney). A tr. infection was found on Burpee 242 lima bean in 2 gardens at Harrow (C. D. McKeen). Anthracnose was more common than in recent years in s. w. Que. In the fields inspected, percentage of plants infected was: At Stanbridge East, 10-acre field 60, small field 1-3; at Laprairie, 4 fields 15-20 (E. Lavallee). From specimens received it was evident that anthracnose was sev. about Amos, Abitibi Co.; several people who obtained seed from the same source suffered heavy losses (J. E. Jacques). A 3-acre planting of a canning variety showed lesions on stems and leaves at South Berwick, N. S. Some plants were already dying and drying up on 3 July and probably the whole crop was a total loss (D. W. Creelman). Anthracnose caused sl. to very sev. damage in all three counties of P. E. I.; one 10-acre field was a complete loss on 16 Aug. (R. R. Hurst). Sl infections in 2 gardens at Topsail, one at St. John's East, and one at Holyrood, Nfld. (G. C. Morgan).

DRY ROOT ROT (Fusarium solani f. phaseoli) caused sev. damage in some fields of white beans in Essex, Kent and Huron counties, Ont. (N. J. Whitney).

SOOTY MOULD (Heterosporium sp. associated). A mod. infection was seen on the pods of a crop being harvested in Kent Co., Ont.; the damage would be sl., provided the crop is not subjected to prolonged moist periods before threshing (N. J. Whitney).

HALO BLIGHT (Pseudomonas phaseolicola). Infection was sl.-sev. in plantings of garden beans examined in s. Alta. Several varieties were completely destroyed in the plots at Brooks. Resistant varieties of field

beans were also infected at Brooks, but they remained free from disease in the plots at Lethbridge (M. W. Cormack, F. R. Harper). Infections were tr. -sev. in garden plots at Edmonton and Athabasca. Probably on account of good quality seed, blight was less prevalent than usual in the test plots (L. E. Tyner, A. W. Henry). Specimens received from places in Man. indicated that infection was sev.; halo blight was prevalent in the variety tests at the University, Winnipeg (W. A. F. Hagborg). An average infection of 5% of the plants was recorded in fields of white beans in Essex, Kent, and Huron counties, Ont. (N. J. Whitney). Infection was a tr. in a small field of Golden Wax at Caanan, N. S. Production of snap beans in this district has declined from 4,000 hampers in 1949 to 1,000 in 1950, and 300 in 1951. In 1952, this one grower grew a small acreage. He secured clean seed and grew it on fields not recently in beans; he produced an excellent crop (K. A. Harrison).

BACTERIAL LEAF SPOT (Pseudomonas syringae). A tr. infection was seen in a white bean field at Grand Bend, Huron Co., Ont. (N. J. Whitney). This pathogen has not previously been reported on beans in Canada (I. L. C.).

ROOT ROT (Pythium debaryanum). Infection was sl., but infected plants were destroyed, in a field of Michelite at Grand Bend, Ont. (N. J. Whitney).

SCLEROTINIA ROT (S. sclerotiorum) was mod. on the pods in a garden at Claresholm, Alta. (M. W. Cormack).

RUST (Uromyces appendiculatus). Infection was heavy in only one field of white beans in Kent Co., Ont.; other fields showed a tr. (N. J. Whitney). Rust mod. infected a few plants of Kentucky Wonder pole beans in a kitchen garden at Kentville, N. S. (K. A. Harrison).

ROOT ROT (Verticillium sp.) infected 50% of the plants in a planting of lima beans in Kent Co., Ont., and caused mod. damage. A species of Verticillium was isolated consistently from the roots, but its pathogenicity has not been tested (N. J. Whitney).

COMMON BLIGHT (Xanthomonas phaseoli) was present in most plantings examined in s. Alta., but generally it caused less damage than halo blight with which it was usually associated (M. W. Cormack, F. R. Harper). Infection on white beans was 25-50% in Essex, Kent, and Huron counties, Ont. The disease was particularly sev. between Blenheim and Ridgetown; in some fields the leaves and later the pods were sev. damaged (N. J. Whitney). Low infections were noted in gardens in Queens Co., P. E. I. (R. R. Hurst).

BACTERIAL BLIGHT (Xanthomonas phaseoli and Pseudomonas phaseolicola). Numerous cases were observed in Sask.; damage was mod. (R. J. Ledingham). The disease appeared to be less common than usual in Sask., in spite of the high atmospheric humidity during the summer (T. C. Vanterpool). In the 6 fields inspected at Laprairie and Stanbridge East, Que.; infection was 1-2% of the plants (E. Lavallee).

MOSAIC (virus). A few infected plants were seen in a garden at Lethbridge and in the variety plots at Brooks, Alta. (F.R. Harper). Less than 1% of the Red Pod Kidney Wax plants were affected in a 1/2 acre plot at Ottawa, Ont. (V. R. Wallen). Mosaic (Phaseolus virus 1) infection was a tr. in a garden in Fredericton and 1% in a field of wax beans in Carleton Co., N.B. Yellow mosaic (Phaseolus virus 2) was found infecting 2-6% of the plants, mostly Kentucky Wonder, in 6 farm gardens in York and Sunbury counties; in all cases the beans were growing near gladioli that showed a faint mottle (D. J. MacLeod). Some 20% of the pole bean plants were stunted and killed in a garden at Kentville, N.S.; gladioli nearby showed sev. mosaic symptoms (K. A. Harrison).

2,4-D INJURY was severe in a garden at Ottawa, Ont.; brush around the garden had been sprayed with 2,4-D (H.N. Racicot).

BEET

LEAF SPOT (Cercospora beticola). Sl. infection was seen in a garden at Charlottetown, P.E.I. (J.E. Campbell).

LEAF SPOT (Phoma betae). A mod. infection was observed on a 1/2 acre plot of Detroit Dark Red #16 at Ottawa, Ont. (V.R. Wallen).

SCAB (Streptomyces scabies) caused sev. damage to a 1/2 acre planting at Rockland, N.S.; the field had been heavily dressed in the spring with chicken manure (D.W. Creelman). Mod. infection was seen in 3 fields at Manuels, Nfld. (G.C. Morgan).

BROAD BEAN

POWDERY MILDEW (Erysiphe polygoni) was seen occasionally on plants grown for seed at Lillooet, B.C. (G.E. Woolliams).

BROCCOLI

CLUB ROOT (Plasmodiophora brassicae). From a shipment of 100,000 plants from the Snider Division, General Foods, Albion, N.Y., consigned to the Dominion Preserving Co., Laprairie, Que., and inspected at Montreal, 91 plants were intercepted. When these were examined in Ottawa, it was found that in one group of 5 plants there were four with swollen roots. Sections of typical roots from 2 plants revealed the characteristic plasmodia of P. brassicae. Another bundle of plants was mostly affected by mild cases of Wire Stem (Rhizoctonia solani) and a third bundle showed Oedema (non-parasitic) (H.N. Racicot, I.L. Conners).

CABBAGE

POD MOULD (Alternaria tenuis) affected all the plants in 1/10 acre plot of Canadian Acre being grown for seed at Ottawa, Ont. Pods were moulded and not setting seed, causing 80% loss of crop (V. R. Wallen).

SOFT ROT (Erwinia carotovora) destroyed about 3% of the heads in a field under irrigation at Harrow, Ont. (C. D. McKeen). Two plants were infected in a 1/10 acre seed plot of Chieftan Savoy at Ottawa, Ont. (V. R. Wallen).

YELLOWS (Fusarium oxysporum f. conglutinans). A whole farm of 40 acres at St. Vincent de Paul, Que. seems infested with the organism. In a varietal test on the farm, the percentage of plants affected of each variety was: Green Acres 90. 3; Golden Acre 86. 7; Penn State Ballhead 85. 4; Danish Ballhead 81. 9; Jersey Wakefield H. Imp. 75. 1; Winningstadt Hatif 47. 6, and Copenhagen Market 38. 3. Yellows has not been found elsewhere in Laval Co. (E. Lavallee).

CLUB ROOT (Plasmodiophora brassicae) was reported from Fort William, Ont. ; the grower stated that he had had the same trouble for 4 years (H. N. Racicot). Club root is one of the main problems in the growing of crucifers in the Montreal district, Que. Many reports were received from farmers of loss in cabbage, cauliflower, chinese cabbage, turnip and radish, losses varying from 5 to 60% of the crop (E. Lavallee). Tr. infection was observed in Danish Ballhead in Queens Co. , P. E. I. , (R. R. Hurst). Club root is a very serious disease in Nfld. , especially in areas where there is insufficient land for a rotation of crops. Losses were heavy in 10 gardens in Conception Bay and 8 on the Southern Shore; infection was light in a commercial planting at Clarke's Beach (G. C. Morgan).

BACTERIAL SPOT (Pseudomonas maculicola) was found affecting a considerable portion of the cabbages in a shipment from the United States (E. Lavallee, H. N. Racicot). The organism was readily isolated from the lesions and the isolate proved pathogenic (M. D. Sutton).

WIRE STEM (Rhizoctonia solani). Sev. damage occurred in a large bed in which the seedlings were crowded at Lethbridge, Alta. (M. W. Cormack). The disease was prevalent on seedlings in a few greenhouses at Leamington, Ont. (C. D. McKeen). Many seedlings of cabbage, cauliflower, and turnip were affected in Laval Co. , Que. (E. Lavallee). Damage was sev. at Cole Harbor, Halifax Co. , N. S. (D. W. Creelman, W. A. L. MacLaughlan).

STERILITY (?yellowstype of virus) was found affecting 2 plants grown for seed in a garden in York Co. , N. B. (D. J. MacLeod).

CARROT

LEAF SPOT (Cercospora carotae) half defoliated a many-acre field at Ste. Rose, Laval Co., Que.; the crop could not be sold as bunched carrots (E. Lavallee). Leaf spot was severe in one field at Waterville, N.S. (K. A. Harrison).

SOFT ROT (Erwinia carotovora). A 20% infection was present in November in a ton of carrots grown in Mont Pearl and in storage at St. John's, Nfld.; 1/2 ton lot imported from Halifax, N.S., in the same storage was also infected (G. C. Morgan).

NEMATODES (Meloidogyne sp.). There are many fields more or less infected at St. Martin, Ste. Dorothee, and at St. Janvier, near St. Jerome in Que. (E. Lavallee).

VIOLET ROOT ROT (Rhizoctonia crocorum) caused a sl. infection on Chantenay and Danvers in the Thedford marsh, Ont., but the affected roots were a total loss (N. J. Whitney).

STORAGE ROT (Sclerotinia sclerotiorum) caused sev. damage this fall at Arborfield and Saskatoon, Sask., to carrots in home storage (T. C. Vanterpool).

BACTERIAL BLIGHT (Xanthomonas carotae). A sl. infection was seen in several fields of Chantenay and Nantes grown for seed in the Grand Forks area, B.C., but a 25% infection was present in one field (G. E. Woolliams). A tr. was present in the University plots, Winnipeg, Man. (W. A. F. Hagborg).

YELLOWS (Callistephus virus 1). A sl. infection was found on the seed crop in the Grand Forks area, B.C., and on the root crop at Summerland (G. E. Woolliams). A 1% infection was found in carrot fields at Taber, Barnwell, and Medicine Hat, Alta., by mid-September (F. R. Harper). Infection was sl. in the plots at Lacombe and 3-6% in the test plots at Edmonton. A few flixweed plants (Descurainia sophia) in an adjacent alfalfa plot were found with symptoms resembling those of yellows (T. R. Davidson). Yellows was severe on 15% of the plants in 3 fields examined in the north end of the Thedford marsh, Ont. (N. J. Whitney). A tr. was present in 1/2 acre seed crop of Chantenay #27 at Ottawa, Ont. (V. R. Wallen). Yellows infection, 5-10%, was commonly seen in carrot fields on Isle Jesus, in the Montreal district, Que. (E. Lavallee). Yellows was common on carrot in Carleton, Sunbury, Queens, and Victoria counties, N.B.; infection ranged from a tr. to 42%. In a private garden in York Co., 67% of the roots were sev. damaged (D. J. MacLeod). Only about 3% of the carrots in Kings Co., N.S., were affected this year; carrots were a poor crop and this fact may explain the low incidence of yellows (K. A. Harrison). A 1% infection was noted in a planting in Queens Co., P.E.I. (R. R. Hurst). Sl. infections were noted in 2 small fields at Clarke's Beach, Nfld. (G. C. Morgan).

CAULIFLOWER

WIRESTEM (Rhizoctonia solani) caused up to 5% damage to seedlings in flats in 2 greenhouses at Leamington, Ont. (C. D. McKeen). About 5% of the transplants were sl. affected in a greenhouse at St. John's, Nfld.; the decrease in infection over last year is credited to the use of Arasan-treated beds (G. C. Morgan).

WHIPTAIL (molybdenum deficiency) sev. affected 3 large fields at St. Martin and Ste. Dorothee, Que.; the crop was practically a total loss (E. Lavallee).

CELERY

BROWN SPOT (Cephalosporium apii) was again found near Burlington, Ont., and the organism was readily isolated from the brown spots (B. H. MacNeill). Several affected plants of Utah Salt Lake were brought in from a farm in Wentworth Co., Ont., where brown spot had not been noticed before; subsequent search revealed no other affected plants. A variety of fungicides including fixed copper, Dithane D-14 plus zinc sulphate, and ferbam was used. Magnesium sulphate was also added to each spray to correct a magnesium deficiency. Two growers in York Co., also sent in affected plants of various Utah varieties. Both growers claimed that the disease was also present in 1951. No estimate of the infection could be made at one farm because the crop was already harvested, but at the other 5% of the plants were affected. It is possible that the disease was spread from the former farm to the latter by the purchase of plants in 1951. In 1952 only home-grown plants were raised on the latter farm (C. B. Kelly).

EARLY BLIGHT (Cercospora apii) was more prevalent than late blight on 3 neighboring farms on muck soil at Ste. Dorothee, Laval Co., Que.; celery has been grown on the same land for many years (E. Lavallee).

VIOLET ROOT ROT (Rhizoctonia crocorum) was found sev. affecting 7% of the Epicure celery on a farm in the Thedford marsh, Ont. (N. J. Whitney). Although the fungus attacks a wide variety of plants, the present report appears to be the first of its occurrence on celery in North America (I. L. C.).

LATE BLIGHT (Septoria apii-graveolentis). A heavy infection developed in a one-acre field at Leamington, Ont., in June. Weekly sprays of fixed copper were applied, but their effectiveness was reduced by almost daily overhead irrigation (C. D. McKeen). Late blight was present on most celery whether grown in beds or fields in Laval Co., Que., but the damage varied with the spray program followed (E. Lavallee).

YELLOWS (Callistephus virus 1, Western strain). A 2% infection was found in one field in Sunbury Co., N. B. (D. J. MacLeod).

BLACK HEART (non-parasitic) affected 10-20% of the plants in parts of 2 small fields where growth had been most rapid in Kings Co., N.S. (K. A. Harrison). About 5% of the plants were affected in a planting in Queens Co., P. E. I. (R. R. Hurst).

CUCUMBER

LEAF SPOT (Alternaria sp.) has become quite common in Kings Co., N. S., in gardens where cucumbers are raised year after year; it has not been noticed in fields of pickling cucumber (K. A. Harrison).

GREY MOULD (Botrytis cinerea) was prevalent in April and May in a few greenhouses in the Leamington district, Ont. Protective spraying with ferbam has reduced disease incidence in recent years (C. D. McKeen).

SCAB (Cladosporium cucumerinum) was present, as usual, in most greenhouse crops in Essex, Co., Ont., but it caused little damage (C. D. McKeen). Mod. infection on cucumbers received from Casselman on 5 Aug. (H. N. Racicot). Only a small amount of scab developed along the Saint John River Valley and in the Grand Lake district, N. B. However, a few late fields were sev. damaged. No scab appeared in the plots sprayed with fungicides at Macdonald Corner (J. L. Howatt). Scab completely destroyed a field of pickling cucumbers at Kentville, N. S. The disease first appeared in that part of the field that overlapped on an area that bore a diseased crop in 1951; it then spread over the whole field (K. A. Harrison). Scab caused sl. damage to a crop of Chicago Pickling at Charlottetown, P. E. I. (J. E. Campbell).

BACTERIAL WILT (Erwinia tracheiphila) was present in most fields in the Harrow-Leamington area, Ont., destroying up to 3% of the plants. Late crops in Kent Co., were more sev. damaged (C. D. McKeen).

POWDERY MILDEW (Erysiphe cichoracearum) has become a destructive disease in the greenhouses in s. w. Ont. Powdery mildew entered a few greenhouses in the fall of 1951, where it developed on young cucumber plants and persisted throughout the winter months despite attempts to eradicate it. The purchase of young plants from greenhouses where the disease existed served to disseminate it over much of the greenhouse cucumber area. The harvest of several crops was curtailed by the death of mildew-infected foliage. Field crops were also severely infected in August and September (C. D. McKeen).

WILT (Fusarium sp.) affected cucumbers at Estevan and Regina, Sask. (T. C. Vanterpool).

WILT (Phomopsis sp.) A trace of wilt was found in one greenhouse at Leamington, Ont. This disease was previously attributed to Mycosphaerella citrullina, but cultural studies have shown that the fungus is a Phomopsis (C. D. McKeen).

ANGULAR LEAF SPOT (Pseudomonas lachrymans). A tr.-mod. leaf infection was observed in commercial plantings at Taber, Alta. The leaves were sev. damaged in a sprinkler-irrigated field at Medicine Hat, but plants made considerable recovery later in the season. No fruit infection was seen (F.R. Harper, M.W. Cormack). Angular leaf spot was very sev. in a field at St. Eustache, Man., on which a crop of cucumbers was grown in 1951. Damage was mod. in several other fields of pickling cucumbers. Good recovery of the crop followed treatment with a fixed copper. Pathogenic isolates 4028 and 4068 were obtained (W.A.F. Hagborg).

DAMPING-OFF (Pythium ultimum) caused the death of a few plants in several greenhouses at Leamington, Ont. (C.D. McKeen).

WILT (Verticillium albo-atrum) caused the total loss of crop on 2 1/2 acres of cucumbers at Steveston, Lulu I., B.C. (N.S. Wright).

MOSAIC (Cucumis virus 1) was present in several crops of field cucumbers in the Leamington area, Ont. It affected up to 30% of the plants of Burpee hybrid in one greenhouse. Whereas formerly this variety showed high resistance to Cucumis virus 1, recently it has been showing little resistance to the strains of this virus now present in Ont. (C.D. McKeen). Sl. infections were noted in several widely separated fields in Lincoln Co., (J.K. Richardson). A tr. of mosaic was seen in 3 plantings in Sunbury Co., N.B. (D.J. MacLeod). A sl. infection was recorded in Chicago Pickling at Charlottetown, P.E.I. (J.E. Campbell).

FOOT ROT (cause unknown) was found, as usual, in a few greenhouse crops where the soil had not been sterilized previously or at least not before the present crop was planted (C.D. McKeen).

2,4-D INJURY was reported on cucumber, tomato, and zinnia from Leader, Sask. (T.C. Vanterpool).

EGGPLANT

DAMPING-OFF (Rhizoctonia solani) again caused damage to seedlings in flats in several greenhouses in the Harrow area, Ont. (C.D. McKeen).

WILT (Verticillium albo-atrum) occurred in the Okanagan Valley, particularly at Summerland, Kelowna, and Vernon, B.C., affecting a few to 50% of the plants (G.E. Woolliams). The disease affected about 10% of the plants in 3 fields near Harrow, Ont. (C.D. McKeen).

JERUSALEM ARTICHOKE

POWDERY MILDEW (?Erysiphe cichoracearum) slightly infected a planting at Vancouver, B.C. (H.N.W. Toms).

RUST (Puccinia helianthi) was heavy in a garden at Pakenham, Ont., causing the death of the lower leaves (E.G. Anderson).

LETTUCE

BOTTOM ROT (Rhizoctonia solani). A tr. -3% of the plants were destroyed in several fields at Leamington, Ont. (C. D. McKeen).

DROP (Sclerotinia sclerotiorum) caused sev. losses in several market gardens at Medicine Hat, Alta.; it also killed some plants in gardens at Lethbridge (F. R. Harper).

YELLOWS (Callistephus virus 1) affected 3% of the plants in a small field, at Glenmont, N. S., where the seed was sown directly in drills (K. A. Harrison). Diseased specimens were received from North Sydney where infection was said to be general throughout 10,000 plants (D. W. Creelman).

FERTILIZER INJURY. Over 15 acres of young seedlings were completely burned off at Ste. Therese, Two Mountains Co., Que. Fertilizer had been applied in the rows immediately under the seedlings. Injury occurs when a heavy rain is followed by very hot sunny days (E. Lavallee).

TIP BURN (non-parasitic). It was estimated that 40% of a carload of lettuce imported into Montreal, Que., was affected (J. E. Jacques). Several small growers in Kings Co., N. S., complained that they were having trouble with late-planted crops (K. A. Harrison).

MELON

POWDERY MILDEW (Erysiphe cichoracearum) appeared in most fields in the Harrow-Leamington area, Ont.; heavy leaf and stem infection caused defoliation and death of vines, reducing the yield and lowering the quality of melons in crops maturing in late August (C. D. McKeen).

WILT (Fusarium bulbigenum var. niveum). Iroquois is being grown on farms infested with the organism in Ont., and to date has shown no evidence of loss of resistance. The appearance of wilt in fields of susceptible varieties indicates that the fungus is spreading to new areas (C. D. McKeen).

ROT (Fusarium sp.). Half the melons in the first 2 pickings from a 3-acre field near Harrow, Ont., were affected. The rot started at the blossom end of the fruit; the fungus gained entrance through a tiny opening in the region of the stylar scar. Later pickings were free of the trouble (C. D. McKeen).

DAMPING-OFF (Pythium irregulare). The starting of melon plants in wooden bands in outdoor beds has resulted in more late damping-off than formerly in s. w. Ont. Although the soil in the bands is steamed, the fungus readily reaches the roots of the young plants from the unsteamed soil below. On account of the cool weather in May plant growth was very retarded and the disease became more serious than usual. It also caused sev. losses after the plants were set in the field; 50% of the plants died on one farm at Harrow (C. D. McKeen).

WILT (Verticillium albo-atrum) killed 50% of the plants by mid-Sept. in the trial plots at Vancouver, B. C. ; only some fruit that matured before the attack began in early Sept. were harvested (H. N. W. Toms). Wilt was present in most commercial plantings in the Osoyoos district, affecting up to 20% of the plants (G. E. Woolliams).

MOSAIC (virus) was sev. in many fields in the Harrow-Leamington district, Ont. The virus was transmitted by infestations of cotton aphids. Near one field, where every melon plant was infected, half the low hairy ground cherry (Physalis pubescens) showed mosaic symptoms (C. D. McKeen).

ONION

PURPLE BLOTCH (Alternaria porri). About an acre of onions at Ste. Dorothee, Laval Co., Que., were so sev. affected that they could not be sold in bunches (E. Lavallee).

NECK ROT (Botrytis allii). A sev. infection occurred prior to harvest in a field near Barnwell, Alta. (F. R. Harper). An affected specimen was received from Medicine Hat (L. E. Tyner). Neck rot was present in specimens taken from a shipment of onions at Montreal. The crop had been grown at Newmarket, Ont. It appeared that the crop had grown very rapidly and were immature when harvested as the sound tissues were spongy (H. N. Racicot). During an inspection of a warehouse at St. John's Nfld., infection was 4-48%, av. 21% in a small shipment from the West Coast; in 50 bags from N. S., av. infection was 2% (G. C. Morgan).

NECK ROT (Botrytis cinerea followed by Penicillium sp.) was found affecting onions in storage at Saskatoon, Sask. ; the onions had not been properly cured (T. C. Vanterpool).

BULB ROT (Fusarium oxysporum f. cepae) was found at Kelowna, B. C., affecting plants growing in a field, in which the disease was first observed over 20 years ago (G. W. Woolliams).

DOWNY MILDEW (Peronospora destructor). The epidemic was less severe at St. Martin and Ste Dorothee, Laval Co., Que. this year than in 1951 (P. D. S. 31:52). Damage was 5-20%, depending on the degree of maturity (E. Lavallee).

ROOT ROT (Pythium irregulare). A few patches of diseased seedlings of Spanish onions was seen in one greenhouse bed at Leamington, Ont. (C. D. McKeen).

PINK ROOT (Pyrenochaeta terrestris) appeared in the Leamington marsh, Ont., again affecting the same areas. Besides P. terrestris, a Pythium and a Fusarium were isolated from the roots (C. D. McKeen).

SMUT (Urocystis cepulae) was found infecting on examination at Vancouver about 30% of the seedlings in one shipment imported from Walla Walla, Wash. ,and consigned to Cloverdale, B. C. (W. Touzeau, W. Jones). Smut killed about 30% of the seedlings in 3 small fields infected with smut at St. Joseph de Sorel, Que. (E. Lavallee).

YELLOWS (Callistephus virus 1) was found affecting 3 plants in a garden in Sunbury Co. , N. B. (D. J. MacLeod).

PARSNIP

GREY MOULD (Botrytis cinerea) was observed on a specimen in a store in Saskatoon, Sask. (T. C. Vanterpool).

ROOT KNOT (Meloidogyne sp.). A sl. infection was seen on the fibrous roots at Hatzic, B. C. (A. D. Christie, J. Bosher).

LEAF SPOT (Ramularia pastinacae). A sl. infection was observed in a field at Barnwell, Alta. (F. R. Harper, D. B. O. Savile). Infection was mod. in a garden at Kentville, N. S. (I. V. Hall, D. W. Creelman).

SCLEROTINIA ROT (S. sclerotiorum) was observed in a store in Saskatoon, Sask. (T. C. Vanterpool). Specimens also received from the Farm, Indian Head (R. J. Ledingham).

YELLOWS (Callistephus virus 1) caused tr. -1 1/2% infection in 3 gardens in Sunbury Co. , N. B. (D. J. MacLeod).

PEA

LEAF and POD SPOT (Ascochyta pisi). A sl. infection in one field of peas being grown for seed was found by inspectors of the Plant Products Division at Creston, B. C. ; the diagnosis was confirmed (G. E. Woolliams). Tr. leaf infections but no spots on the pods were observed in 5 fields in the Lethbridge area, Alta. A garden patch at Medicine Hat was mod. infected (F. R. Harper). Traces were found in plantings at Edmonton and Lacombe (T. R. D.). The disease was reported to be severe in a small garden at Hoosier, Sask. (T. C. Vanterpool). Infection was tr. -sev. in garden plantings in Queens Co. , P. E. I. (R. R. Hurst).

POWDERY MILDEW (Erysiphe polygoni) was fairly prevalent late in the season in a garden at Summerland, B. C. , after the crop was mostly harvested (G. E. Woolliams). Sl. damage was caused in a planting at the Forestry Station, Sutherland, Sask. (H. W. M.). Infection was sev. in a late planting in a garden at Kentville, N. S. (K. A. Harrison).

ROOT ROT (Fusarium spp.) caused a 40% reduction of the yield of the canning crop in the Montreal district, Que. The spring was excessively wet (R. O. Lachance). A 8-10 acre field at Napierville was a total loss (E. Lavallee). All the plants were killed in a garden patch in Fredericton, N. B.; the ground was very moist and heavy (S. R. Colpitts). Root rot caused about 5% damage at Kentville, N. S., in a new garden patch made 3 years ago and disease-free until this year. In an old garden nearby the crop was a failure on account of root rot (K. A. Harrison). Root rot destroyed 10% of the plants in a field in Freshwater Valley, St. John's, Nfld.; peas have been grown in the same field for the last 4 years (G. C. Morgan). The wet conditions in some of the areas suggest that pathogens other than Fusarium spp. may have been active (I. L. C.).

MYCOSPHAERELLA BLIGHT (M. pinodes). Diseased plants were received from one grower in Man.; no survey of pea diseases was made (W. A. F. Hagborg). A sl. infection was found in 1/10 acre block of Thos. Laxton-Wilt Resistant at Ottawa, Ont. (V. R. Wallen).

DOWNY MILDEW (Peronospora pisi). A sl. infection was seen on Onward at Sidney, B. C. (W. R. Orchard). Tr.-sl. infections were found in 5 fields near Lethbridge, Alta. (F. R. Harper) and a sl. infection in the plots at Edmonton (T. R. D.).

BACTERIAL BLIGHT (Pseudomonas pisi). Traces of leaf and pod infection were found in 13 fields near Lethbridge, Alta. by 31 July (F. R. Harper). A mod. infection was seen in Valley field peas at the Station, Melfort, Sask.; the seed was from Ottawa (H. W. M.). Infection was sev. on samples received from a Man. firm who was having field peas grown under contract. At least one field was reported to be not worth harvesting (W. A. F. Hagborg).

ROOT ROT (Rhizoctonia solani). Tr.-mod. infection was noted in 3 fields near Barnwell, Alta., by mid-June (F. R. Harper).

LEAF BLOTCH (Septoria pisi). A sev. infection was seen in a garden at Edmonton, Alta. (A. W. Henry). Mod.-sev. infections were present on some varieties at the Stations at Melfort and Scott. (H. W. M.). Infection was mod. on the lower leaves of Ottawa PE-4 in a 1/10-acre block at Ottawa, Ont. (V. R. Wallen).

RUST (Uromyces fabae). Infection was sl. in a 1/10-acre block of Ottawa PE-11 at Ottawa, Ont. (V. R. Wallen); tr. on Little Marvel at the Station, l'Assomption, Que. (H. Genereux); tr. on Fenland Wonder in a garden at Kentville, N. S. (K. A. Harrison).

MOSAIC (Pisum virus 1). Infection ranged from a tr. to 3.5% in gardens in York and Sunbury counties, N. B. (D. J. MacLeod).

PEPPER

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

SOFT ROT (Erwinia caratovora) caused only sl. damage in fields in Essex Co., Ont. Corn-borer damage was light, thus reducing the number of infection courts (C. D. McKeen).

DAMPING-OFF (Pythium sp. and Rhizoctonia solani). A little damping-off developed here and there in flats of seedlings and in transplant beds in Essex Co., Ont., but losses were less than 1% of the plants (C. D. McKeen).

WILT (Verticillium albo-atrum) was found on several farms located in the Okanagan Valley, B. C.; infection varied from sl. to over 75% (G. E. Woolliams).

BACTERIAL SPOT (Xanthomonas vesicatoria) was more widespread in sweet pepper fields in Essex Co., Ont., than in previous years. The disease is seed-borne (C. D. McKeen).

TOBACCO and CUCUMBER MOSAIC (virus) caused sev. losses in 2 fields at Harrow, Ont. (C. D. McKeen). Mosaic (Solanum virus 2) was found on 3 plants in a garden at Fredericton, N. B. (D. J. MacLeod).

ETCH (virus) became widespread in two sweet pepper fields at Harrow, Ont.; infestation of the fields by the green peach aphid preceded the appearance of the disease (C. D. McKeen).

BLOSSOM-END ROT (non-parasitic) was very prevalent in Essex Co., Ont. Losses were probably greater than those caused by all other causes combined; a severe drought occurred in the area (C. D. McKeen).

SUN SCALD (non-parasitic). A high percentage of the fruit showed this condition in August in Essex Co., Ont. (C. D. McKeen).

POTATO

The Division of Plant Protection, Science Service, has supplied the data contained in Tables 5-8 on Seed Potato Certification. All fields entered for certification were planted with Foundation or Foundation A seed.

Table 5. Seed Potato Certification
Fields and Acres Inspected and Passed in 1952

Province	Number of Fields		Fields Passed	Number of Acres		Acres Passed
	Entered	Passed	%	Entered	Passed	%
P. E. I.	6,117	5,519	90.2	23,109	21,039	91.0
N. S.	411	359	87.3	662	572	86.4
N. B.	2,865	2,703	94.3	14,400	13,190	91.6
Que.	996	842	84.5	2,694	2,162	80.3
Ont.	709	614	86.6	2,009	1,720	85.6
Man.	124	107	86.3	444	369	83.1
Sask.	51	49	96.1	76	58	76.3
Alta.	177	163	92.1	702	578	82.3
B. C.	719	629	87.5	1,892	1,627	86.0
Total	12,169	10,985	90.3	45,988	41,315	89.8
Previous Yearly Totals						
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
1948	15,635	12,504	80.0	70,561	57,392	81.3

Acres Entered		Acres Passed	
1952	45,988	1952	41,315
1951	46,176	1951	40,402
Decrease of 198, or 0.4%		Increase of 913, or 2.3%	

The acreage entered for Seed Potato Certification was almost the same as in 1951, when there was a sharp decline from the level of several post-war years. The percentage of fields rejected on account of disease in Que. was noticeably lower than for several years although the figure is still the highest in Canada. The rejections for bacterial ring have greatly declined in Que., but they have increased in Ont., so that the percentage of fields rejected for ring rot is almost the same in the two provinces (8.0% in Que. and 7.6% in Ont.). The most significant change in the varieties being grown was the large increase in acreage of the new Canadian variety Canso, of which 2,430 acres passed inspection. However, with the appearance of races of Phytophthora infestans capable of attacking the variety, it may attract little interest in the future.

Table 6. Seed Potato Certification
Acreage Passed by Varieties

Variety	P. E. I.	N. S.	N. B.	Que.	Ont.	Man. - Alta.	B. C.	Total
Katahdin	2,023	129	8,060	18	937	20	15	11,202
Sebago	10,099	68	189		41	1	6	10,404
Irish Cobler	4,423	55	627	169	89	45		5,408
Green Mountain	2,205	50	1,091	1,795	37	11	123	5,312
Canso	1,322	35	693	44	294	36	6	2,430
Netted Gem	42	40	149		2	528	1,154	1,915
Pontiac	545	26	713			96	15	1,395
Bliss Triumph	14	46	914			22		996
Keswick	184	7	255	48	51	15	12	572
Warba	131	11	33		12	83	89	359
Rural Russet		18	253		20			291
Chippewa	12	39	16		204		1	272
White Rose			95				135	230
Kennebec	12	29	53	44		12	2	152
Early Ohio						66		66
Others*	27	19	49	44	33	70	69	311
Total	21,039	572	13,190	2,162	1,720	1,005	1,627	41,315

* These varieties with the acreage of each were: Ontario 51, Columbia Russet 47, Teton 44, Early Epicure 31, Red Warba 26, Canus 22, Dooley (Rural New Yorker) 19, Early Rose 13, Sequoia 12, Garnet Chili 8, Mohawk 8, Burbank 7, Gold Coin 5, McIntyre 5, Great Scot 3, Pawnee 3, Manota 2, Wee MacGregor 2, Carter's Early Favorite 1, Sir Walter Raleigh 1, Arran Victory 0. 5, and White Bliss 0. 5.

EARLY BLIGHT (Alternaria solani) was reported as follows: Sl. -mod. infection in only 64 (8. 8%) of the fields inspected in B. C., mostly in the Cariboo and central B. C. (H. S. MacLeod); in seed crops, infection very sl. in s. Alta. (R. P. Stogryn), but it occurred in 35 (33%) of the fields in n. Alta. (J. W. Marritt); sl. -sev. infections in commercial plantings at Medicine Hat (F. R. Harper) and Edmonton (G. B. Sanford); generally late in season in Sask., but less sev. than in 1951 (A. Charlebois); only sl. infection in Man., mostly about Winkler (D. J. Petty); infections tr. -sl. in most parts of Ont. (C. D. McKeen et al), being somewhat heavier in e. Ont. (E. H. Peters) and mod. -sev. in several fields of Canso (F. J. Hudson et al); infection was 179-sl. 33-mod. 1-sev. /996 fields inspected in Que.; sl. infection of Alternaria rot in one lot of Teton tubers (B. Baribeau); infection sl. -mod. in most fields in N. B. and heavier than in 1951; heavier on Keswick and Canso than on other varieties; Alternaria rot affected a few tubers in 2 fields of Keswick at harvest (C. H. Godwin); infection usually sl. in N. S. in 1952 except for a few fields; noted first on Keswick on 3 July in Digby Co. (R. C. Leyton); infection again sl. in P. E. I. (H. L. McLaren); infection rather sev. on the Avalon Peninsula, Nfld., except in a few fields where fungicides were used (G. C. Morgan).

Table 7. Seed Potato Certification: Fields Rejected on Field Inspection, 1952

Province	Leaf Roll	Mosaic	Ring Rot in field	Ring Rot on farm	Black Leg	Wilts	Adjacent Diseased Fields	For-eign Var.	Misc.	Total
P. E. I.	89	108			27	32	53	176	113	598
N. S.	4	8				9	17	11	3	52
N. B.		5	31	18	1		1	99	7	162
Que.	3	21	54	13	26	1	10	18	8	154
Ont.	8	5	15	31	5	1	1	10	19	95
Man.			4	2	4			6	1	17
Sask.		1			1					2
Alta.			1	1	8	2			2	14
B. C.	3	5			14	8		3	57	90
Total	107	153	105	65	86	53	82	323	210	1,184
Rejection as a percentage of fields:										
Entered	0.9	1.3	0.9	0.5	0.7	0.4	0.7	2.6	1.7	9.7%
Rejected	9.0	12.9	8.9	5.5	7.3	4.5	6.9	27.3	17.7	100%

Table 8. Seed Potato Certification: Average Percentages of Diseases found in Fields, 1952

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	.19	.03	.04	.19	.04	.11	.03	.26	.14
Leaf Roll	.16	.09	.02	.04	.05	.01	.07	.23	.05
Mosaic	.10	.11	.03	.09	.06	.01	.11	.09	.06
Fields passed (Final inspection)									
Black Leg	.09	.03	.03	.09	.03	.05	--	.10	.05
Leaf Roll	.05	.06	.02	.01	.02	.01	.01	.01	.02
Mosaic	.03	.07	.02	.04	.02	.01	.01	--	.01

GREY MOULD (Botrytis cinerea). Traces were found in all fields visited in Kings Co., N.S., in October; growers are misled frequently into thinking late blight is present (K. A. Harrison). Infection was sev. on 2% of the Irish Cobbler plants in a small garden in Charlottetown, P. E. I. on 27 Aug. (R. R. Hurst).

BLACK DOT (Colletotrichum atramentarium). Traces were noted on dead stalks that had matured early at Kentville, N.S. (K. A. Harrison). Black dot sev. affected about 1% of the plants in a field of Irish Cobbler at East Baltic, P. E. I., on 28 Aug. (D. B. Robinson).

BACTERIAL RING ROT (Corynebacterium sepedonicum) was not found in any crops grown for certification in 1952 in B. C. (H. S. MacLeod). It was found, however, in the Fraser Valley in a 4-acre field of White Rose, where 15% of the tubers were affected. The source of infection could not be traced. No recurrence of the disease was observed on any farms where it had previously been found. At digging time a survey for ring rot was made on Lulu Island, where 125 acres of potatoes were inspected and found free of the disease. Tubers affected with ring rot were found in a carload of Netted Gem from Washington State in January and the shipment was returned to the point of origin by the wholesaler (W. R. Foster).

In Alta., all lots of the 1951 crop infected by bacterial ring rot were disposed of through approved channels by the end of that year. Early disposal gave growers ample time to clean up their premises before seed stocks to be planted in 1952 were brought in. As the potato crop matured somewhat earlier than usual in 1952, ring rot symptoms could be readily detected during the ring rot survey. Of the 601 fields (6,296 acres) inspected in the pest control areas of Edmonton, Calgary, Brooks, and Lethbridge, 75 fields were found infected by ring rot, an over-all increase from 7.7% in 1951 to 12.5% in 1952. The increase was due to a sudden flare-up of the disease in the Lethbridge area, while there were lower percentages in all other areas (W. Lobay). Ring rot was found in one field entered for certification in s. Alta. (R. Stogryn).

Ring rot was again seen in several lots of table stock grown about Lumsden, Sask. (A. Charlebois). Affected specimens were received from only 2 growers, one at Indian Head and the other at Maple Creek. Although it was not uncommon several years ago to receive 10-25 specimens each fall, it is doubtful that the disease is now less prevalent, because many growers have come to recognize the disease (R. J. Ledingham). A tr. of ring rot was found in 2 fields in Man. and 2 others were rejected because the disease had been found in the same stock (D. J. Petty). Ring rot was present in 4 samples of Man.-grown potatoes received for diagnosis (W. A. F. Hagborg).

Bacterial ring rot caused the rejection of 4 fields in district 1 (F. J. Hudson) and in 11 in district 3, Ont.; infection was tr.-1% (H. W. Whiteside). In 1952, 231 specimens of potatoes suspected of being infected with ring rot were received at either St. Catharines or Ottawa for diagnosis. Of the 231 specimens, 202 proved positive. The corresponding figures were: 155 positive in 1951 and 362 in 1950. The number of fields surveyed in the provincial survey is unknown (H. N. Racicot). Ring rot caused the rejection

of 54 (5.5%) of the fields inspected in Que., compared with 15.8% in 1951. Although ring rot is still the main cause of rejections, growers are taking great care in disinfecting their implements, etc., and paper bags have become popular for handling the crop. Infection was usually not more than 0.1%. No ring rot was recorded in Teton entered for certification (B. Baribeau). Ring rot caused the rejection of 49 (3.2%) of the fields entered for certification in N.B.; compared with 3.4% in 1951 (C.H. Godwin). No survey of fields of table stock potatoes was made in N.S. Many of the fields entered for certification were inspected 3 times for possible occurrence of ring rot, but the disease was not encountered (R.C. Layton). Ring rot was not observed during field inspection in P.E.I., but 10 cases were found later in the tubers, 5 of which belonged to seed growers and 5 to table-stock growers (H.L. McLaren). Two cases from St. Peters Bay were found on the 1951 crop in May (R.R. Hurst).

POTATO-ROT NEMATODE (Ditylenchus destructor) slightly affected 0.5% of the tubers of mixed varieties in a garden at Victoria, B.C. Bulbous iris known to be affected with nematodes were grown in the same garden the previous year. The identification was made by Dr. A.D. Baker (J. Bosher).

SOFT ROT (Erwinia ?carotovora). A few tubers were sev. rotted shortly after digging of 2 early-harvested fields at Lethbridge (M.W. Cormack). Very little soft rot was seen this year in district 3, Ont. Disinfection of storage spaces seemed to have reduced its occurrence. Canso and Sebago are the varieties most affected (H.W. Whiteside). Incipient soft rot was observed in many tubers in a shipment of Florida-grown potatoes sent by transport to Toronto in February 1953; presumably moist conditions prevailed for some time before arrival at destination (J.K. Richardson). Several specimens were received in September and October from N.B. fields (J.L. Howatt). The disease was prevalent both in the e. and w. coasts of Nfld., this year, particularly in Canso and Arran Comrade. A sl. infection was also present in a few fields of Arran Victory. The weather was very wet (precipitation, August to October, 16.56 in.) at harvest after an unusually dry July (0.73 in.). There were considerable mechanical injury and hollow heart present (G.C. Morgan).

BLACK LEG (Erwinia phytophthora) was reported in 171 (23.9%) of the fields inspected in B.C. and caused 14 to be rejected. Its prevalence is attributed to the very cold wet spring especially in the interior, where little black leg develops as a rule (H.S. MacLeod). Black leg was present in 92 (52%) of the fields inspected in Alta. and caused 7 fields to be rejected. It was very prevalent in the irrigated districts in s. Alta., where all commercial stocks are affected. It was present in all districts except the Peace River. Above normal moisture supply favoured the development of the disease (J.W. Marritt, R. Stogryn). Black leg was very prevalent in the Edmonton district; in one commercial field 50% of the plants were infected with lesser amounts in others (T.R.D.). Black leg was unusually common in Sask. in 1952 (T.C. Vanterpool). About half the potato specimens received at the Saskatoon lab. were affected with the disease. Black leg was reported to be

bad where potato eyes had been used for seed (R. J. Ledingham). Black leg caused the rejection of one field, the only one in which it was found (A. Charlebois). Black leg was recorded in 20% of the fields inspected in Man. and caused 4 to be rejected (D. J. Petty).

In Ont. a sl. infection was noted in 4 places in the London district; numerous plants were noted in one part of a large Sebago field at Mt. Brydges (F. Hudson). Black leg was most prevalent in fields adjacent to corn infested with insects. For this reason little certified seed is now grown in Waterloo Co., where corn is extensively grown (W. L. S. Kemp). Black leg was found in 2 fields in Dufferin Co. (H. W. Whiteside). Of the 45 fields inspected in e. Ont., one field of Irish Cobbler grown from P. E. I. seed was rejected and 9 others were sl. infected (E. H. Peters). Black leg was reported in 320 (32. 2%) of the fields inspected in Que. and caused 26 to be rejected, 20 fields being in the Chicoutimi and Lake St. John districts (B. Baribeau). Sev. infection was noted in 2 fields in Saguenay Co. (H. Genereux). Black leg was noted in only a few fields in N. B. and only one was rejected. It was less prevalent than usual because of the very dry season. Seed treatment is not practised in N. B., but growers of Sebago in the Bath area report a measure of control by delaying planting until the seed bed is warm and dry followed by a very light hilling until the plants are well above ground (C. H. Godwin). Black leg was reported in 41 (10%) of the fields inspected in N. S. In one district where black leg has caused the rejection of most Sebago fields, one grower planted Chippewa this year and secured a crop only sl. infected with the disease (R. C. Layton).

Only 27 fields were rejected on account of black leg this year in P. E. I. compared with 131 in 1951; good growing conditions prevailed throughout the season (H. L. MacLaren). In 20 fields of table stock inspected in P. E. I. the average infection was 0. 5% (R. R. Hurst). Climatic conditions were ideal in 1952 for the development of black leg in Nfld., particularly in the Avalon Peninsula. Infection was as high as 10% in a few fields and averaged 2%. Canso, Sebago, Arran Victory, Irish Cobbler, Arran Comrade, and Kerr's Pink were infected (G. C. Morgan).

WILT (Fusarium oxysporum, Verticillium albo-atrum) was found in 38 (5. 6%) of the fields inspected in B. C.; 8 fields, all planted with White Rose seed imported from Lynden, Wash., were rejected (H. S. MacLeod). Wilt was present in 29 (40%) of the fields inspected in s. Alta. In 2 fields near Lethbridge 10 and 40% of the plants were affected; in the others infection was a tr. See under V. albo-atrum (R. P. Stogryn). In n. Alta., wilt was found in only one field in the Edmonton area (J. W. Marritt). Small amounts of wilt were recorded in a third of the fields inspected in Sask. (A. Charlebois). Little wilt was observed in Man. (D. J. Petty).

Wilt was present in most fields inspected in the London district, Ont., being particularly noticeable in some fields of Canso (F. J. Hudson). Only a single field was rejected for wilt in district 2 (W. L. S. Kemp). Traces occurred in most fields in district 3; it was most prevalent in Canso and tubers from infected plants showed some stem-end browning by August (H. W. Whiteside).

Sl. amounts of wilt were noted in 9 fields chiefly of Irish Cobbler and Canso in e. Ont. (E. H. Peters). Wilt was present in several fields in N. B. ; one 20-acre field of Kennebec from Maine-grown seed at Hartland was rejected. The disease was less prevalent than usual in York Co. (C. H. Godwin).

DRY ROT (Fusarium spp.) was not a problem in n. Alta., as most potato crops were harvested under ideal conditions (J. W. Marritt). A wet odourless rot affected tubers of the Ontario variety received from 2 growers at Harrow, Ont. Entrance was through wounds made at digging time. Bacteria and Rhizoctonia were also isolated (C. D. McKeen). Dry rot was of little importance in district 2; careful handling of the crop, clean storage, etc., have reduced losses (W. L. S. Kemp). Dry rot was more prevalent than usual in the 1951 crop in Que. and loss in some bins was fairly heavy. Delay in planting cut sets on account of heavy rains in May and June allowed some dry rot to develop; in some lots of Kennebec 20% of the sets were rotted (B. Baribeau). Dry rot was also a problem in Que. in the fall of 1952, when temperatures were high in October and November. It was particularly noticeable on injured tubers (O. Caron). Dry rot was observed in a few bins of the 1951 crop at shipping points in N. B. ; it caused some loss in a shipment to the Dominican Republic. Elsewhere loss was confined to a few bins where the tubers were stored under improper conditions or had been bruised as a result of rough handling (C. H. Godwin). A black rot, similar to that described in Wash. State Coll. Popular Bull. 195, was found in a lot of Netted Gem at Centreville, N. S. ; the tubers showed slight bruises on the surface with extensive black rot of the interior (K. A. Harrison). Dry rot caused about 1% loss of tubers in storage in P. E. I. (H. L. McLaren). About 50% of the tubers in a small lot of Keswick in storage were affected by F. coeruleum at Charlottetown (R. R. Hurst). Rot due to F. sambucinum f. 6 was also heavy in a lot of Keswick from Brookfield and in Sebago from O'Leary (G. W. Ayers). A destructive seed-piece rot occurred in a lot of Keswick which was being eye-indexed in the greenhouse (G. Ross).

STEM ROT (Fusarium sp.) affected 10% of the plants in two fields, one of Green Mountain and one of Canso at Glenwood, P. E. I. ; affected plants were grouped together (G. W. Ayers).

RHIZOCTONIA (Pellicularia filamentosa (Rhizoctonia solani)) was widespread in B. C. ; infection was 250-sl. 118-mod. 15-sev./403 fields inspected. It is believed to be the most important single disease of potatoes in B. C. (H. S. MacLeod). Rhizoctonia was present in most fields in Alta., but usually infection was sl. (R. P. Stogryn, J. W. Marritt). Rhizoctonia was present in every field inspected in Sask., and sev. losses occurred in some which were planted early on heavy soil (A. Charlebois). The perfect stage developed well in mid-summer in garden plots at Saskatoon, Sask. (T. C. Vanterpool). Sl. infections were noted in Man. (D. J. Petty). A few plants were affected by rhizoctonia in fields about Strathroy and Scotland, Ont. (F. J. Hudson). Some 25-50% of the crop required regrading on account of rhizoctonia sclerotia in district 2 (W. L. S. Kemp). Rhizoctonia was particularly noticeable in the northern part of district 3. It affected 5-50%

of the tubers (H. W. Whiteside). A sl. amount of rhizoctonia was seen on bin inspection in e. Ont. (E. H. Peters). Infection was 65-sl. 5-mod./996 fields inspected in Que. In general, tubers were sl. affected, but some lots were mod. affected in Matane and Rimouski counties (B. Baribeau). Rhizoctonia was general on the growing crop in N. B. Some development of sclerotia was observed in a few lots on bin inspection, but losses were sl. (C. H. Godwin). Only sl. infections were observed in the field in N. S. No sev. infections of the tubers have been observed and what scurf occurs can be graded to seed standards with little loss (R. C. Layton). Rhizoctonia was of little importance in P. E. I. although sl. more prevalent than last year (H. L. McLaren). The perfect stage was observed on an occasional plant in a field of Green Mountain in Queens Co. on 7 Sept. (R. R. Hurst). Sl. infections were noted in a few fields of Green Mountain and Irish Cobbler in Nfld. (G. C. Morgan).

GANGRENE (Phoma ?foveata Foister). A few tubers were picked in May 1952 from a crop of Green Mountain showing typical "thumb impression" symptoms of gangrene at Fredericton, N. B. The cause of the trouble was confirmed (J. Munro). This disease has not been previously reported in Canada, at least it has not been identified with the old-world disease (I. L. C.)

LATE BLIGHT (Phytophthora infestans). A sl. infection was found on the foliage in 12 fields inspected in the coastal area of B. C., and tr. amounts of rot were seen in the tubers (H. S. MacLeod). A late blight forecast service was set up this year in cooperation with the Laboratory of Plant Pathology at Vancouver. On 13 June, growers on the lower mainland were warned that the weather of the previous 2 weeks had been favourable for blight and if it continued blight might be expected. However, the weather turned hot and dry and sl. infections of late blight were first reported the 2nd week of August on Lulu Island and in the Ladner district. On 13 Aug. growers were told that there was no imminent danger of blight as long as the hot weather lasted, but that they should be ready to spray if the weather changed. After this date, late blight became general in the lower mainland but the infections were sl.-mod. (W. R. Foster).

Late blight was found for the first time in s. Alta., when leaf infection was general in 6 fields in early Sept. near Rainier, killing the plants in patches. Most growers destroyed the tops before harvest and very little tuber infection occurred (M. W. Cormack, F. R. Harper). A sl. infection was observed on the foliage in 15 gardens at Edmonton on 22 Aug. The disease started early but was checked by fine weather. The organism was isolated from one lot of affected tubers (G. B. Sanford). A sl. infection was found in early September in a field near Estevan, Sask., but few tubers became infected (A. Charlebois). One specimen of late blight rot was received from a field at Margo in e. Sask. (R. J. Ledingham). Tr. to sl. infections were seen about Portage la Prairie, Man., by mid-August (D. J. Petty). The mod. early appearance of late blight in Man. suggested for a time that the disease might become widespread and sev. However the low rainfall in the autumn permitted the crop to be harvested under very good conditions with almost no tuber rot (J. E. Machacek).

Late blight was almost entirely absent from s. w. Ont. (F. J. Hudson). but it was general in district 3, being of some importance in the Muskoka-Parry Sound, and Cochrane districts and sev. in the Temiskaming district. In the s. part of the district late blight appeared late, but it eventually caused some tuber rot several weeks after harvest. Late blight was seen on the foliage in several fields of Canso but not on the tubers. Ontario again appeared to possess some resistance (H. W. Whiteside). Late blight was observed on Green Mountain in a spray plot at Ottawa, on 15 July, but the plot was sprayed with Dithane D-14 and no further spread was observed. The disease was next reported in a field of Canus at Melcalfe on 11 Aug. After this date late blight gradually spread and increased until it was general, infection being sl. -mod. in well protected fields and sev. in fields left unprotected (H. N. Racicot). Late blight was observed in e. Ont. from 11 Aug. on. Infection was sev. in 2 fields near Westmeath and mod. in one 15-acre field of Canso at Metcalfe. Tuber rot was very light (E. H. Peters). Late blight was found in a cull-pile at St. Martin, Laval Co., Que. on 24 June (E. Lavallee). Climatic conditions were very variable during the growing season in Que., with considerable differences in various parts of the province. Late blight was first reported in fields about 6 Aug., a date over 3 weeks later than in 1951, in several widely scattered points in Que., and by 18 Aug., it was known in many districts. Late blight was slow in developing, but warm weather accompanied by heavy dews and rain favoured its development in September. Many growers dug their potatoes while the tops were still green or partly destroyed by late blight and stored the tubers in warm storage spaces. Losses at digging time were as high as 10-80% of the crop. Late blight rot was also heavy in the tubers already harvested, amounting to 10-60% when the tubers were graded for market. It is conservatively estimated that 10%, or 1 1/2 million bushels, of the crop was lost. Fields dug after the tops were killed with a herbicide showed little tuber rot. Late blight caused some defoliation at two places on Canso, Kennebec, and Keswick (B. Baribeau, H. Genereux).

Late blight was first reported at Bath, N. B., on 12 July and reports of the disease were received from most potato areas during the summer. However late blight never reached epidemic proportions and infection was largely confined to scattered fields inadequately sprayed or dusted. Late blight rot caused little trouble; what little occurred was in Carleton and Victoria counties in small lots of table stock from fields improperly sprayed or harvested while the tops were green (C. H. Godwin). Some late blight developed in unsprayed fields of Keswick and Canso, particularly in York Co. (J. L. Howatt).

Late blight was noted on a cull pile in Kings Co., N. S., on 8 July. It was found in a field in Digby Co. on 28 July. The disease developed rapidly until in late August when sev. local infections were present in several counties. A dry spell and a frost on 9 Sept. checked blight in many places, but it continued to spread in frost-free areas into October. Even where the vines were killed with a herbicide 2 weeks before digging, tuber rot sometimes caused losses of 25% of the crop. In general tuber rot was much greater than last year, when late blight was epidemic on the foliage (K. A. Harrison, R. C. Layton). Plants of Solanum nigrum scattered along the

seashore at Pembroke were sev. affected by late blight (D. W. Creelman, A. E. Roland). Late blight was first found at O'Leary, Prince Co., P. E. I., on 21 July. The weather was not favourable for the development and spread of the disease. The mean temperature for July to September was 3.6°F. higher than last year and the rainfall was 7.11 in. compared with 15.61 in. in 1951. The disease was virtually absent in e. Kings Co.; in the rest of P. E. I., it was readily controlled by spraying. Blight, however, was sev. on the foliage of Canso, of which there was a considerable acreage in Queens and e. Prince counties. Growers had to kill the vines with chemicals to reduce tuber rot. Growers are persuaded that spraying is just as necessary for Canso and Keswick as it is for the older varieties (L. C. Callbeck, H. L. MacLaren). Late blight appeared first in Nfld. in early August. Later it became general and caused heavy foliage infection and mod. tuber rot in e. Nfld., where 16.56 in. of rain fell in August to October. On the west coast rainfall and late blight infection was much lighter. Late blight was seen in 2 fields of Canso with an odd tuber rotting. No blight was seen in Keswick and Kennebec (G. C. Morgan).

LEAK (Pythium ultimum). A few tubers were found affected during harvesting and in the bins of two growers at Saanichton, B. C. (W. Jones). Leak was found several times affecting Keswick; in one 5-acre field at Chilliwack, 20% of the tubers harvested became decayed (W. R. Foster). Leak occurred in tr. amounts in 5 crops in the Pemberton area (H. S. MacLeod). The disease was sev. in one lot of early harvested tubers in storage at Lethbridge, Alta. (M. W. C.). Considerable rotting occurred in tubers harvested from the plots at Edmonton, more particularly in potatoes grown on heavy soil. Some damage was also reported by commercial growers (T. R. D.).

VIOLET ROOT ROT (Rhizoctonia croccorum). A sl. infection was found on a farm on the Thedford marsh, Ont.; the disease occurs periodically on potatoes in the s. end of the marsh (N. J. Whitney).

SILVER SCURF (Spondylocladium atrovirens). Little silver scurf was seen at bin inspection in district 3, Ont. It was observed on tubers of smooth-skinned varieties at the Royal Winter Fair in Toronto in November. The disease has been seen most frequently in potatoes grown on light, sandy soils (H. W. Whiteside). Traces were recorded on Irish Cobbler in Queens Co., P. E. I. (R. R. Hurst).

POWDERY SCAB (Spongospora subterranea). A sev. infected tuber of Green Mountain from Milner, B. C., was received 16 Dec. (H. N. Racicot). The disease was reported from a few bins in the Lower St. Lawrence district, Que. (B. Baribeau). A sl. infection was reported in tubers of Bliss Triumph grown at Scott's Bay, Kings Co., N. S. (R. C. Layton). Infection was sl.-mod. in 3 fields at Brigus, Nfld. (G. C. Morgan).

COMMON SCAB (Streptomyces scabies) was more severe this year than last in B. C. Five crops of smooth-skinned varieties grown in the Okanagan were rejected (H. S. MacLeod). Infection was tr. -sl. on most table stock at Edmonton, Alta. (T. R. D.). A sev. infection was found on potatoes grown near Whitehorse, Yukon; the soil was a sandy loam cultivated since 1926 (G. B. Sanford). Scab was found on tubers of Netted Gem, a variety rarely affected, in 2 seed stocks in the Lacombe area. The disease in general was less sev. than usual due to optimum moisture in soil during the growing season (J. W. Marritt). Little scab was found in Man. (D. J. Petty).

Most fields in the London district, Ont., were affected with some sl. scab; a few tubers grown at Strathroy showed sev. scab (F. J. Hudson). Growers and shippers in s. Ont. report that scab was unusually prevalent this year. Growers found that it was virtually impossible to grade their stock to Canada No. 1 standards. The lesions were mostly of the mild scurfy type causing little real damage except loss of appearance (J. K. Richardson). Scab is less sev. in district 2 since the planting of susceptible varieties such as Irish Cobbler and Chippewa has been curtailed. Some table stock growers in the Ancaster area are now planting large acreages of the resistant Ontario and are having little trouble with scab (W. J. S. Kemp). Scab was less prevalent in district 3 than for several years. Growers whose farms appeared infested with scab are now growing Ontario. Weather conditions in 1953 were also unfavourable for scab development (H. W. Whiteside). Sev. affected tubers were received from a garden at Lancaster (H. N. Racicot). A sev. infection was noted in a few lots grown in the Lower St. Lawrence district, Que. (B. Baribeau). Common scab was more prevalent than usual in N. B., but the average loss is not likely to be high (C. H. Godwin). Scab was evidently more prevalent than usual in N. S. Some lots of seed potatoes contained too much scab to be graded. Similarly, some lots of table stock could not be graded to meet the standards of Canada No. 1 (R. C. Layton). Common scab was prevalent on all varieties grown in P. E. I. Except for Sebago and Netted Gem, the varieties showed about 5% scab. It is estimated that 15 bu. per acre will be graded out on account of scab (H. L. McLaren). Infection was 15-sl., 15-mod. 2-sev. in Nfld. Scab was so heavy in a commercial planting of Canso and Keswick that the crop was unmarketable (G. C. Morgan).

WART (Synchytrium endobioticum). As in 1951, losses from wart were not high in Nfld. Very low precipitation in July and high rainfall in the next 3 months when the soil was near saturation did not favour the spread of the wart organism. In the Conception Bay area, wart infection was again less than in previous years. Many growers have changed over from growing the susceptible varieties Arran Victory, Arran Comrade, Arran Pilot, Kerr's Pink, Great Scot, Northern Beauty, and Bliss Triumph to the mauve-blossomed Sebago, which has proved highly resistant to wart. Losses from the disease are high in small plots where the common varieties are still grown on the south shore, St. Mary's and Colinet; wart was found in 27 out of 31 gardens visited. In recent wart trials, Kennebec appeared to be one of the best of the highly resistant varieties (G. C. Morgan).

VERTICILLIUM WILT (V. albo atrum) was found occasionally in potato fields about Osoyoos and Summerland, B. C. (G. E. Woolliams). Damage was sl. -sev. in 15 fields examined in s. Alta. About 30% of the plants were killed in a field of Netted Gem near Lethbridge (F. R. Harper), M. W. Cormack). Wilt was found in 33 (3. 3%) of the fields inspected in Que. and caused one rejection (B. Baribeau). Wilt was reported in 91 (22%) of the fields inspected in N. S. The disease was quite sev. this year; in some fields of table stock, over 50% of the plants were affected. It was most prevalent in Kennebec followed by Canso, Sebago and Irish Cobbler (R. C. Layton). Verticillium wilt was general in Sebago affecting tr. -20% of the plants in P. E. I. (G. W. Ayers). Wilt was about as prevalent as in 1951; 32 fields were rejected (H. L. McLaren).

LEAF ROLL (virus) was found in 106 (14. 7%) of the fields inspected in B. C., and caused 3 fields to be rejected; it was most prevalent in the Grand Forks area. Leaf roll necrosis was seen in the tubers in 2 fields late in the season (H. S. MacLeod). Leaf roll occurred in 38 (21%) of the fields inspected in Alta., but none were rejected. The disease was quite prevalent in garden plots in Edmonton and current season infection caused sev. necrosis in the tubers in some where certified seed was used (R. P. Stogryn, J. W. Marritt). Low infections were seen in fields inspected in Sask. (A. Charlebois). and in Man. (D. J. Petty). Little leaf roll was seen in the London district, district 2, and in e. Ont. (F. J. Hudson et al). In district 3, 8 fields were rejected, with 7% infection in a field of Canus (H. W. Whiteside). Leaf roll was noted in 233 (2. 3%) of the fields in Que.; in one of the 3 fields rejected 25% of the Canso plants were infected (B. Baribeau). Leaf roll was much less prevalent than usual in N. B. and no fields were rejected on account of the disease (C. H. Godwin). Leaf roll was recorded in 121 (29%) of the fields inspected in N. S. and 5 were rejected (R. C. Layton). Leaf roll caused 89 fields to be rejected in P. E. I. in 1952, compared with 36 in 1951 (H. L. MacLaren). Tr. to 10% infection was recorded in 20 fields in Nfld., highest infections were in English varieties (G. C. Morgan).

MOSAIC (virus) was found in 88 (12. 2%) of the fields inspected in B. C., and 5 were rejected (H. S. MacLeod). The disease was recorded in 14 (8%) of the fields inspected in Alta. (J. W. Marritt). Mosaic was present in 25% of the fields inspected in Sask.; one field was rejected. (A. Charlebois). Only low infections were present in Man. (D. J. Petty). Mosaic caused the rejection of a field of Keswick in district 2, Ont. (W. L. S. Kemp), 2 fields in district 3 (H. W. Whiteside) and 2 fields, one of which was Canso, in e. Ont. (E. H. Peters). Mosaic was reported in 329 (33%) of the fields inspected in Que. and 21 fields were rejected (B. Baribeau). Mosaic was less prevalent than usual in N. B. and only 5 fields were rejected; symptoms may have been masked to some extent during the hot dry weather (C. H. Godwin). The disease was reported in 118 (84%) of the fields inspected in N. S.; 8 fields were rejected (R. C. Layton). Mosaic was apparently less prevalent than last year in P. E. I.; 108 fields were rejected as compared with 200 in 1951. (H. L. McLaren). In 20 fields of Green Mountain table stock, average

infection was 4% (R.R. Hurst). Mosaic infection was high in many fields in Nfld., the highest being 50%, average 15% (G.C. Morgan).

LEAF STREAK (Solanum virus 1, N strain). A tr. was found in Katahdin, Chippewa and Keswick in a test plot at Fredericton, N.B. (D.J. MacLeod).

SIMPLE MOSAIC (Solanum virus 1, L and S strains) was observed in Kennebec, Canso, Chippewa, Keswick, Pontiac, Mohawk, Sebago and a number of unnamed seedlings in N.B. Two plants of Green Mountain affected by the S strain were observed in a tuber index test (D.J. MacLeod).

FOLIAR NECROSIS (Solanum virus 1, D strain). A tr. was found in Canso and Arran Victory grown in York Co., N.B. (D.J. MacLeod).

Plants of Keswick, which were found to be infected with slight, medium and severe strains of Solanum virus 1, showed practically no symptoms under field conditions in a test plot in Albert Co., N.B. While these strains appear to have no effect on Keswick, they showed a wide range of symptoms when inoculated into Datura stramonium (D.J. MacLeod).

RUGOSE MOSAIC (Solanum viruses 1 and 2). A tr. to 6% of the plants were found infected in 5 fields of table stock in Carleton and York counties, N.B. (D.J. MacLeod). A few plants were infected in 2 plantings in Lethbridge, Alta. (F.R. Harper).

CRINKLE MOSAIC (Solanum viruses 1, 2, and 3). A tr. was seen in 3 fields in York Co., N.B. (D.J. MacLeod).

MILD MOSAIC (Solanum viruses 1 and 3). Tr.-5% infection was observed in table stock fields of Green Mountain and Bliss Triumph in Carleton, Victoria, and York counties, N.B. (D.J. MacLeod).

RUGOSE MOSAIC (Solanum virus 2, strain 21). This unusual strain found in York Co., N.B., when inoculated into 6 plants each of 12 varieties, induced premature death by chlorosis in 9 varieties the first year and rugose mosaic developed the second year. No symptoms were observed in the other 3 varieties the first year, but rugose mosaic also appeared in them the second year (J. Munro).

FAINT MOSAIC (Solanum virus 3). An indistinct fleeting type of mosaic was observed in Arran Victory, Golden Wonder, Pontiac, Keswick, Sebago, Mohawk, and 4 unnamed seedlings in a test plot at Fredericton, N.B. In the same plot the Arran Victory, Keswick, Pontiac, and Sebago showed a mild mosaic when infected with a combination of Solanum virus 1 and Solanum virus 3 (D.J. MacLeod).

Recent studies at Fredericton on Solanum Virus 3 (Potato virus A) have shown that susceptibility to this aphid-transmitted virus is common among Canadian and American potato varieties. Canso, Irish Cobbler, and Mesaba, were found to react towards infection by virus A with acronecrosis, and are

therefore extremely resistant under field conditions. In 19 other varieties, however, a combination of this virus and the almost universally present Solanum virus 1 (virus X) produced the typical symptoms of mild mosaic indicative of susceptibility towards virus A. These varieties were: Ashworth, Bliss Triumph, Chisago, Green Mountain, Houma, Kasota, Kennebec, La Soda, Marygold, Mohawk, Norkota, Ontario, Placid, Pontiac, Russet Burbank, Russet Rural, Teton, Warba, and White Rose. In the variety Pontiac, no easily distinguished symptoms were produced by either virus A or a strong strain of virus X alone, but a combination of the two viruses produced a typical mild mosaic. The U.S.D.A. Seedling 41956, which is immune to virus X, shows only a slight waviness of the leaves when infected by virus A (R.H. Bagnall).

MILD MOSAIC (Solanum virus 11). A tr. to 3% was found in 5 fields of Irish Cobbler in Carleton and York Counties, N.B.; 2% was also found in Irish Cobbler grown in Carleton Co. sent in for a tuber-index test (D.J. MacLeod).

LEAF ROLLING MOSAIC (Solanum virus 11) was found in 4 fields of Green Mountain table stock in Carleton, Sunbury and York counties, N.B. (D.J. MacLeod).

NET NECROSIS. A tr. was found in Green Mountain, Irish Cobbler, and Netted Gem in 3 fields in N.B. When scions from the plants grown from tubers showing net necrosis were grafted to tomato and other indicator hosts, symptoms were produced in these hosts resembling those associated with purple top. Net necrosis in these varieties may thus be the result of infection by purple top (D.J. MacLeod). Very few fields showed net necrosis in B.C. (H.S. MacLeod). Mild net necrosis was seen in a few lots of tubers of Green Mountain grown in Madawaska Co., N.B. (C.H. Godwin). Net necrosis was observed in one lot of Green Mountain in N.S. (R.C. Layton).

PURPLE or BUNCH TOP (virus). Two of the 9 units affected with the haywire stage in B.C. (P.D.S. 31:72) were propagated in 1952. No symptoms appeared except that the plants were somewhat stunted. When scions were grafted to tomato and Cyphomandra betacea, no symptoms developed. Apparently the virus was not perpetuated in the tubers for a second year (N.S. Wright). Haywire was found in one field in s. Alta. (R.P. Stogryn). Haywire was found in 17 (15%) and purple top in 24 (19%) of the fields inspected in n. Alta.; both stages were most prevalent in the Peers district. Warba seemed the most susceptible of the varieties grown (J.W. Marritt). Traces of purple top were seen in a few fields in Man. (D.J. Petty). A single affected plant was seen in a field of Katahdin at Strathroy, Ont. (F.J. Hudson), and only the odd scattered plant was noted in district 2 (W.L.S. Kemp). Purple top was present in 8 fields in Canso, Katahdin, and Keswick in e. Ont. (E.H. Peters). A small percentage of purple top was observed in Katahdin, Sebago, Keswick, and Canso in district 3 (H.W. Whiteside). A sl. infection was noted in Que. in a few fields mostly

of Canso and Irish Cobbler (B. Baribeau). Purple top occurred to a sl. extent in all commercial varieties in N. B., notably on Green Mountain in York Co. (C. H. Godwin).

Purple top was common in potato fields in Carleton, Charlotte, Queens, Victoria, Sunbury, and York counties, N. B. It was observed in Canso, Chippewa, Bliss Triumph, Keswick, Katahdin, Green Mountain, Irish Cobbler, Kennebec, Pontiac, Sebago, and Netted Gem. Infection was tr.-7%. The early stage of purple top, or late leaf-roll stage (P. D. S. 27:69) was widespread in the same counties where purple top was observed. It was noted on all varieties mentioned above except Pontiac and Netted Gem. Symptoms of purple top appear in a large percentage of the tops of some varieties such as Irish Cobbler and Green Mountain, but the virus passes into only a small percentage of the tubers of the affected plant. A trace of the haywire stage was seen in one field each of Irish Cobbler and Green Mountain in York Co. Misses as high as 22% were observed in fields of Canso, Keswick, and Katahdin in York Co. Nine seed-pieces out of 17 dug up and replanted in the greenhouse produced weak plants 6-10 weeks after replanting. When scions from these plants were grafted to tomato or other indicator plants symptoms of purple top were produced (D. J. MacLeod).

Tr.-sl. infection of purple top was seen in a few fields of Sebago and Canso in N. S. (D. J. Petty). Purple top was observed affecting on the average 1% of plants in 10 fields of Sebago in P. E. I. (R. R. Hurst).

SPINDLE TUBER (virus) was found in only one field in s. Alta., but 5% of the crop was affected (R. P. Stogryn). Some spindle-shaped tubers were observed in bins especially in Durham Co., Ont. (W. L. S. Kemp). The disease was observed in a field of Sebago in n. Ont. (H. W. Whiteside). A few affected plants were seen in a 40-acre field of Kennebec in Que. (B. Baribeau). A tr. was observed in several fields of commercial varieties in N. B. (C. H. Godwin). A tr. was noted in Canso, Green Mountain, Irish Cobbler and Kennebec in 4 fields in York Co. (D. J. MacLeod). Spindle tuber caused the rejection of 38 fields in P. E. I. compared with 31 in 1951 (H. L. McLaren). Infection averaged 0.5% in several table stock fields examined in P. E. I. (R. R. Hurst). A sl. infection was seen on Arran Victory in Conception Bay, Nfld. (G. C. Morgan).

WITCHES' BROOM (virus) affected 1% of the plants of White Rose in a 4-acre planting on Sea Island, B. C. The potatoes had come from McBride, near Prince George, where they became infected in 1951 (N. S. Wright). Witches' broom was found in 56 (7.6%) of the fields inspected in B. C., a marked decrease from the last 2 years; only 2 fields were rejected. Most of the disease is in the Cariboo and central B. C., but it also sl. affected a few crops of locally-grown seed in the North Okanagan (H. S. MacLeod). Witches' broom was found in 18 (17%) of the fields inspected in n. Alta., again being most prevalent in the Peers and n. e. areas (J. W. Marritt). The disease was again observed in the North Bay and Cochrane districts, Ont. (H. W. Whiteside). A tr. was found in one field each of Irish Cobbler and Green Mountain in York Co., N. B. (D. J. MacLeod), and in a field of Irish Cobbler in Queens Co., P. E. I. (R. R. Hurst).

YELLOW DWARF (virus). A few affected plants were seen in a field of Keswick in late July in district 3, Ont. (H. W. Whiteside).

BLACK HEART (non-parasitic). Affected a few tubers of Irish Cobbler in one bin in Queens Co., P. E. I. on 4 Feb. (R. R. Hurst).

FROST INJURY. A sl. amount of frost necrosis occurred in central B. C. (H. S. MacLeod). In some areas in n. e. Alta., 14 degrees of frost on 3 Oct. caused some damage to potato crops on lighter soils, up to 50% loss occurring in a few areas (J. W. Marritt). An early frost caused some damage in district 2, Ont. Exposed tubers were frozen in the field, and up to 25% loss occurred where the tubers had not yet been put in winter storage (W. L. S. Kemp). A field frost caused about 10% damage in 3 fields about Kemptville (E. H. Peters). Frost necrosis was prevalent about St. John's, Nfld. (G. C. Morgan).

GIANT HILL occurs widely in B. C., but no fields were rejected (H. S. MacLeod). A few plants were found affected in fields inspected in n. Alta. (J. W. Marritt). A few affected plants were observed in Green Mountain in the North Bay district, Ont. (H. W. Whiteside). and in Que. (B. Baribeau). Giant hill was seen in a number of fields of Green Mountain in N. S. (R. C. Layton).

HOLLOW HEART (non-parasitic) affected 3% of the tubers in one lot of Sebago examined in P. E. I. 27 Oct. It was reported frequently in Sebago and 15 times in Irish Cobbler (R. R. Hurst). Hollow heart was noted in Canso at a few places in e. Ont. (E. H. Peters).

JELLY END-ROT (non-parasitic) affected about 2% of the tubers in two lots of potatoes in Kings Co., N. S. Early growth was severely checked by dry conditions followed by a wet August and secondary growth (K. A. Harrison).

INTERNAL BROWN SPOT or SPRAIN (non-parasitic). Mod. affected 10% of the tubers of Irish Cobbler in a field in Kings Co., P. E. I. (R. R. Hurst).

LENTICEL SPOT (cause undetermined) affected a few tubers of a seedling at Saanichton, B. C. It was found in previous years on Warba and White Rose. The symptoms are similar to the disease described by Blodgett and Rich (Wash. State Coll. Popular Bull. 195:67. 1949) as caused by Erwinia carotovora (W. Jones).

LIGHTNING INJURY was observed in 2 fields in Nfld. (G. C. Morgan).

LOW TEMPERATURE INJURY. About 75% of the tubers were injured in a field of Green Mountain at O'Leary, P. E. I., from contact with frozen ground during digging (R. R. Hurst). In all, 5 cases of severe chilling in storage were diagnosed in the St. John's area, Nfld. (G. C. Morgan).

MEASLES (cause unknown) affected about 10% of the tubers in 2 fields, one of White Rose and another of Kennebec, at Invermere, B.C. (J.C. Hamilton, N.S. Wright). The symptoms of measles (Wash. State Coll. Popular Bull. 195:31. 1949) are "a rough scaly skin and a dull lifeless appearance of affected tubers. There may be a tan-coloured area, usually around the lenticels, which enlarges and extends into the tuber forming a pocket of pink or brown tissue... Later in storage the affected tissue may become darker, almost black, and appear as raised puffy areas which finally resemble black rot..." (I.L.C.).

NO-SPROUT TUBERS (non-parasitic). There were several poor stands, particularly of Canso and Ontario in district 3, Ont. The buds on the seed piece had failed to grow and small tubers were formed about the eye on short stolons. In most cases, the growers had planted the tubers directly after removing them from storage. Weather was cool and wet at planting time (H.W. Whiteside). In one field of Canso in Que., 24% of the sets failed to produce tops; several small tubers were formed close to the set (B. Baribeau). Up to 40% of misses were reported in a number of fields of Canso in Kings Co., N.S.; the eyes developed small tubers instead of sprouting (K.A. Harrison).

STEM-END BROWNING (non-parasitic) was prevalent in medium-sized and large tubers of Canso in district 3, Ont., affecting up to 30% of the crop in some fields. Large tubers were often hollow as well (H.W. Whiteside). About 1% of a small sample of Irish Cobbler was affected in Queens Co., P.E.I. (R.R. Hurst).

PUMPKIN

POWDERY MILDEW (Erysiphe cichoracearum) was observed in the plots at Vancouver, B.C. (H.N.W. Toms); and was fairly heavy late in the season in some fields at Summerland. (G.E. Woolliams).

RHUBARB

GREY MOULD (Botrytis cinerea). A sl. infection was noted on many stalks at Langley, B.C.; the fungus gained entrance where the stalks had been nicked by the cutting knife (I.C. MacSwan).

RED LEAF (cause unknown) is extremely prevalent and destructive in Sask., making the growing of rhubarb hazardous in this province. On account of the intensification of the colour in infected plants containing anthocyanin, the name "red leaf" for this disease seems more appropriate than "crown rot", the name used earlier in the Plant Disease Survey reports (R.J. Ledingham).

SPINDLY STALK (?virus). About 1% of the roots, when forced in March at North Kingston, N.S., produced small spindling petioles (K.A. Harrison).

SALSIFY

WHITE RUST (Cystopus cubicus) was general on plants, with several pustules on most leaves, at the Botanical Garden, Montreal, Que. (J. E. Jacques).

SPINACH

RUST (Puccinia subnitens). A sl. development of the aecia was present on leaves received from Kamloops, B. C. (I. C. MacSwan).

SQUASH

GREY MOULD (Botrytis cinerea). A tr. was seen at Cambridge, N. S. (K. A. Harrison).

POWDERY MILDEW (Erysiphe cichoracearum) was found on half the plants late in the season at Summerland, B. C. (G. E. Woolliams). Most crops became sev. infected in August and September in Essex Co., Ont. (C. D. McKeen).

BLACK ROT (Mycosphaerella citrullina) affected about 10% of the Sweet Keeper squash in storage on 12 Feb. 1952 at Cambridge, N. S.; the fungus was isolated (K. A. Harrison).

MOSAIC (virus) affected up to 50% of the plants in several fields in Essex Co., Ont.; loss of crop in one field was estimated at 30% (C. D. McKeen).

SCALD (non-parasitic). A superficial brown scald disfigured 80% of the Sweet Keeper squash in storage on 12 Feb. 1952 at Cambridge, N. S.; Blue Hubbard in the same cellar was not affected. No organism was present in the scalded areas, but the affected tissue favoured the entry of Botrytis. A large quantity of apples was stored in the same place (K. A. Harrison).

SWEET CORN

STALK ROT (Erwinia dissolvens) affected a few plants in a garden at Victoria, B. C. (N. Siefert, W. E. McKeen).

SMUT (Ustilago maydis) was observed on Southern Bantam in the Vancouver area, B. C. (I. C. MacSwan).

MAGNESIUM DEFICIENCY. Typical symptoms of magnesium deficiency were seen in an acre field at Pereaux, Kings Co., N. S. The field symptoms were confirmed by a quick test made by C. A. Eaves. Two applications of 50 lb. of magnesium sulphate, separated by 7 days, were effective and a good crop was obtained (K. A. Harrison).

TOBACCO

A special report on tobacco diseases in Ontario was prepared by Dr. Z. A. Patrick.

Seedbed Diseases

BLUE MOULD (Peronospora tabacina) did not occur either in the New or Old Tobacco Belts of Ont. until the last week of May, when scattered infections appeared in numerous districts. By this time, transplanting was well under way and damage was slight because after the plants became infected the dry weather proved unfavourable for development of the disease.

YELLOW PATCH (excessive nutrients) caused some damage throughout the Old and New Tobacco Belts. Many growers still tend to overfertilize their tobacco seedbeds even though they are aware of the danger from so doing.

DAMPING-OFF (Pythium sp. and Rhizoctonia solani) was widespread and caused mod. damage during the early part of the season. Continued cloudy weather provided favourable conditions for the disease, but it caused damage for the most part where plants in the seedbeds were too crowded and where water was applied in excess or in a faulty manner. In all beds where heavy damage was observed the growers had not followed the recommended program for control of blue mould.

This program consists of a spray application of ferbam 4 lb. in 100 gal. of water, using 4-5 gal. per 100 sq. yd. of seed bed. First application is made when the leaves on the young seedlings are the size of a dime and the applications are repeated twice a week until transplanting time. The value of the program for the control of damping-off as well as blue mould has been observed repeatedly over the last 10 years.

MUSHROOMS caused mild damage throughout the burley and dark tobacco areas of Kent Co.

2,4-D INJURY. A number of cases of injury were noted; it may apparently arise from using improperly cleaned sprayers or from drift from adjacent weed-spraying operations.

Field Diseases

BLUE MOULD (Perenospora tabacina). Due to the extremely dry weather conditions during and after transplanting, damage to tobacco in the field by the blue mould fungus was insignificant in the tobacco growing regions of Ont.

BROWN ROOT ROT (nematodes) was widespread causing sl-mod. damage to susceptible burley and flue varieties throughout Ont. The disease was perhaps more serious during 1952 than in any recent year because the first 5-6 weeks after transplanting were extremely dry.

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.

FRENCHING (? soil toxins). A few fields of flue tobacco in Kent, Norfolk and Simcoe counties were a partial loss on account of frenching. This disorder was limited, however, to fields where the soil type is unfavourable for growing tobacco.

WILT (Fusarium oxysporum var. nicotianae) was widespread throughout the tobacco-growing areas of Ont. The damage was sl., however, because relatively few plants in each field were affected.

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

ETCH (virus) again proved to be responsible for most of the damage on burley and black tobaccos.

RING-SPOT (virus) was observed throughout the burley, dark and flue-cured tobacco area; damage was very slight.

HOLLOW STALK (Erwinia carotovora). 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) occurred in several fields of flue-cured and burley tobacco in Essex and Kent counties. The disease was limited to a few plants growing in parts of the field where drainage was poor.

Other Observations

ETCH (virus) affected a few scattered plants belonging to cigar varieties in the plots at Ottawa, Ont. (D. B. O. Savile, L. W. Koch).

TOMATO

EARLY BLIGHT (Alternaria solani). Tr. infections were observed in the plots at Lacombe and Edmonton, Alta. (T. R. D.). The disease became widespread late in the season on the canning crops in s. w. Ont. and caused much defoliation. The collar-rot phase was found affecting 6% of the plants of an importation from Georgia; up to 30% of the plants died in the field and the remainder was severely stunted (C. D. McKeen). Infection was sev. on leaves of plants from a home garden at Ottawa, Ont. (K. M. Graham). Early blight was present in every field in Laval Co., Que., but the damage was sl. (E. Lavallee). Commercial varieties were less sev. affected than usual in Kings Co., N. S., but several hybrids under test at Kentville were sev. defoliated in August. There were no complaints of losses during ripening

(K. A. Harrison). Tr. infections were seen in several gardens in Queens Co., P. E. I. (R. R. Hurst). Early blight caused little damage in most gardens and no heavy losses were noted or reported in Nfld. (G. C. Morgan).

GREY MOULD (Botrytis cinerea) affected 1% of the fruit of Stokesdale at Kentville, N. S. The disease causes losses of this order every year; it is usually found on fruit under the heaviest foliage and is heaviest towards the close of the season (K. A. Harrison). The disease affected about 2% of the plants in a greenhouse at St. John's, Nfld; a few of the fruit in contact with the soil rotted (G. C. Morgan).

LEAF MOULD (Cladosporium fulvum). A sl. infection was reported from Grande Prairie, Alta. (A. W. Henry). Cladosporium fulvum fruited profusely on fall crops of Vulcan in some greenhouses at Leamington, Ont.; in others the variety was free from mould. Improved Bay State showed resistance to the forms of C. fulvum present in s. w. Ont. (C. D. McKeen). Leaf mould caused sev. damage in a number of garden plots in London, causing in some complete crop failure. Its occurrence appeared to be associated with frequent heavy watering during very hot spells (R. A. Ludwig). Leaf mould caused sev. losses in a greenhouse at Hantsport, N. S. where the disease has caused losses in the past (D. W. Creelman). Leaf mould is destructive in greenhouses in St. John's, Nfld. Of the 5 greenhouses visited, foliage infection was sev. in 3 and sl. in 2. Growers state that Vetomold and V121 used to be highly resistant, but during the last few years they have proved highly susceptible. The varieties grown in 1952 were Vetomold, V121, Carter's Sunrise, Bonny Best and Burbank (G. C. Morgan).

ANTHRACNOSE (Colletotrichum phomoides) was sev. in many canning crops in s. Essex Co., Ont. especially in fields on sandy soils. In some fields the losses were mod. even where several ziram sprays had been applied (C. D. McKeen). One grower in Lincoln Co. reported that 50% of fruit in one large planting were sev. affected on 8 Oct. Diseased specimens were also received from Wentworth Co. (W. G. Kemp). Anthracnose is increasing slowly in prevalence in the Kentville area, N. S., infecting 50% of the fruit in one planting. It has also been found outside the area. Most commercial growers are using a fairly long rotation and ziram is being used as a spray (K. A. Harrison).

BACTERIAL CANKER (Corynebacterium michiganense). A tr.-sl. infection was seen in fields about Vernon, Kelowna, and Lillooet, B. C., but in one field at Vernon, 20% of the plants of Clark's Early were affected. Bird's-eye spot, the fruit spot phase of this disease, was observed in several fields in the Kamloops and Ashcroft districts. The infection was low and the affected fruit were culled out during packing. The spot was seen on plants that showed no vine infection (G. E. Woolliams). A sl. infection was present in the University variety plots at Winnipeg, Man. (W. A. F. Hagborg). An isolated field of 3000 plants was severely affected at St. Joseph du Lac, Two Mountains Co., Que. (E. Lavallee).

FUSARIUM WILT (F. lycopersici) caused losses in both early and late crops of tomatoes in Essex Co., Ont. The extremely hot summer favoured the disease and revealed several infected areas, where the fungus was previously unknown (C. D. McKeen).

ROOT KNOT (Meloidogyne sp.) caused sev. damage to a crop in a greenhouse in Sunbury Co. N. B.; the transplanting soil was apparently infested (S. R. Colpitts).

PHOMA ROT (P. destructiva). Only a tr. was seen in the ripening rooms in Kings Co., N. S., this year (K. A. Harrison).

LATE BLIGHT (Phytophthora infestans) was heavy late in the season on Stokesdale-4 in the plots at Vancouver, B. C.; other staked varieties were disease-free (H. N. W. Toms). Late blight infected both the foliage and fruit in a series of greenhouses at West Lorne, Ont., but the loss caused is unknown. No other outbreak was encountered in s. w. Ont. (C. D. McKeen). Late blight was noticed on the foliage and fruit at Ottawa about 1 Sept. It continued to increase until 30 Sept. it was present in every garden and commercial field, fruit infection being tr. -25%, av. 5% (H. N. Racicot). Late blight was first observed on 26 Aug. in Laval Co., Que. By 1 Sept, 20% of fruit were affected, increasing to 40% when picking was about completed (E. Lavallee). Late blight was much less sev. than last year. It appeared 18 Aug. in Richelieu and Quebec districts and 15 Sept. at Ste. Anne de la Pocatiere. On 22 Sept. a 10% infection was observed at Mistassini, Lake St. John district, being heaviest in Quebec 13, Asgrow and Quebèc 5 (H. Genereux). Late blight was found 23 Aug. severely affecting a planting of tomatoes, adjacent to affected Keswick potatoes in York Co., N. B. Considerable fruit rot developed late in the season in some localities (J. L. Howatt, S. F. Clarkson). Excellent control was obtained by large growers in Kings Co., N. S., but several garden plots were sev. infected (K. A. Harrison). Infection was tr. -sev. in Queens Co., P. E. I. (R. R. Hurst).

BUCK-EYE ROT (Phytophthora parasitica) affected only a few fruits in several fields in s. Essex Co. (C. D. McKeen).

BACTERIAL SPECK (Pseudomonas tomato). A small percentage of the fruits in the University variety plots, Winnipeg, Man., were unmarketable on account of the disease (W. A. F. Hagborg).

STEM ROT (Sclerotinia sclerotiorum). A few scattered plants were dead or dying in the variety plots at Brooks, Alta. (M. W. Cormack, F. R. Harper). A few plants in each of several flats were girdled at Pereaux, Kings Co., N. S.; cankers bore mycelium and sclerotia. A tr. of fruit and stem rot was present in the plots at Kentville in September (K. A. Harrison).

LEAF SPOT (Septoria lycopersici). Unlike most years, leaf spot was of no economic importance in most early and late canning crops in Essex Co., Ont. Apparently extreme drought conditions prevented the development of

the disease (C. D. McKeen). Leaf spot was sev. on the lower leaves by 21 July in a planting at Ottawa, Ont. (H. N. Racicot). Leaf spot caused more or less defoliation in many fields in Laval Co., Que., in August. In one field, the disease was already severe by 2 June (E. Lavallee). Young plants in several flats showed heavy infection of the older leaves in a greenhouse at Pereaux, N. S. The grower started his spray program early and the disease caused little defoliation in the field (K. A. Harrison).

VERTICILLIUM WILT (V. albo-atrum) caused stunting, wilting and death of up to 75% of the plants in a commercial greenhouse in Vernon and one in Kelowna, B. C. Wilt was prevalent and occurred in most commercial fields in the Okanagan, Thompson and Upper Fraser valleys. An extensive survey revealed an average of 55% of the plants affected. As the yield of affected plants suffered an average reduction of 12% in yield, it was calculated that yield was reduced by 6.6% or 2,725 tons over the entire area (G. E. Woolliams). It may be noted that Verticillium Wilt is found nearly every year in Essex Co., Ont., but it has never become an important disease. In the last 7 seasons at Harrow, I have not observed serious epidemics like those seen in the Niagara Peninsula (Can. J. Res. C. 21:95-117. 1943). The disease is most prevalent following a cool, wet spring (C. D. McKeen).

MOSAIC (virus) affected a few plants in fields about Osoyoos and Vernon, B. C.; it caused little damage (G. E. Woolliams). Mosaic infected up to 100% of the plants in many canning tomato fields in Essex Co., Ont., but no estimate of damage was made. The date on which symptoms appeared varied appreciably from farm to farm (C. D. McKeen). In two fields at Ste. Dorothee, Laval Co., Que., nearly all the plants were affected; the crop was noticeably reduced and 20-30% of fruits were of poor quality (E. Lavallee). In one greenhouse, at Kingston, N. S., where an attempt was made to control mosaic, the infection was definitely slower in becoming established although by March all the plants were affected. In previous years all the plants were infected early in the season. Workers were asked not to smoke while working and to wash their hands after smoking and handling diseased plants. Mosaic was not conspicuous in the field crop in Kings Co. this year (K. A. Harrison). Some 10% of the plants showed infection when the crop was examined in 3 greenhouses in St. John's, Nfld. (G. C. Morgan).

PURPLE TOP (virus). A tr. was seen in 3 plantings in York Co., N. B., and 10% infection in a garden at Fredericton (D. J. MacLeod).

STREAK (virus) caused sev. damage to 20% of the plants in a field of Gem at Vernon, B. C. (G. E. Woolliams). In Welland Co., Ont., streak appeared at one end of a greenhouse; about 200 of the 800 plants had to be removed to stop the spread of the disease (J. K. Richardson).

BLOSSOM-END ROT (non-parasitic) was not reported or observed in the plots, Vancouver, B. C., or in the Lower Fraser Valley (H. N. W. Toms). The disorder affected the fruit on the first truss on many farms in the Okanagan,

Thompson and Upper Fraser Valleys (G. E. Woolliams). Blossom-end rot was widespread in the canning crop in s. w. Ont. during August, losses up to 40% being attributed to the trouble. Following rain in early September it disappeared (C. D. McKeen). Blossom-end rot was sev. on the first trusses in a field of staked tomatoes in Lincoln Co. (J. K. Richardson). The disorder affected 20% of fruit in plots in a dry location at Ste. Anne de la Pocatiere early in the season; elsewhere it was less destructive (R. O. Lachance). Blossom-end rot affected 20% of the fruit in a planting in Kentville, N. S., during dry weather in July. Few complaints were received this year (K. A. Harrison). One case of heavy damage was recorded in Queens Co., P. E. I. (R. R. Hurst). Blossom-end rot was common in gardens about St. John's and Topsail, Nfld. About 5% loss was noted in 2 greenhouses (G. C. Morgan).

BLOTCHY RIPENING (cause unknown) occurred on the early maturing trusses on several farms in Kings Co., N. S.; the uneven colouring was less pronounced than in some years. One sev. affected sample was received (K. A. Harrison).

CREOSOTE INJURY. Young seedlings were severely burned in a new greenhouse attached to a building that had been covered with tar paper at St. Joseph du Lac, Deux Montagnes Co., Que. The seedling boxes were removed to beds outside and the plants recovered (E. Lavallee).

SKIN CRACKING (non-parasitic) was severe in the canning crop in Essex Co., Ont. following a heavy rain at mid-harvest (C. D. McKeen). Several reports of severe skin cracking were received from the Avalon Peninsula, Nfld., following heavy rains in August, which were preceded by a very dry July (G. C. Morgan).

2,4-D INJURY. The leaves were malformed in 2 successive plantings in a greenhouse at Medicine Hat, Alta. Nearby grass had been sprayed with 2,4-D ester about a year previously and boards used subsequently in the starting bed had been in contact with the grass (F. R. Harper). Several truck growers about Saskatoon, Sask., have complained that drift of 2,4-D from spray or dust applications on grain fields in their area have caused sev. damage particularly to tomatoes. In one tomato planting of several acres, damage characteristic of 2,4-D was sev.; fruit production was delayed and the fruit were off-shape (R. J. Ledingham). Injury was also observed for the last 3 years at North Battleford, Sask. (T. C. Vanterpool). Sev. damage was reported in a city garden, Ottawa, Ont. (H. N. Racicot). Sev. damage (60% loss) was caused in a field of tomatoes when weeds along the highway were sprayed with 2,4-D ester in Sunbury Co., N. B. The vines were curled and twisted and sev. stunted; fruits were distorted and some failed to set seed (D. J. MacLeod).

SUN SCALD (non-parasitic) was noticed in 3 gardens in the Avalon Peninsula, Nfld., in which leaf development was poor (G. C. Morgan).

TURNIP

GREY MOULD (Botrytis cinerea) affected only 3% of the roots of Ditmars swede turnips in storage at Barton, N.S., where the loss was 30% in 1951 (P.D.S. 31:83). The storage space was disinfected with formaldehyde, and no cabbage were stored in the same space (K.A. Harrison).

SOFT ROT (Erwinia carotovora) was affecting 1% of the Ditmars roots at Barton, N.S., in October; entrance was through growth cracks (K. A. Harrison).

DOWNY MILDEW (Peronospora brassicae) was heavy on the leaves at Milner, B.C., on 25 July (H.N.W. Toms).

BLACK LEG (Phoma lingam) sev. affected 2% of the crop of Laurentian swede turnips in a field in Queens Co., P.E.I. (R.R. Hurst).

CLUB ROOT (Plasmodiophora brassicae) caused sev. damage in a field at Jemseg, N.B. (S.R. Colpitts). It caused 80% damage in 1/2-acre field of Ditmars at Barton, N.S. (K.A. Harrison). Club root was present in small amounts in most fields of swede turnip in P.E.I.; several sev. infections were reported in October from various points in the province (G.W. Ayers). Club root was again severe in home gardens in the Avalon Peninsula, Nfld., causing some heavy losses (G.C. Morgan).

STORAGE ROT (Rhizoctonia solani) caused sl. damage to swede turnips in storage in the Victoria district, B.C.; the fungus was isolated from the necrotic tissues (W.R. Foster, W. Jones). A sl. infection occurred on Ditmars in storage at Barton, N.S. (K.A. Harrison).

BLACK ROT (Xanthomonas campestris). Stecklings of a Foundation seed stock of Acadia swede turnip were noted to have black streaks through the tap roots, in Forage plots, Ottawa. Isolations yielded a culture of X. campestris, which proved virulent when tested on cabbage seedlings. A seed examination of the original seed yielded only 5% affected by bacteria of X. campestris type. Seed was sown on land new to turnips. Typical symptoms of black rot were not observed during the growing season. Infection was sev., destroying 60% of the crop in a 7-acre field of Laurentian near Kingston, Ont. Black rot was followed by soft rot. The crop was grown on bottom land, on which an excellent crop of turnips had been grown in 1951. The debris from the previous crop, however, was heavy and not removed. Here again no leaf symptoms were evident on plants examined in the field (R.J. Baylis).

MOSAIC (virus). Specimens apparently affected by mosaic were received from St. Leonard de Port Maurice, Hochelaga Co., Que. (R.J. Baylis). A 10-acre field of Laurentian at Riviere des Prairies showed 15-20% of the plants infected (E. Lavallee). A crop of stecklings of Ditmars were 100%

affected when lifted in 1951 and the roots were so weak when tested in the greenhouse that they were not planted in 1952. Plots in the same area in 1952 showed 50-90% of the plants affected at harvest. Infection on the wild radish (Raphanus raphinistrum) in the area was estimated at 20%. One commercial planting isolated from other fields was almost free of infection. (K. A. Harrison).

STERILITY (virus). About 1% of the plants showed sev. symptoms in a seed plot in York Co. N. B. (D. J. MacLeod). Sterility affected 1% of the plants of Ditmars at Barton, N. S. ; a little of the trouble shows up every year (K. A. Harrison).

WITCHES' BROOM (virus). A tr. was seen in a seed plot in York Co., N. B. (D. J. MacLeod).

BROWN HEART (boron deficiency). Affected specimens were received from Springhill, N. S. ; the grower claimed that the disorder appeared despite the use of fertilizer containing boron. (K. A. Harrison). Swede turnips were sl. affected in several garden plots in Conception Bay, Nfld. (G. C. Morgan).

VEGETABLE MARROW

POWDERY MILDEW (Erysiphe cichoracearum) was heavy on Long White Bush at Vancouver, B. C. ; it apparently caused no damage (H. N. W. Toms).

WATERMELON

ANTHRACNOSE (Colletotrichum lagenarium) was sev. in a 2-acre field at Harrow and in an 8-acre one near Aylmer, Ont. ; losses were 20-60% (C. D. McKeen).

BLOSSOM-END BROWNING (non-parasitic). Ironsides, which is resistant to Fusarium wilt, showed up to 40% of its fruits affected in the Laboratory plot at Harrow, Ont. ; no other varieties were affected (C. D. McKeen).

IV. DISEASES OF FRUIT CROPS

A. POME FRUITS

APPLE

STORAGE ROT (Alternaria ?mali) affected several apples in a retail market at Charlottetown, P. E. I. (R. R. Hurst).

FIRE BLIGHT (Erwinia amylovora). Damage was severe in the provincial orchard at Brooks, Alta. All trees of several susceptible varieties were removed. Slight to moderate infection occurred on apples at New Dayton and Lethbridge (M. W. Cormack). A tree of Bechtel's Crab, Malus iowensis var. plena, at Ottawa, Ont., showed 8 infected blossom spurs. This species is seldom affected (H. N. Racicot).

RUST (Gymnosporangium spp.). G. juniperi-virginianae was reported to be moderately heavy on Delicious and Wealthy in the Trenton district, Ont. Fruits were deformed at the calyx end (G. C. Chamberlain). Infected leaves were found on scab-resistant seedlings (row 7, trees 96, 108, 109) in the Dept. of Agriculture orchard at Smithfield (H. N. Racicot, I. L. Conners). G. clavipes affected less than 5% of fruit in any orchard seen in N. S.; infection was usually only a trace in spite of heavy development of telia on juniper. Prolonged rains at telial expansion may have been unfavourable to infection (J. F. Hockey).

TWIG BLIGHT (Nectria cinnabarina) damaged a few branches on a tree of Red Rome Beauty at Woodville, Kings Co., N. S. (R. G. Ross).

EUROPEAN CANKER (Nectria galligena) caused moderate damage to Gravenstein, Red Delicious and Wagner in a 15-year old orchard at Cambridge, Kings Co., N. S. The orchard had been neglected for 5 years (J. F. Hockey).

ANTHRACNOSE (Neofabraea malicorticis) was severe in an orchard of Wagner at Sidney, B. C. (W. Jones).

PERENNIAL CANKER (Neofabraea perennans). An usually heavy infestation of woolly aphis in Creston Valley, B. C., has increased the danger that perennial canker and bull's-eye rot, already increasing, will again become major problems (J. M. Wilks).

BLACK ROT (Physalospora obtusa) slightly infected wild apples at Centreville, Carleton Co., N. B. (S. R. Colpitts). Gravenstein and Northern Spy showed 2% infection at Kentville, N. S., in October (J. F. Hockey). Traces were seen in Northern Spy on sale at Charlottetown, P. E. I. in February (R. R. Hurst).

POWDERY MILDEW (Podosphaera leucotricha) was common in the North Saanich district, B. C., and occasionally caused die-back of twigs (W. Jones). In the Okanagan Valley, mildew caused slight damage to fruit of Jonathon and McIntosh and severely damaged terminal growth of the former (D. L. McIntosh).

SILVER LEAF (Stereum purpureum) affected a few trees at the Station, Kentville, N.S., and killed one (C.O. Gourley, R.G. Ross).

SCAB (Venturia inaequalis) was moderately heavy on the fruit of three trees of Yellow Transparent at Britannia Beach, B.C. (I.C. MacSwan). Scab was severe on foliage and fruit of all varieties of the Kootenay, Salmon Arm and part of Penticton districts (D.L. McIntosh). Scab was generally well controlled in the Niagara Peninsula, Ont. In the Laboratory orchard, St. Catharines, infection was 59% on fruit of unsprayed McIntosh; infection in the variously sprayed trees ranged from 0.3 to 18.0% (G.C. Chamberlain). It was severe on fruit of a crab from Kenogami, Chicoutimi, Co., Que. (H.N. Racicot). To judge from requests for information, it was common and severe in home orchards at Montreal, Longueuil and Sorel (J.E. Jacques). Scab was difficult to control in the lower St. Lawrence because sprays generally could not be applied at the best time. Even the best growers produced low-grade fruit (R.O. Lachance).

In N.B. the early part of the season greatly favoured scab development and infection was moderate to severe in poorly sprayed orchards. Most of the scab seen was from ascospore infection. The latter half of the season did not favour spread (J.L. Howatt). The overwintered leaves contained more perithecia than usual. A light ascospore discharge occurred at Fredericton on 7 May and heavy discharges on 12, 21 and 22 May. Rainfall was heavy from 7 May to 21 June. Leaf infection was seen on 5 June. Primary scab was controlled in well-sprayed orchards, but in others infection was heavy. The wet weather usually made timely spraying difficult (S.F. Clarkson).

In N.S. ascospores were mature before the buds of most of the apple varieties showed green. Very severe infection periods were experienced during the pink, full bloom and petal fall periods. Primary infections appeared during full bloom, increasing the inoculum. The season was difficult for spraying and favoured fungus development. Orchards which received little or no spray were defoliated in July. Many commercial growers used eradicant fungicides to supplement their regular sprays, with excellent results (J.F. Hockey). Infection was 5% at Charlottetown, P.E.I. (J.E. Campbell). Infection varied from sl. to sev. in various districts (R.R. Hurst). Scab caused defoliation of unsprayed McIntosh in the Waterford Valley area, Nfld. A moderate infection was noted on Yellow Transparent at Topsail (G.C. Morgan).

BITTER PIT (physiological) affected 5% of a lot of Northern Spy in Lincoln Co., Ont., in December; the fruit were sound when picked. Severely pitted specimens of a shipment of Wine Sap from B.C. were received from Toronto on 28 April 1952, without information on the percentage affected. Specimens of Talman Sweet were received from Montreal, Que., 21 Nov. (G.C. Chamberlain).

DROUGHT SPOT (boron deficiency) severely affected all fruit of Northern Spy at a location in Queens Co., P.E.I. (R.R. Hurst).

FREEZING INJURY destroyed 2% of the fruit in a hamper of Delicious in Queens Co., P. E. I., in January (R. R. Hurst).

CHLOROSIS (lime-induced iron deficiency) was seen on apples and all other tree fruits in many districts of the Okanagan Valley, B. C., particularly where poor drainage causes wet soil. Experiments indicate that some of this trouble may be due to combined deficiencies of iron, manganese and zinc (C. G. Woodbridge).

CHLOROSIS (manganese deficiency) has been found in many parts of the Okanagan Valley, B. C., in apple and other fruits and in vegetables. It is usually found in slightly alkaline soils, pH 7.2-7.9 (C. G. Woodbridge).

LEAF BLOTCH (magnesium deficiency) was unusually serious this year in the Okanagan Valley, B. C., perhaps because of the hot, dry summer. Experimental spraying with Epsom salt gave good control, but soil applications were ineffective (C. G. Woodbridge). Early defoliation and fruit drop occurred on McIntosh with a heavy crop at Cambridge, Kings Co., N. S., but trees in the same orchard with a light crop appeared quite normal (J. F. Hockey).

LITTLE LEAF and ROSETTE (zinc deficiency) were much more prevalent than usual in the Okanagan Valley, B. C., on all tree fruits (C. G. Woodbridge). It appeared, at least in mild form, on some trees of most orchards in Creston Valley. Orchards sprayed in June with zinc oxide responded quickly (M. F. Welsh).

SOOTY MOULD (?on aphis honey dew) was seen on McIntosh at Gagetown, Queens Co., N. B., on 6 Aug. (S. R. Colpitts).

PEAR

FIRE BLIGHT (Erwinia amylovora). Very little damage occurred in Bartlett and Flemish Beauty plantings this year in the Okanagan Valley, B. C. (D. L. McIntosh). It is still moderately serious in a few orchards in Creston Valley, but continued winter cutting and inspection have reduced the intensity in most parts of the valley to the level of the years preceding the 1948-1951 epidemic. Blossom-spraying shows promise in some of the orchards still infected (M. F. Welsh). Limb and trunk cankers occurred on a number of trees in an orchard of 8-year-old Bartlett in Lincoln Co., Ont. Killing of twigs, spurs and branches was common in a 6-year-old block of Bartlett, where many trees have been seriously injured by trunk cankers in the last three years (G. C. Chamberlain).

FRUIT ROT (Gloeosporium sp.). A few fruits of Clapp's Favorite from a home garden at Kentville, N. S., were rotted on 10 Sept. (D. W. Creelman).

FRUIT ROT (Phytophthora cactorum) attacked a few fruit on the trees in late August, in an orchard at Wolfville, N. S., that had received the full spray schedule for scab and showed little of that disease (D. W. Creelman).

SCAB (Venturia pirina) was common on unsprayed trees in home gardens at Sidney, B. C. (W. Orchard). It was serious on Bartlett, in which it is usually unimportant, in the Fonthill and Fenwick district, Welland Co., Ont. In one orchard 40 bu. were graded unmarketable out of 160 due to large blemishes. In a second the loss was stated to be 5 out of 14 tons (G. C. Chamberlain). Specimens sent by Mr. Chamberlain bore superficial but very large lesions with a pattern of reticulate scales. The appearance suggested that infection had taken place when the fruit was small, but that the lesions had remained too shallow to cause the fruit to be seriously malformed (D. B. O. S.). At Wolfville, N. S., foliage infection was 25% on unsprayed Bartlett and Sheldon. Fruit scab was heavy on unsprayed trees at Kentville, causing considerable distortion and cracking (D. W. Creelman). Scab was heavy on Flemish Beauty in Queens Co., P. E. I. (R. R. Hurst).

SUMMER WILT (cause unknown) was seen in several parts of the Okanagan Valley, B. C. It occurs from August to October, before or after picking of the crop. Affected trees wilt completely a few days after the first symptoms are visible. Removing the crop and spraying the foliage continuously with water slow down the wilting. Trees often die in the same year, but may put out weak suckers in the next year (C. G. Woodbridge).

THIN WOOD (cause unknown). Seen on Bartlett at Summerland and Penticton, B. C. (C. G. Woodbridge). See P. D. S. 31:89.

QUINCE

RUST (Gymnosporangium clavipes) infected 10-60% of the fruit on different trees at the Station, Kentville, N. S. Much of the fruit was useless (D. W. Creelman).

B. STONE FRUITS

APRICOT

CORYNEUM BLIGHT (Clasterosporium carpophilum) was severe on unsprayed fruit throughout the Okanagan Valley, B. C. (D. L. McIntosh). Infection was moderate in Creston and West Kootenay Valleys. In unsprayed orchards fruit spotting was severe and twig cankering moderately severe. The shuck-fall spray, developed for peaches, is even more effective for fruit protection in apricot; but the September spray gives only partial control of bud infections and limb and twig cankers in apricot (M. F. Welsh).

BROWN ROT (Monilinia (Sclerotinia) fructicola). Fruit infection was heavy at Summerland, B. C., on seedlings closely planted in propagation rows under sprinkler irrigation (D. L. McIntosh). Blossom blight was 75% on a single apricot in a peach orchard at Wolfville, N. S. (D. W. Creelman).

WILT (Verticillium albo-atrum) was found at Osoyoos, B. C., on young Moorpark trees in orchards where wilt had been present in crops such as tomato and cantaloupe (G. E. Woolliams).

LITTLE LEAF and ROSETTE (zinc deficiency). Symptoms were unusually prevalent in the Okanagan Valley, B. C., on tree fruits and were noticed for the first time on apricot (C. G. Woodbridge).

SWOLLEN NODES (boron toxicity). Greatly enlarged nodes are a symptom of boron toxicity in the Okanagan Valley, B. C., often associated with die-back or stunting of the tips of branches. Caused by over-zealous use of boron compounds to correct deficiency (C. G. Woodbridge).

CHERRY

BLACK KNOT (Dibotryon morbosum) was heavy on wild pin cherry at Centreville, Carleton Co., N. B. (S. R. Colpitts). It caused severe damage to sour cherries in Queens Co., P. E. I. (R. R. Hurst). A moderate infection occurred on sour cherries at Topsail, Nfld. It was heavy on wild pin cherry near Grand Falls, in Bonavista Bay and on the Avalon Peninsula (G. C. Morgan).

SHOT HOLE (Higginsia hiemalis) was severe late in the season on all varieties of sweet cherry in the West Kootenay district, B. C. Early infection of leaves and fruit pedicels was scarce (J. M. Wilks, M. F. Welsh). It was not important on sour cherry this year in the Niagara Peninsula, Ont. Unsprayed trees showed 10-18% leaf infection and slight defoliation at the end of the season (G. C. Chamberlain).

BLOSSOM BLIGHT and BROWN ROT (Monilinia (Sclerotinia) fructicola and M. laxa). Blossom blight was light on Bing and Lambert sweet cherry at Boswell, B. C. (D. L. McIntosh), but was moderately heavy on all varieties in the West Kootenay districts. A dry spell while the fruit was ripening caused fruit rotting to be very light (J. M. Wilks, M. F. Welsh). Blossom blight (M. fructicola) was only a trace in sweet cherry orchards in the Niagara Peninsula, Ont.; but 6-7% of blossoms were destroyed in an orchard of Montmorency sour cherry, and a little rot of green fruit occurred in the same orchard (G. C. Chamberlain). M. fructicola, spreading from blossom infection, caused a loss of 10% of the crop of sweet cherry at Kentville, N. S. Hot, dry weather in July checked its spread in sweet and sour cherries (D. W. Creelman, C. O. Gourley).

CROWN ROT (Phytophthora cactorum). Surveys of 49 orchards of Bing, Lambert and Van sweet cherry throughout the Okanagan Valley, B. C., revealed 33 infected trees out of 4615 examined (D. L. McIntosh).

POWDERY MILDEW (Podosphaera oxyacanthae) caused heavy loss of fruit of Lambert sweet cherry on the upper benches at Penticton, B. C. It occurred mainly on the terminal leaves of young trees of Van at the Station,

Summerland (G. E. Woolliams). Mildew caused slight foliage damage to Montmorency sour cherry at Erickson, in Creston Valley (J. M. Wilks). It was present on all trees of a young, closely planted block of Montmorency in the Laboratory orchard, St. Catharines, Ont., but caused slight damage (G. C. Chamberlain).

WITCHES' BROOM (Taphrina cerasi) was seen on Mayne I, near Vancouver I., B. C. It seems to be increasing in the district (W. Jones). Witches' broom was seen on a sweet cherry at Langley, B. C., and two specimens were brought in from the Vancouver area. Agricultural workers reported it to be general on sweet cherry in the Fraser Valley (I. C. MacSwan). It was seen at Kilgard and in the Aberdeen-Otter area, lower Fraser Valley. The broom of reddened leaves was conspicuous against the blossom on 28 April (H. N. W. Toms).

WILT (Verticillium albo-atrum). The pathogen was isolated from several diseased trees of Van in the stone fruit orchard at the Station, Summerland, B. C. (G. E. Woolliams). Specimens from two 3-year-old trees of Montmorency, sent in from Aldershot, Ont., showed the vascular discoloration typical of Verticillium (G. C. Chamberlain).

Dr. R. S. Willison has provided the following report, "Virus Disease Survey in the Niagara Peninsula, Ont."

The sixth annual survey for incidence of virus and virus-like symptoms in sweet and sour cherry orchards was conducted in 1952. The data for sweet cherries are summarized in Table 9 and for sour cherries in Table 10. Trees removed for various reasons during the six year survey period are not included in the current summaries. The tables present the percentage occurrence of symptoms, both old and new cases, and the percentage of previously infected trees not showing symptoms in 1952.

In both sweet and sour cherries, the frequency of recurrence of a given symptom type varies from orchard and from season to season. Moreover, the seasonal conditions which favour expression of one symptom type may not favour that of another type; e. g., in sour cherries etching (the chronic phase of necrotic ring spot) recurred in 50. 2 and 16. 5% of known cases in 1951 and 1952 respectively, whereas the corresponding figures for recurrence of yellows were 52. 0 and 79. 7%.

Since shock symptoms in sour cherries occur only in the early stages of infection with a number of different virus types, the appearance of shock after chronic symptoms have been observed on a tree for more than one year indicate a second infection presumably with a virus more or less different from the one already present. Several such cases of multiple infection have been recorded during the six-year survey period, under the following circumstances:

(a) on trees known to have been infected for more than one year;

(i) shock after chronic symptoms of necrotic ring spot - 10
(ii) " " " " " yellows - 14
(iii) " " previous shock (several years intervening) - 13

(b) on trees not known to have been infected for more than one year;

Chronic symptoms of necrotic ring spot observed only in the year preceding the appearance of shock symptoms - 66

Table 9. Summary of occurrence of symptoms in 13 sweet cherry orchards in 1952

Symptoms recorded	Cases				Percentage Trees Examined
	New	Recurring	Non-Recurring	Total	
Mottles, rings, etc.	101	246	781	1128	56.40
Necrotic spotting	199	9	70	278	13.90
Tatter leaf (suspect)	17	7	174	198	9.90
Tatter leaf	13	98	117	228	11.40
Crinkle and pseudocrinkle	65	80	250	395	19.75
Small leaf (rosette ?)	16	11	12	39	1.95
Rasp leaf	1	1	4	6	.30
Mild rugose mosaic	7	2	1	10	.50
Lambert spot	1 (a)	1	0	1	.05
Yellow mosaic patterns	3	0	0	3	.15
Yellow leaves (?)	3	0	0	3	.15
Total cases	425	455	1409	2289	114.45
Combined cases	---	150	735	885	44.25
Trees affected				1404	70.20
No symptoms				596	29.80
Total trees				2000	100.

(a) Tree removed

In the last instance, the observed shock may or may not have been evidence of a second infection. It is also known that, if infection occurs early in the growing season, a tree can become systemically infected without going through the shock phase. Thus the actual frequency of multiple infection probably greatly exceeds the frequency demonstrable by survey only.

Table 10. Summary of occurrence of symptoms in 10 sour cherry orchards in 1952.

Symptoms recorded	Cases				Percentage Trees examined
	New	Recurring	Non Recurring	Total	
Yellows (suspect)	63	16	205	284	9.2
Yellows	403	672	171	1246	40.4
Etching	36	62	314	412	13.3
Shock symptoms	29	5	213	247	8.0
Green ring mottle	7	8	1	16	0.5
Mottle & ring patterns	57	4	44	105	3.4
Tatter leaf (suspect)	2	0	13	15	0.5
Narrow leaf	10	2	7	19	0.6
Rasp leaf	3	2	12	17	0.6
Abnormal fruit	2	0	0	2	0.1
Total cases	612	771	980	2363	76.6
Combined cases	--	84	534	618	
Trees affected				1745	56.6
No symptoms				1339	43.4
Total trees				3084	100.

ABNORMAL FRUIT (virus). Two trees in one of the survey orchards of Montmorency sour cherry in Louth Twp., Lincoln Co., Ont., bore mildly rosetted, leathery, rolled leaves, and malformed fruit with internal browning. Parts of each tree also had symptoms of yellows. A similar case was reported in 1950 from Clinton Twp. The disease is sporadic and may be caused by infection with an uncommon combination of viruses. Two trees of sweet cherry, Windsor and an unnamed variety, in Saltfleet Twp., Wentworth Co., bore bumpy or furrowed fruit with some internal browning, and leaves suggestive of tatter leaf; suspected to be due to virus infection (R.S. Willison).

LITTLE CHERRY (virus). Little further spread is possible within the Kootenay districts, B.C., and none was reported. Symptom severity remains constant in the West Kootenays. In Creston Valley there was additional evidence, in some orchards, that fruit size can be increased by heavy fertilizer applications; but only some orchards respond, and even in them symptoms other than fruit size are unchanged (J.M. Wilks, M.F. Welsh).

MOTTLE LEAF (virus). One infected tree of Bing sweet cherry was seen in Creston Valley, B.C. The tree was removed. This is the second record

in this valley, the first having been found, and removed, in a neighbouring orchard in 1950. This second tree was evidently displaying second-year symptoms of a severe form of the disease (M. F. Welsh).

RING SPOTS (virus) Symptoms were more severe and seen on more trees of all sweet cherry varieties than usual. In several large plantings surveyed almost all trees showed ring spotting in some degree. Symptoms were most pronounced in Deacon and in Van budded to old Lambert. In Van the symptoms seem to be a shock reaction to viruses in the Lambert trees (M. F. Welsh).

SEVERE MOTTLE LEAF (virus) was seen on one sweet cherry tree (?Yellow Spanish) in Clinton Twp., Lincoln Co., Ont. One or two trees that showed similar symptoms last year in Louth Twp. were removed by the grower. The disease seems to be gradually spreading through the district. It is similar to the disease reported from B. C. and Wash., and also resembles the mild rugose mosaic and velvet mottle reported from Ont. (R. S. Willison).

YELLOWS (virus) caused moderate damage to Montmorency sour cherry at the Station, Kentville, N. S. (C. O. Gourley).

SEVERE NECROTIC SPOTTING (?virus). Five or six trees out of several hundred in a planting of Windsor sweet cherry at Winona, and 1 or 2 of an unknown variety at Stoney Creek, Wentworth Co., Ont., showed severe necrotic spotting of leaves, internal bark necrosis and reduced crop. One tree at Stoney Creek had very bumpy bark, with necrotic, slightly gummy lesions in the bumps. The trees at Winona bore malformed fruit with bumps and depressions; they had been noticed by the foreman in 1951, but the symptoms were stated to be more severe in 1952 (R. S. Willison).

PEACH

CROWN GALL (Agrobacterium tumefaciens) was seen on a tree in a home garden at Vancouver, B. C. The tree bore a large crop (H. N. W. Toms). Infection was 80% in a shipment of young trees from a nursery in Lincoln Co., Ont. (G. C. Chamberlain).

SCAB (Cladosporium carpophilum). Infection was very light in one orchard at Grand Pre, Kings Co., N. S. (C. O. Gourley).

CORYNEUM BLIGHT (Clasterosporium carpophilum). Isolated infections were seen on peach fruit in the Okanagan Valley, B. C. (D. L. McIntosh). In the Kootenays, infection was nil in adequately sprayed orchards, but was mod., with fruit spotting and killing of trees, in those that were not sprayed. A 5-year test spray programme, concluded in 1952, has proved convincingly that: (1) a late September spray of Bordeaux mixture, ferbam with wettable sulphur (1 lb. -3 lb. per 100 gal.), or fixed copper will prevent all new

infections on limbs or twigs, and in a few years will greatly reduce fruit and leaf infection; (2) the addition of a shuck-fall spray will further reduce infection in some seasons; (3) the pink spray has no demonstrable value. Most orchards now receive the September and shuck-fall sprays (M. F. Welsh, J. M. Wilks).

BROWN ROT (Monilinia (Sclerotinia) fructicola). In the Laboratory orchard, St. Catharines, Ont., only a trace of blossom blight occurred. Brown rot in harvested fruit from unsprayed trees after 9 days in storage was 63.7%, compared with 10-30% from sprayed trees. In general, brown rot was a serious factor in harvested fruit in the Niagara Peninsula, losses being considerable in shipment and at markets. Sluggish markets and a surplus of fruit resulted in much wastage of packed fruit (G. C. Chamberlain). Infection was light on Early Red Fire and other varieties in an orchard at Grand Pre, Kings Co., N.S. (C. O. Gourley).

LEAF CURL (Taphrina deformans). In the Kootenays, B. C., the 5-year spray test for Coryneum blight (q. v.) has shown that the late September spray of Bordeaux mixture or ferbam with wettable sulphur also gives excellent control of leaf curl. It is much easier to apply than the early spring application of lime-sulphur. A wet spring in 1952 favoured leaf curl in unsprayed orchards (M. F. Welsh, J. M. Wilks). Four trees at one end of an orchard in Lincoln Co., Ont., which could not be reached in applying the dormant spray, were seriously infected. No leaf curl was found in well-sprayed orchards. Scattered infections were seen in a young block of Elberta and Golden Jubilee, in Lincoln Co., where spraying was delayed (G. C. Chamberlain). Infection was 100% on unsprayed trees at Kentville, Mahone Bay and Shelburne, N.S. (D. W. Creelman). Phygon, substituted for Bordeaux mixture in the dormant spray failed to give any control (J. F. Hockey).

CANKER (Valsa spp.). V. cincta caused extensive cankers on 10-30 young trees of Elberta in an orchard in Pelham Twp., Welland Co., Ont. Wilting and die-back resulted. The trunk cankers followed winter injury due to excessive cultivation in 1951 and failure of wood to mature (G. C. Chamberlain). V. leucostoma caused severe cankers on most of the 1951 sucker growth on Early Red Fire at Grand Pre, N.S. Cankers to 18 in. long were numerous. Severe trunk cankers were present on some trees. Infections could be found on most trees of all varieties in the orchard (C. O. Gourley).

WILT (Verticillium albo-atrum) was found occasionally on 2-4-year-old Vedette, Valiant, and Veteran at Osoyoos, B. C., in orchards where Verticillium has been recorded on crops such as tomato and cantaloupe (G. E. Woolliams). Scattered trees were affected in a 5-year-old planting of Elberta in Lincoln Co., Ont., showing wilt and defoliation on one side (G. C. Chamberlain).

BACTERIAL BLIGHT (Xanthomonas pruni). Infection was moderate in June on the leaves of Early Red Fire at Grand Pre, N.S. (C.O. Gourley).

BUD FAILURE (cause unknown) was seen in several parts of the Okanagan Valley, B.C. The buds start to swell in the spring, but then die and slough off. It is sometimes related to boron deficiency, but in other cases the tissues of affected trees have a very high boron content. Trees seldom die, but the leaves are 4-6 weeks late. Trees appear normal at the end of the summer (C.G. Woodbridge).

LITTLE LEAF and ROSETTE (zinc deficiency) was seen on peach in the Okanagan Valley, B.C., for the first time (C.G. Woodbridge).

PLUM

BLACK KNOT (Dibotryon morbosum) was severe on damson plums in a neglected orchard at Sidney, B.C. (W. Jones). Scattered infections were seen in a block of 200 Stanley prune trees in Niagara Twp., Lincoln Co., Ont. (G.C. Chamberlain). A young orchard of several varieties at Grand Pre, N.S., was heavily infected. All trees and 20% of branches bore knots; although mainly on 1950 and 1951 growth, some knots on main branches made it impossible to prune without ruining trees (C.O. Gourley, D.W. Creelman). Black knot is serious on plums in Nfld. In five orchards examined, 75% of the trees were infected. A few growers cut out new knots, but usually start too late to save the trees (G.C. Morgan).

SHOT HOLE (Higginsia prunophorae) was heavy but caused slight damage in August at Fredericton, N.B. (S.R. Colpitts).

BLOSSOM BLIGHT (Monilinia laxa) was moderately severe on Yellow Egg in an orchard at Sidney, B.C. (W. Jones).

FRUIT ROT (Rhizopus nigricans). A car-load imported from western United States showed 77% of the fruit infected on arrival at Montreal, Que., on 19 Aug. (J.E. Jacques).

PLUM POCKET (Taphrina communis) occurred on young, unsprayed trees of Burbank at Kingston, Kings Co., N.S.; it was also severe on an unidentified variety at Upper Dyke (D.W. Creelman).

ROOTSTOCK INCOMPATIBILITY caused marked swelling at the budding point of about 20/200 5-year-old Stanley prune trees in the Niagara Peninsula, Ont. The affected trees, bearing their first crop, were unthrifty and broke off readily at the junction of stock and scion (G.C. Chamberlain).

SWOLLEN NODES (boron toxicity) was seen in the Okanagan Valley, B.C., on prune and apricot (q.v.) (G.C. Woodbridge).

WINTER INJURY. A row of 18 trees of Red June Japanese plum in Niagara Twp., Lincoln Co., Ont., showed extensive damage to main limbs and crotch. Valsa canker followed the injury (G. C. Chamberlain).

C. RIBES FRUITS

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola). A few bushes of cultivated black currant were heavily infected at Rochfort Bridge, Alta. (A. W. Henry). Rust was heavy on black currants at Ste. Foy, Que., causing defoliation before the end of the season (D. Leblond). Infection on black currants was light at the Station, Kentville, N.S. (C. O. Gourley). Heavy infections caused moderate to severe damage to red currants in Queens Co., P. E. I. A light infection occurred near Charlottetown on what was supplied from a commercial nursery in Ont. as "the new rust-resistant black currant" and stated to have been produced at Ottawa (R. R. Hurst). Whether these plants are actually either Coronet or Crusader is not yet known.

ANTHRACNOSE (Drepanopeziza ribis) caused severe defoliation in a garden at Lethbridge, Alta. (F. R. Harper). A hedge of R. alpinum was heavily spotted and partly defoliated at Chambly, Que., in early Sept. (J. E. Jacques).

SEPTORIA LEAF SPOT (Mycosphaerella grossulariae). Infection was moderate to severe in a planting at Taber, Alta. (M. W. Cormack).

POWDERY MILDEW (Sphaerotheca mors-uvae) was severe in some garden and commercial plantings at Edmonton, Alta. (T. R. Davidson, A. W. Henry). It was reported from Muenster, Sask. (T. C. Vanterpool). Infection was heavy on a few plants of black currant at the University of Manitoba, Fort Garry, Man. (W. A. F. Hagborg). Infection was moderate, but damage light, on Coronet and Crusader black currant at the Station, Kentville, N.S., on 13 June (C. O. Gourley).

GOOSEBERRY

WHITE PINE BLISTER RUST (Cronartium ribicola). A trace was seen in Queens Co., P. E. I. (R. R. Hurst).

ANTHRACNOSE (Drepanopeziza ribis) caused considerable defoliation in a garden at Ucluelet, on the west coast of Vancouver I., B. C. (W. Jones). Infection was light on the varieties at the Station, Kentville, N.S. (C. O. Gourley).

SEPTORIA LEAF SPOT (Mycosphaerella ribis) was moderately heavy at Ste. Foy, Que. (D. Leblond). Traces were seen in Queens Co., P. E. I. (R. R. Hurst).

CANE BLIGHT (Nectria cinnabarina). Severely infected twigs were received from Normandin, Que., with no information as to the extent of the damage (H. N. Racicot).

CLUSTER CUP RUST (Puccinia caricis) was heavy on the young leaves of gooseberries at Metaghan River, Digby Co., N. S., on 23 May. It was moderately heavy on O-274 at Kentville (C. O. Gourley).

POWDERY MILDEW (Sphaerotheca mors-uvae) was heavy on fruit displayed for sale at Vancouver, B. C. (H. N. W. Toms). It was severe in a garden at Edmonton, Alta. (T. R. D.). Infection was light but general on the varieties at the Station, Kentville, N. S., on 14 July, despite one spray with sulphur (C. O. Gourley). Specimens were received from Curling, Nfld. (D. W. Creelman).

D. RUBUS FRUITS

BLACKBERRY

CANE GALL (Agrobacterium rubi) was found in all commercial plantings of Himalayan blackberry examined in the Saanich Peninsula, Vancouver I. B. C., and was present in 75% of the plants. Although damage was not severe, a general unthriftiness resulted (W. E. McKeen).

RUST (Gymnoconia peckiana). Infection was 25% on Rubus allegheniensis at Acacia Valley, Digby Co., N. S. (D. W. Creelman). A trace was seen on blackberries in a garden at Charlottetown, P. E. I. (R. R. Hurst).

AUCUBA MOSAIC (virus). Infection was 1% in Himalayan blackberry in the Saanich Peninsula, B. C. (W. E. McKeen).

MOSAIC (virus). A striking mosaic was seen on wild blackberry at Abbotsford, B. C. (R. Stace-Smith).

LOGANBERRY

CANE GALL (Agrobacterium rubi) infected 20% of the plants in 2 fields of boysenberry in the Saanich Peninsula, B. C., causing unthriftiness. Infection was 100% in two fields of loganberry and a trace in others; it caused imperfect ripening of the fruit and drying up of the plants (W. E. McKeen).

CROWN GALL (Agrobacterium tumefaciens) was present in varying amounts in all commercial plantings of loganberry in the Saanich Peninsula, B. C. It causes increasing unthriftiness and eventual death of the plants (W. E. McKeen).

SEPTORIA LEAF SPOT (Mycosphaerella rubi) attacked all leaves of boysenberry and loganberry in the Saanich Peninsula, B. C., causing moderate damage (W. E. McKeen).

RASPBERRY

CANE GALL (Agrobacterium rubi) was found on one plant in a garden in the Saanich Peninsula, B. C. (W. E. McKeen).

CROWN GALL (Agrobacterium tumefaciens) is heavy in the raspberry plantation at the Substation, MacDonald Corner, N. B., and seems to be spreading to adjacent apple seedlings. Most of the raspberries were brought in from Ont., and seemed to be healthy on arrival. Conditions seem to favour the development of crown gall on raspberry in some localities (J. L. Howatt). Occasional infections severely damaged Viking in Queens Co., P. E. I. (R. R. Hurst).

GREY MOULD WILT (Botrytis cinerea) caused considerable damage in a 1/2 acre plot of Washington on peat loam at South Burnaby, B. C., in 1949. Inadvertently omitted from P. D. S. The disease started with a wilt of the cane tips, which gradually spread down the cane. First noticed by the grower in August; when brought to the Laboratory in December, sclerotia were plentiful, with B. cinerea growing from them (H. N. W. Toms). Infection was 5-10% in a plantation of Viking at Centreville, Kings Co., N. S. Some lesions bore large sclerotia typical of the organism. Isolations from 3/24 small sclerotia from various affected canes also yielded it (K. A. Harrison). Previously reported under the name Cane Blight. J. F. Hockey (Sci. Agr. 32:150-152. 1952) adopts the above name from Wormald, who applied it to the disease in England.

SPUR BLIGHT (Didymella applanata) was heavy on canes received on 5 Aug. from Sydenham, Frontenac Co., Ont. (H. N. Racicot) Infection was moderate in e. Ont. in early summer. In the Picton-Belleville area it later became severe, causing considerable defoliation. It was not serious at Ottawa (A. T. Bolton). A 2-acre field at Chateauguay, Que., was severely affected, with yield reduced at least 25% (E. Lavallee). Traces were seen on Lloyd George in Queens Co., P. E. I. (R. R. Hurst).

ANTHRACNOSE (Elsinoe veneta) was moderately heavy on Washington at Kentville, N. S. There were few complaints this year of losses from anthracnose, probably because all stands were thinned by winter injury and conditions did not favour infection (K. A. Harrison). A trace was seen on Lloyd George in Queens Co., P. E. I. (R. R. Hurst). In two gardens at Topsail and one at St. John's, Nfld., Tayler and Latham were moderately infected. A trace was seen in Conception Bay (G. C. Morgan).

SEPTORIA LEAF SPOT (Mycosphaerella rubi). A 75% infection caused moderate damage to Rideau and Trent at Kentville, N. S., in August. No infection was seen on other varieties on trial. Such heavy infections are infrequent in N. S. (D. W. Creelman).

YELLOW RUST (Phragmidium rubi-idaei) was general but caused slight damage to Washington and Viking at the Station, Saanichton, B. C., but Milton, Newburg, Tahoma, Taylor, and Willamette continue to remain free from infection (W. R. Orchard). Yellow rust was general on Washington in the Fraser Valley, and infection was the most severe yet seen. In some plantings, especially on Lulu Island, it caused the leaves to dry up prematurely, reduced vigour and reduced the crop. It was not seen on Newburg and Willamette (R. E. Fitzpatrick, I. C. MacSwan). It was heavy, often causing severe defoliation, on Washington in the Chilliwack area, but was completely absent from Newburg, the other main variety (R. Stace-Smith). Some infection was seen in October in a farm garden near Fergus, Ont. (C. B. Kelly).

LATE YELLOW RUST (Pucciniastrum americanum). A light, scattered infection was seen on Viking in Louth Twp., Lincoln Co., Ont. (G. C. Chamberlain). Infection was heavy on both leaves and fruits of an unidentified red raspberry submitted from Billings Bridge, near Ottawa (H. N. Racicot). It caused extensive defoliation in the Ottawa district and the Picton-Belleville area. Viking and Latham were almost completely defoliated. Herbert, Madawaska, and Trent were unaffected (A. T. Bolton). It was very common on Viking at the end of the picking season at Kentville, N. S., attacking 50% of the smaller berries (K. A. Harrison).

POWDERY MILDEW (Sphaerotheca humuli) was common in a nursery planting of Latham at Arkona, Ont. (G. C. Chamberlain). Powdery mildew was seen in seedling plantations at Ottawa (A. T. Bolton). A moderate infection caused slight damage to Latham at Charlottetown, P. E. I. (R. R. Hurst).

VERTICILLIUM WILT (V. albo-atrum) was isolated from cultivated black raspberries showing streaking of canes and wilting of lower leaves, in the University test plots, Vancouver, B. C. (R. Stace-Smith). Ten plants in a planting of 2,000 one-year old Viking were killed in Lincoln Co., Ont. (G. C. Chamberlain). A trace was seen in Lloyd George in Queens Co., P. E. I. (R. R. Hurst).

MOSAIC (virus) Green mosaic was found on Cuthbert, Latham, Marlborough, and Newburg in the Fraser Valley, B. C., but not on Washington, although the latter variety develops typical symptoms when inoculated by grafting. Mottle mosaic was found commonly on most varieties grown in the Fraser Valley, and a mosaic is also widespread on Rubus parviflorus (R. Stace-Smith). Mosaic infection was nil to slight in a varietal planting at Edmonton, Alta. (T. R. D.). Mosaic was found in most small patches in the Ottawa district, Ont., but was seldom seen in the larger commercial plantings (A. T. Bolton). In P. E. I. most unrogued plantings of Viking have heavy mosaic infections. In a planting at Charlottetown roguing of infected and adjoining plants has been practised for 25 years and infection is only a trace, indicating that the practice is perfectly feasible (R. R. Hurst).

SEVERE LEAF CURL (virus). An apparently unrecorded virus disease was found in two locations on Washington in the interior of B. C. There is a severe stunting of the current year's growth, dwarfing and curling of leaves, and bud proliferation in the leaf axils that gives a rosette appearance. The plants are rapidly killed (R. Stace-Smith).

VEIN CHLOROSIS (virus) was found in Lloyd George in a nursery at Crescent Beach, B. C. First report to the Survey; originally described from Scotland (R. Stace-Smith).

WINTER INJURY. Raspberries at the Station, Lacombe, Alta., and at Lacombe Nurseries were 80-100% killed, whether laid down and covered or not. The canes were killed, but the roots were unaffected. Low temperatures in early spring are believed to have been responsible (G. B. Sanford). In Sask. the winter was very hard on raspberries. Even the hardiest varieties were considerably damaged; and others, e. g. Viking, killed back to ground level (R. J. Ledingham). Winter injury was seen in many plantations in e. Ont., especially where the plants were on unsuitable soil. It was also serious in a few plantings in w. Que. (A. T. Bolton). In Kings Co., N. S., damage to Viking was 100% at Centreville, 50% at Kentville, and 40% at North Kingston. Newburg suffered 25% loss at Kentville, and trace at Berwick. The most severe injury was associated with vigorous growth and inadequate hardening in the previous fall (K. A. Harrison).

E. OTHER FRUITS

BLUEBERRY

CROWN GALL (Agrobacterium ?tumefaciens). Galls were found on stems of a large percentage of plants in a field in the Saanich Peninsula, B. C., and caused a general unthriftiness (W. E. McKeen). It continues to be troublesome in coastal B. C. (R. E. Fitzpatrick, I. C. MacSwan).

BLOSSOM and TWIG BLIGHT (Botrytis cinerea) again was common in coastal B. C., following frost injury (I. C. MacSwan, R. E. Fitzpatrick). Blossom blight caused slight injury to Vaccinium corymbosum at Kentville, N. S., in June (D. W. Creelman).

WITCHES' BROOM RUST (Calyptospora goeppertiana). The odd infected clone of low-bush blueberry was seen in nearly every field visited in Charlotte Co., N. B., and Kings Co., N. S. (C. L. Lockhart). Two infected bushes were seen in a 1/4-acre planting of Vaccinium corymbosum at Kentville, N. S. (D. W. Creelman).

CANKER (Godronia cassandrae). Cankers appeared on year-old wood in June, in coastal B. C., but none were seen on current growth (R. E. Fitzpatrick, I. C. MacSwan). At Centreville, N. S., infection in Burlington and Jersey was about 40%; and damage was high because plants had to be heavily pruned. Rancacas and Stanley were only lightly affected. A light infection was seen at Aylesford. In a planting at Oxford, 5-10% of plants bore active overwintering cankers in May, but the eventual damage was not determined (C. L. Lockhart).

POWDERY MILDEW (Microsphaera alni var. vaccinii). A 25% infection caused slight defoliation of Vaccinium myrtilloides in September at South Alton, Kings Co., N.S. (D. W. Creelman).

LEAF and BLOSSOM BLIGHT (Monilinia vaccinii-corymbosi). A survey in Charlotte Co., N.B., indicated: Fields free from infection, 29.1%; fields with trace infections, 54.1%; fields with severe infection (50% or over), 16.6%. All severely infected fields were second-crop land; those with a trace were first or second crop. Sclerotia were found in June in old winnowing piles and under infected plants in several fields, but were not then sporulating. Incidence of the disease is reduced by burning. Traces were found on low-bush blueberries at Kentville, Steam Mill and Morristown, N.S. Isolations from blighted leaves invariably yielded the pathogen. In spray tests at Steam Mill fermate 2-100 gave best control, followed by Bordeaux mixture 10-15-100 and Basicop 3-100, each in one application at blossom time (C. L. Lockhart).

FRUIT ROT (Pestalotia vaccinii) was cultured from fallen fruit of low-bush blueberry at the Station, Kentville, N.S. (C. L. Lockhart).

LEAF SPOT (Septoria sp.). A trace occurred at Tower Hill, Charlotte Co., N.B., on low-bush blueberry. Considerable leaf-spotting of undetermined origin occurred in Charlotte Co., N.B., and Kings Co., N.S., causing some defoliation (C. L. Lockhart).

RUST (Thekopsora vacciniorum) was seen on Vaccinium ovalifolium on Goat, Dam, Grouse and Hollyburn Mts., near Vancouver, B.C. (H. N. W. Toms). This mountain species has also been found affected by this rust in the Shickshock Mts., Que. (D. B. O. S.). V. corymbosum was rusted at Pleasant Lake, Yarmouth Co., N.S. Rust was also seen on Gaylussacia baccata at North Wedgeport (D. W. Creelman).

GRAPE

CROWN GALL (Agrobacterium tumefaciens). Galls were present on the lower trunks of 10% of the vines in a 4-year-old block of Seibel 5437 at the Horticultural Experiment Station, Vineland, Ont.; shoot growth was greatly retarded (G. C. Chamberlain).

DEAD ARM (Fusicoccum viticola). In a 19-year-old vineyard of Concord in the Niagara Peninsula, Ont., 647/2044 (31.6%) of the vines were infected in either trunk or arms. The disease is widespread and general in the older vineyards (G. C. Chamberlain).

DOWNY MILDEW (Plasmopara viticola) was moderately heavy on 28 Aug. on foliage of Rogers Red near St. Catharines, Ont., but was not as important as usual in the district (G. C. Chamberlain). Severely infected fruit was received in late July from Pointe Claire, Que. (H. N. Racicot).

POWDERY MILDEW (Uncinula necator) was prevalent late in the season on Concord in Lincoln Co., Ont., but caused little damage. It is troublesome in a planting of French hybrids in Lincoln Co., loss of vines and dieback of canes being attributed to late infections. Bertill-Seyne 2846 is particularly susceptible; on 23 Sept. infection was 100% and defoliation 60-70% (G. C. Chamberlain). A trace was seen in a garden at Kentville, N. S. (D. W. Creelman).

CHLOROSIS (iron deficiency). Scattered areas of chlorosis occur annually in a number of vineyards in the Niagara Peninsula, Ont. Symptoms reach a peak in July and some recovery occurs late in the season (G. C. Chamberlain).

STRAWBERRY

CROWN DECAY (Armillaria mellea) affected a few plants of British Sovereign on newly cleared land at Saanichton, B. C. (W. Orchard).

GREY MOULD (Botrytis cinerea) was heavy on peduncles, hulls and berries, and even whole crowns of Senator Dunlap in the Berwick area, Kings Co., N. S. Satisfactory control was obtained on one farm through the application of one or two sprays of wettable sulphur (C. O. Gourley, D. W. Creelman). A light infection was seen in a few plantings of Premier in Nfld. (G. C. Morgan).

LEAF BLIGHT (Dendrophoma obscurans). Small amounts were seen in only a few plantations in e. Ont. (A. T. Bolton). The pathogen was associated with red hulls at Medford, Kings Co., N. S., but whether it was the primary cause of the condition is uncertain. This is the first report of the fungus from N. S., where the leaf blight phase of its attack has not yet been distinguished (D. W. Creelman, D. B. O. Savile).

LEAF SCORCH (Diplocarpon earliana) was limited in all plantations examined in e. Ont. at fruiting time, but became severe in August and September, especially in the Ottawa district. It varied from severe to very severe in Elgin, Senator Dunlap, Sparkle, Temple and Valentine. Many plants were killed and runner-formation was generally greatly reduced (A. T. Bolton). It was severe on Louise at Ste. Foy, Que. (D. Leblond).

LEAF BLOTCH (Gnomonia fructicola). A trace with the Zythia stage in fruit, was found on lower leaves of Senator Dunlap in association with other foliage diseases at Kentville, N. S. First report from N. S. (D. W. Creelman, D. B. O. Savile). It may be noted that under the name G. fragariae Alexopoulos and Cation (Mycol. 44:221-223. 1952) found it repeatedly in Mich., since first recognising it there in 1947. The organism is probably widespread in North America, but is easily overlooked.

LEAF SPOT (Mycosphaerella fragariae) was a trace on leaves sent in from a garden at Canora, Sask. (R. J. Ledingham). Infection was light at fruiting time in e. Ont., except for one heavy attack at Kemptville. It became severe in late summer, especially in the Ottawa district and along L. Ontario near Port Hope and Belleville. Considerable infection was seen on Senator Dunlap in w. Que. (A. T. Bolton). Leaf spot was heavy in a field at Rougemont, Rouville Co., Que. (J. E. Jacques). Infection was slight on Senator Dunlap at Jemseg, Queens Co., N. B. (S. R. Colpitts). In the Berwick area, Kings Co., N. S., infection was moderate on Senator Dunlap on 17 June. By July it was heavy on all varieties except Premier. Owing to the wet spring leaf spot built up rapidly and was a big factor in reducing the crop to about half the forecast yield. The conidial stage was collected on 19 Nov. on Fragaria vesca plants set out in a field of Jessie as virus indicators, at Central Chebogue, Yarmouth Co. (C. O. Gourley). On 5 Sept. at Charlottetown, P. E. I., leaf spot was heavy on Louise; light on Crimson Glow, Dorset, King, Mackenzie, Midland, Premier, Sparkle, Temple and Valentine; and nil on Catskill, Dresden, Senator Dunlap and Swanee (J. E. Campbell). Light infections were seen in many gardens in Nfld. (G. C. Morgan).

POWDERY MILDEW (Sphaerotheca humuli) was common on British Sovereign in Vancouver I., B. C., fruiting sparsely but causing reddening of the foliage (W. Jones). It was severe in localized patches in fields of British Sovereign in the lower Fraser Valley, B. C., causing slight reductions in yield (I. C. MacSwan, R. E. Fitzpatrick). Small amounts were found in several beds near Summerland, B. C. (G. E. Woolliams). It was found in three plantings of Senator Dunlap in the Ottawa district, Ont., in June, but none was seen in w. Que. (A. T. Bolton).

WILT (Verticillium albo-atrum). Infection was ca. 50% at Port Williams, Kings Co., N. S., in a planting of Senator Dunlap on land that had borne two or three successive crops of potatoes. The plants were small and depressed, with the outer leaves usually dead on 24 Oct. Runners were usually absent or were short with small runner plants (C. O. Gourley, D. W. Creelman).

LATENT VIRUSES of the non-persistent crinkle type were found in all of some 50 apparently healthy British Sovereign plants taken from various locations in the lower Fraser Valley, B. C. (R. E. Fitzpatrick).

FERTILIZER INJURY. Many plants of Valentine in a planting in Lincoln Co., Ont., showed marginal scorching or chlorosis on 21 May; mineral fertilizer had been applied after a heavy dressing with chicken manure (G. C. Chamberlain).

JUNE YELLOWS (genetic breakdown) was evident in several small areas in a 1/2 acre planting of Premier in Lincoln Co., Ont., on 20 May (G. C. Chamberlain). This condition was seen in many plantings in the Ottawa district for the first time. Affected plants were scattered and the trouble did not appear to spread. A single case was seen at St. Jean, Que. (A. T. Bolton). Forty percent of the plants were affected on 20 June in a plantation of Premier in Queens Co., N. B. (D. J. MacLeod).

ROOT ROT (cause unknown) was reported from Rosetown, Sask. (T. C. Vanterpool). It was seen in many plantations in e. Ont. in June and July, especially near Belleville and Picton, but infection never exceeded 5% and was usually 1-2%. None was seen in western Que. (A. T. Bolton). A moderately heavy infection occurred in the strawberry section near Grand Lake, N. B. Crop losses up to 50% resulted (J. L. Howatt). A planting of Senator Dunlap in Pictou Co., N. S., was 100% infected. The plants were completely devoid of fibrous roots (C. O. Gourley).

V. DISEASES OF TREES AND SHRUBS

ABIES - Fir

Witches' Broom (Melampsorella cerastii). A large broom on A. balsamea at Kentville, N.S., was sporulating profusely on 27 June (D. W. Creelman).

ACER - Maple

Leaf Spot (Cladosporium humile J. J. Davis) caused heavy spotting of A. rubrum at North Alton, Kings Co., N.S., on 21 Aug. The fungus fruited sparsely on some spots. A perfect stage was produced by Plakidas (Mycol. 39:34. 1952) and named Venturia acerina, but it was unaccompanied by a Latin diagnosis and, as far as we are aware, is still a nomen nudum. First Canadian record. (D. W. Creelman, D. B. O. Savile).

Die-Back (Cytospora ambiens and Nectria cinnabarina assoc.) has caused serious damage to a planting of A. pseudoplatanus at the Station, Kentville, N.S. (D. W. Creelman).

Leaf Spot (Gloeosporium apocryptum) was found on A. rubrum at Highbury, Kings Co., N.S. (D. W. Creelman, D. B. O. Savile).

Leaf Spot (Phleospora aceris) was widespread in Kings Co., N.S. It was heavy on A. rubrum, lighter on A. saccharophorum (saccharum) and trace on A. pensylvanicum in June. It was later found causing occasional large spots and marginal scorching of A. pseudoplatanus at Beaver River, Yarmouth Co. (D. W. Creelman).

Leaf Spot (Phyllosticta minima) was a trace on A. campestre and A. ginnala in the Arboretum, Ottawa, Ont. (J. A. Parmelee).

Leaf Blight (Ramularia lethalis), apparently following Taphrina dearnessii, was light on A. spicatum at New Minas, Kings Co., N.S. (D. W. Creelman, D. B. O. Savile).

Tar spot (Rhytisma spp.). R. acerinum was severe on several A. saccharinum at Montreal North, Que. (J. E. Jacques), on one tree at Centerville, N.S. (D. W. Creelman), and in a row at Southport, P. E. I. (R. R. Hurst). R. punctatum was light on a few trees of A. macrophyllum at Boundary Bay, B. C. (H. N. W. Toms); and light but general on A. pensylvanicum and A. spicatum in Kings Co., N.S.; and a specimen on A. negundo was received from Bridgetown, Annapolis Co. (D. W. Creelman).

Powdery Mildew (Uncinula aceris) was general on A. macrophyllum with poor air drainage at Boundary Bay, B. C. (H. N. W. Toms).

Chemical Injury (2,4-D). Observations for the last 2-3 years suggest a carry-over effect on A. negundo in Sask. The effect is admittedly unproved, but symptoms of 2,4-D injury appear on maple before spraying of cereal crops with 2,4-D starts in the Saskatoon region (T. C. Vanterpool).

AESCULUS - Horsechestnut

Wound Rot (Collybia velutipes) severely damaged a tree of A. hippocastanum in Queens Co., P. E. I. (R. R. Hurst).

Leaf Blight (Guignardia aesculi) was very severe in communities along the shore in Digby and Yarmouth Co., N.S., where A. hippocastanum is the principal shade tree. The humid weather in the coastal areas seems to favour the disease. It was also severe in Kings Co. (D. W. Creelman). Blight was a trace to heavy throughout P. E. I. (R. R. Hurst, J. E. Campbell).

Canker (Nectria cinnabarina). A trace was seen in Queens Co., P. E. I. (R. R. Hurst).

ALNUS - Alder

Powdery Mildew (Phyllactinia corylea). Infection averaged 50%, with severe damage, on Alnus spp. at several locations in Kings Co. and at Pleasant Lake, Yarmouth Co., N. S. (D. W. Creelman).

Leaf Spot (Ramularia ?alnicola Cke.). Specimens on A. crispa var. mollis from Acacia Valley, Digby Co., N. S., yielded a Ramularia tentatively identified as R. alnicola of which authentic material is not available. The conidia and conidiophores are much longer than those described for A. alnicola, but this may be largely a reaction to the dense pubescence of A. crispa var. mollis compared with A. glutinosa, a phenomenon seen in several species of Ramularia. The conidiophores are often scandent on the hairs. This is apparently the first North American record of this fungus (D. W. Creelman, D. B. O. Savile).

Leaf Spot (Septoria alni) was heavy on A. incana at Casey's Corner, Kings Co., N. S. (D. W. Creelman, D. B. O. Savile).

Catkin Deformation (Taphrina robinsoniana). Infection was 75% at Canning, N. S. (D. W. Creelman).

Leaf Blight (Taphrina tosquinetii (Westend.) Tul.) caused a general scorch on two small shrubs of A. crispa var. mollis, in July 1951, near St. Anthony, Nfld. Det. A. J. Mix. The mycelium is apparently systemic and perennial. This predominantly European species was hitherto reported in North America only in New Hampshire (D. B. O. Savile).

AMELANCHIER

Black Leaf Curl (Apiosporina collinsii) was a trace in the Beaverlodge district, slight near Alliance, and moderate at Edmonton, Alta. (T. R. D.).

Rust (Gymnosporangium clavariaeforme) was light at Bunbury, Queens Co., P. E. I. (J. E. Campbell, I. L. Conners).

Blossom Blight (Monilinia amelanchieris). Infection of blossoms and young fruit was 20-50% on A. intermedia at Steam Mill and North Alton, Kings Co., N. S. (D. W. Creelman).

Leaf Spot (Phyllosticta innumerabilis Peck) was moderate on A. intermedia and light on A. stolonifera at Gaspereaux Lake, Kings Co., N. S. Conidia bacillar or knobbed, 5.5-8.5 x 1.0-1.5 microns; apparently a micro-conidial stage (D. W. Creelman, D. B. O. Savile).

Leaf Spot (Physalospora obtusa) was light on A. intermedia at New Minas, Kings Co., N. S.; the Sphaeropsis stage was present (D. W. Creelman, D. B. O. Savile).

BETULA - Birch

Powdery Mildew (Phyllactinia corylea). Infection was about 75% with mod. damage on B. alba, B. lutea and B. populifolia at Moore's Falls, Kings Co., N. S. (D. W. Creelman).

Leaf Spot (Septoria ?betulae) was seen on B. lutea at White Rock, Kings Co., and B. populifolia at Pleasant Lake, Yarmouth Co., N.S. The Septoria spp. on Betula are poorly delimited, but this seems to be the best disposition for these specimens (D. W. Creelman, D. B. O. Savile).

Leaf Blister (Taphrina carnea Johans.) was common on B. glandulosa at Chesterfield Inlet, Dist. of Keewatin, in 1950, and occasionally on B. pumila at St. Anthony, Nfld., in 1951. Det. A. J. Mix (D. B. O. Savile).

Witches' Broom (Taphrina nana Johans.) was occasional on B. glandulosa at Great Whale River, Que., in 1949. Det. A. J. Mix (D. B. O. Savile).

CARYA - Hickory

Leaf Spot (Microstroma juglandis) was very heavy on a single tree at Trenton, Ont. (K. M. Graham, D. B. O. Savile).

CHAMAECYPARIS - Cypress

Root and Crown Rot (Phytophthora ?lateralis) is commonly found on C. lawsoniana in nurseries and gardens in the lower mainland, B. C. (I. C. MacSwan).

CORNUS - Dogwood

Crown Rot (Phytophthora cactorum) affected 8 trees of C. nuttallii in a garden at Vancouver, B. C., very seriously, and it appeared that they would die. This disease is common in the area. Several enquiries evidently referring to it were received (I. C. MacSwan).

Leaf Spot (Septoria cornicola) caused slight defoliation of C. alternifolia at Forest Glade, Kings Co., N.S. (D. W. Creelman).

CORYLUS - Hazelnut

Leaf Spot (Gloeosporium coryli) caused widespread damage to C. cornuta in Kings Co., N.S., producing large spots and marginal scorching. The affected leaves turned yellow in late Aug. and defoliation was 50% by early Sept. (D. W. Creelman).

Leaf Spot (Gnomoniella coryli). Traces were found at North Alton, Highbury and Northville, Kings Co., N.S. (D. W. Creelman).

Powdery Mildew (Phyllactinia corylea) was heavy on C. cornuta at Gaspereaux L., Kings Co., N.S. (D. W. Creelman).

CRATAEGUS - Hawthorn

Scald (Entomosporium thuemenii) was moderately heavy at Kentville and severe at Yarmouth, N.S., on C. oxyacantha, which is extensively planted. Defoliation of one hedge was 50% on 30 July (D. W. Creelman).

Rust (Gymnosporangium clavipes). Infection was 5% on fruits of C. oxyacantha in a hedge at the Station, Kentville, N.S. It was heavy on twigs and fruits of C. macrosperma at Steam Mill, Kings Co. (D. W. Creelman).

Leaf Blight (Monilinia johnsonii (Ell. & Ev.) Honey). A trace of the Monilia stage was seen on leaves of C. macrosperma at Kentville, N.S. First report to the Survey (D. W. Creelman).

CUPRESSUS - Cypress

Leaf and Twig Blight (Coryneum sp.) caused considerable damage to a hedge of C. macrocarpa at Salt Spring Island, B.C. (W. Jones).

FRAXINUS - Ash

Leaf Spot (Mycosphaerella effigurata (Schw.) House, syn. Cylindrosporium fraxini, Marssonina f., Piggotia f.) was heavy on specimens of F. pennsylvanica var. subintegerrima from Indian Head, Sask. (D.B.O. Savile). It was heavy, but seemed to cause little damage, on F. americana at White Rock, Kings Co., N.S. (D.W. Creelman). This polymorphic and widespread fungus has been reported to the Survey under various names. It seems preferable to unite all records under the ascigerous stage. See Weiss and O'Brien (Index of Plant Diseases in the United States. Part 4: 771-774. 1952) for additional synonymy (D.B.O.S.).

Powdery Mildew (Phyllactinia corylea) was heavy on one tree of F. pennsylvanica in the Arboretum, Ottawa, Ont. Only twice before reported to the Survey on Fraxinus, both times from Guelph, Ont. (P.D.S. 24:100, and 29:96). Most published records of this fungus on Fraxinus are from Michigan westward (J.A. Parmelee).

Rust (Puccinia sparganioides) was light on a tree of F. americana at Contrecoeur, Vercheres Co., Que. (J.E. Jacques). It was heavy on the same host in Kings Co., N.S. Pycnia seen on 12 June; aecia plentiful by 24 June; infected leaves wilting by 1 July, and trees appeared scorched by mid July; defoliation advanced by 1 Aug. (D.W. Creelman). Very heavy on young F. americana in a nursery at Charlottetown, P.E.I., on 17 July (J.E. Campbell).

HAMMAMELIS - Witch Hazel

Leaf Spot (Stilbospora sp. associated) was moderately heavy on H. virginiana at Acacia Valley, Digby Co., N.S. The spots bore superficial, perfectly flat acervuli with dark brown spores 14-22 x 5.0-7.3 microns, usually 3-5-septate, often with end cells paler than others. Hendersonia foliorum Fckl. var. hammamelidina Fairman was described from N.Y., but neither the description nor a specimen has been seen. The spores of the present fungus resemble those of Hendersonia, but the fruit body shows no tendency toward the form of a pycnidium (D.W. Creelman, D.B.O. Savile).

JUNIPERUS - Juniper

Rust (Gymnosporangium spp.). G. clavipes was very common on young growth of J. communis var. depressa in Kings and Annapolis Co., N.S., as a result of infections in 1950. G. clavariaeforme was prevalent on the same host throughout the district (J.F. Hockey).

LIGUSTRUM - Privet

Canker (Nectria cinnabarina) completely killed a 5-year-old hedge of L. amurense 40 ft. in length. The general picture suggested prior weakening by winter injury (D.W. Creelman).

LONICERA - Honeysuckle

Leaf Blight (Glomerularia lonicerae) was moderately heavy on leaves sent in for examination from Montreal, Que. (J. E. Jacques).

Powdery Mildew (Microsphaera alni) was severe on hedges in several private gardens and at the Botanical Garden, Montreal, Que. (J. E. Jacques).

OSTRYA - Hop Hornbeam

Leaf Spot (Septoria ostryae) was heavy and caused severe scorching of O. virginiana at White Rock, Kings Co., Ont. Affected trees were about 25% defoliated (D. W. Creelman). Reported previously from N.S.

PICEA - Spruce

Snow Blight (Phacidium infestans Karst.). The lower branches were reported to have been killed at the Agricultural School of La Ferme, Abitibi Co., Que. (J. E. Jacques). cf. P. D. S. 13:80 et seq.

PINUS - Pine

Rust (Coleosporium solidaginis) was common on Aster conspicuous at Clinton, B. C. First report from B. C. on this host (W. Newton). It was heavy in June on the lower needles of all trees in a young plantation of P. sylvestris near Limoges, Ont., on sod with considerable Solidago (D. B. O. Savile).

Rust (Cronartium coleosporioides) was severe in an ornamental hedge of P. contorta at Burnaby, B. C.; not known whether due to repeating aecia or to presence of alternate host (W. Orchard). This rust was collected on Castilleja sp. in the Cariboo district (W. Newton).

Blister Rust (Cronartium ribicola) was heavy, especially on trunks, of a young stand of P. strobus at the Station, Kentville, N.S. The aecia were shedding spores on 9 May when Ribes leaves were expanding (C. O. Gourley). Occasional infections were seen on P. strobus in Kings Co., P. E. I. (R. R. Hurst).

POPULUS - Poplar

Leaf Spot (Fusicladium radiosum). Infection was 50-75% on P. grandidentata at Kentville, N. S., in June, causing considerable defoliation (D. W. Creelman). It was heavy on the same host at Hunter River, P. E. I. in late June (R. R. Hurst).

Anthracnose (Marssonina castagnei) was heavy in a few trees of P. alba, causing considerable defoliation by late Aug., at Ottawa, Ont. (D. B. O. Savile). M. populi was heavy on P. grandidentata and P. tremuloides near Kentville, N. S. Infection was traced to cankered twigs (D. W. Creelman).

Rust (Melampsora abietis-canadensis) was heavy and caused moderate damage to P. tremuloides at South Alton, Kings Co., N.S. (D. W. Creelman).

Leaf Spot (Septoria musiva) was light to moderately heavy on P. tremuloides in Kings Co., N.S. (D. W. Creelman, D. B. O. Savile).

Powdery Mildew (Uncinula salicis). Infection was 75% on P. tremuloides at Gaspereaux L., Kings Co., N.S. (D. W. Creelman).

PRUNUS

Shot Hole (Higginsia hiemalis) was heavy in June on two trees of P. pensylvanica at Barton, Digby Co., N.S., with heavy defoliation (K.A. Harrison, D.W. Creelman). H. lutescens was heavy on P. virginiana at White Rock, Kings Co. (D.W. Creelman, I.V. Hall).

Blossom and Twig Blight (Monilinia fructicola). Infection was 50% on blossoms and 10% on twigs of a single flowering almond, P. triloba, at Kentville, N.S. on 13 June (J.F. Hockey) and was heavy on P. besseyi and P. virginiana at Annapolis on 17 June (K.A. Harrison). Infection was 75-100% on P. glandulosa at Lakeville, Kings Co., on 17 June (D.W. Creelman).

Shoot Hypertrophy (Taphrina flavorubra Ray) was a trace on Hansen's Bush Cherry, P. besseyi, at Atlantic, Shelburne Co., N.S. Det. A.J. Mix. First report from N.S. (D.W. Creelman). Dr. Mix has recently checked other specimens on this or other varieties of P. besseyi, and we are able to report the pathogen from Ont., N.B. and P.E.I. It may form "plum pockets" on the same host (D.B.O.S.).

QUERCUS - Oak

Leaf Blister (Taphrina coerulescens) was frequent, causing slight to moderate damage, on Quercus sp. at Summerside, P.E.I. (R.R. Hurst).

RHAMNUS - Buckthorn

Rust (Puccinia coronata) was moderate at Fredericton, N.B., on R. cathartica (S.R. Colpitts); but, in general, oat crown rust was only a trace on this host in the province (J.L. Howatt). Infection was a trace on this host at Wolfville, N.S. (D.W. Creelman) and in Prince and Queens Co., P.E.I. (R.R. Hurst, J.E. Campbell). Light to moderate infections were found on R. alnifolia in Carleton Co. and Victoria Co., N.B. (J.L. Howatt). The rust on this host commonly goes to Calamagrostis canadensis, which grows in similar habitats (D.B.O.S.). P. coronata var. agrostidis was moderately heavy on R. frangula at Fredericton (J.L. Howatt). A trace of the rust on this host was found at Kentville, N.S., where it is already recorded on Agrostis (D.W. Creelman). See Rust Races, Section I.

Mosaic (virus) affected half the trees in a hedge of R. cathartica in Queens Co., P.E.I. (R.R. Hurst).

SALIX - Willow

Scab (Fusicladium saliciperdum) was severe at the Station, Ste. Anne de la Pocatiere, Que., on weeping willow, S. babylonica var. ?aurea (S. niobe) (R.O. Lachance). It was present, with Physalospora miyabeana, in specimens of Salix sp. from Notre Dame du Nord, Temiskaming Co. (Ruth Macrae, I.L. Conners). It and blight were very heavy at Grand Pre and elsewhere in the Annapolis Valley on French willows or remaining suckers of killed trees. Good control was obtained at Grand Pre as a result of spraying as soon as the ground would support a sprayer. S. alba var. calva (S. coerulea) remains apparently immune (K.A. Harrison). Scab was heavy in Kings and Queens Co., P.E.I. (R.R. Hurst).

Anthracnose (Marssonina kriegeriana) was severe on 12 trees of S. babylonica in a low area in Stanley Park, Vancouver, B. C.; both leaves and twigs affected (I. C. MacSwan).

Blight (Physalospora miyabeana). The perfect stage, but not the Gloeosporium stage, was present on cankers in specimens of S. sp. received on 29 July from Notre Dame du Nord, Temiskaming Co., Que. (Ruth Macrae, I. L. Conners). See also under scab.

Leaf Spot (Ramularia rosea) was collected on S. ?discolor at Thorpe Road, Kings Co., N. S. (D. W. Creelman, D. B. O. Savile).

Tar Spot (Rhytisma salicis) was a trace on S. sp. near Edmonton, Alta. (T. R. D.).

Powdery Mildew (Uncinula salicis) was severe but patchy on willows near Edmonton, Alta. (T. R. D.). It was heavy on S. lucida and widespread on other spp. in Kings Co., N. S. (D. W. Creelman).

Gall (?insect). Large galls occurred on branches and trunks of laurel willow, S. pentandra, grown as a hedge at Centreville, Carleton Co., N. B. Although the galls superficially resembled crown gall, repeated attempts at isolation with various techniques failed to yield the organism. It is suspected that an insect was involved (M. D. Sutton, S. R. Colpitts).

SAMBUCUS - Elder

Leaf Spot (Ascochyta wisconsina J. J. Davis) caused moderate damage to S. canadensis at Kentville, N. S. First report to the Survey (D. W. Creelman).

SORBUS - Mountain Ash

Rust (Gymnosporangium juniperi (G. aurantiacum). Infection was 10% on leaves of Sorbus americana at East Margaretsville, Annapolis Co., N. S., and was also found at Pleasant Lake, Yarmouth Co. (J. F. Hockey, D. W. Creelman). These are our first mature specimens of this species from N. S., although pycnia presumably of it have been reported previously (P. D. S. 24: 102. 1945). To judge from its abundance at St. Anthony, Nfld., in 1951, collecting in Cape Breton in late summer will show it to be plentiful in suitable habitats. It is common in the Ungava Peninsula as far north as Great Whale River, and pycnia have been found as far north as Fort Chimo on Ungava Bay.

TILIA - Basswood

Leaf Spot (Cercospora microsora) caused considerable defoliation of T. americana at South Williamstown, Annapolis Co., N. S. (J. F. Hockey, D. W. Creelman).

Leaf Spot (Gloeosporium tiliae) caused slight damage to planted Tilia sp. at Bunbury, Queens Co., P. E. I. (J. E. Campbell).

Coral Spot (Nectria cinnabarina) caused slight damage to T. cordata at Kentville, N. S. (D. W. Creelman).

ULMUS - Elm

Dutch Elm Disease (Ceratostomella ulmi). The number of samples from elm trees suspected of having the Dutch elm disease received at the Ottawa Laboratory for culturing in the 1952 season was considerably less than in former years. The reduction was mainly the result of the general

survey being discontinued in Ontario as had previously been done in Quebec. The total number of samples received was 468: 53 from Ontario, 393 from Quebec, and 22 from Manitoba. Of these, 25 from Ontario and 209 from Quebec (32 of which were research samples) yielded Ceratostomella ulmi. No new serious outbreak of the disease was reported (Ruth Macrae).

Leaf Spot (Gnomonia ulmea). Infection was 75% on U. americana at Kentville, N. S., on 31 July, and the leaves were starting to turn yellow. Infection was 25% in a hedge of U. pumila at Woodside, Kings Co., in September, but injury was slight (D. W. Creelman).

Coral Spot (Tubercularia ulmea). Several inquiries were received concerning this disease in hedges in the Montreal area, Que. (J. E. Jacques). Specimens were received of U. ?pumila from a 20 ft. hedge at Halifax, N. S., in which infection was evidently heavy. It is prevalent in N. S. on "Chinese" elm (D. W. Creelman). Damage to U. pumila was severe at Summerside, P. E. I. (R. R. Hurst). See P. D. S. 31:109. 1952 concerning the nomenclature and identities of these Asiatic elms.

Winter Drought. W. Murray, Superintendent of Parks, Regina, Sask., describes the failure of a relatively large number of elms on the city boulevards to leaf out normally. The leaves open late and are abnormally small; and the trees die in a year or two. The condition has been seen on the University campus at Saskatoon (T. C. Vanterpool). A possibly related condition has been seen occasionally on a small scale at Ottawa, Ont., in trees bordering back yards or lawns that were used as skating rinks. The branches adjacent to the rink bear small leaves that may look as though infected by a virus, and usually die the following year. This effect may be due either to lack of oxygen or to low temperature. The clear ice of a rink presumably is a much poorer insulator than even the thinnest snow cover; and the soaking of the soil below the rink probably greatly reduces the insulating value of the soil itself. With the increased demand for complete removal of snow from city streets, injury to shade tree roots is to be expected (D. B. O. Savile).

VIBURNUM

Downy Mildew (Plasmopara viburni) was heavy on the lower leaves of V. opulus in a crowded planting at Ottawa, Ont. The disease tends to build up if we have two or more successive summers of abundant rainfall, but virtually disappears after a prolonged spell of dry weather (D. B. O. Savile).

VI. DISEASES OF ORNAMENTAL PLANTS

ACONITUM - Monkshood

Yellows (Callistephus virus 1) severely damaged 8 plants in a garden at Fredericton, N. B. (D. J. MacLeod).

ALTHAEA - Hollyhock

Rust (Puccinia malvacearum) was found in gardens throughout the Okanagan Valley, B. C., but caused less damage than usual, probably because of the dry season (G. E. Woolliams). It was severe in a garden at Fort Macleod, Alta. (M. W. Cormack). Plants in a garden at Ottawa, Ont., were 100% infected on 31 July (H. S. Thompson). Specimens were received from Quebec, Que., where it was stated to be severe in a garden (J. E. Jacques). Rust was heavy even on the youngest leaves of specimens received from Mouth of Keswick, York Co., N. B., in early August (H. S. Thompson). Infection was 100% and damage severe in a garden at Kentville, N. S., by 20 June. These plants have been infected for a number of years. Pustules are evident each year in April. Malva neglecta in the same garden is also heavily infected every year (D. W. Creelman). Infection ranged from trace to very heavy throughout P. E. I. (R. R. Hurst).

ANTIRRHINUM - Snapdragon

Grey Mould (Botrytis cinerea). Infection was a trace in a greenhouse in Queens Co., P. E. I., in late April (R. R. Hurst).

Downy Mildew (Peronospora antirrhini) was present in seedlings grown by the Public Works Dept., Red Deer, Alta., in early May. Some seedlings were killed. Reported only from Ont. (A. W. Henry).

Oospores were plentiful in the leaves, which suggests that the pathogen may be soil-borne. It may also occur in trash with seed. The conidia measured 28.5-31.5 x 16.5-21.0 microns, further proof of the variability already discussed (P. D. S. 29:101) Note that in this earlier report Dr. Baker's figures from spores in Calif. were unfortunately given as 21-99 microns long; the figures should read 21-29 microns (D. B. O. Savile).

Rust (Puccinia antirrhini) was seen in most parts of the Okanagan Valley, B. C., but the dry season prevented serious damage (G. E. Woolliams). It was moderately heavy on Golden Queen at St. Catharines, Ont., in September (W. G. Kemp).

Root Rot (Pythium sp.) killed several plants in a garden at Lethbridge, Alta. (M. W. Cormack).

Yellows (Callistephus virus 1) infected 7% of the plants in a plot at the Laboratory, Fredericton, N. B. (D. J. MacLeod).

AQUILEGIA - Columbine

Leaf Spot (?Actinonema (Phyllosticta) aquilegiae). A moderate infection occurred at Ste. Anne de la Pocatiere, Que. in September (D. Leblond). See P. D. S. 25:108.

Powdery Mildew (Erysiphe polygoni) was seen in gardens in most parts of the Okanagan Valley, B. C., but usually did not develop until after flowering (G. E. Woolliams). It was moderately heavy at Ste. Anne de la Pocatiere, Que., on 30 Sept. (D. Leblond).

ARBUTUS

Leaf Spot (Monochaetia sp.) was common on madrona, A. menziesii, at North Saanich, B.C. (W. Jones).

ARMERIA - Thrift

Leaf Spot (Septoria armeriae Allescher) was recently shown by T. E. T. Bond (Trans. Brit. Mycol. Soc. 35:81-90. 1952) to be the cause of disease of a cultivated thrift, Bees Ruby (?A. gaditana x A. maritima), in England. The pathogen was described from northern Greenland on A. maritima var. sibirica. Although there is no record of its occurrence under cultivation in Canada, it may be noted that it was found, for the first time in continental North America, at Great Whale River, Que., on the Hudson Bay coast, in 1949, on A. maritima var. labradorica. Infection was very light and was found only in the examination of plants infected by Uromyces armeriae. A trace has since been found in a phanerogamic specimen from Nome, Alaska. The pycnidia agree well with Bond's description and illustrations, and the spores are rounded at the ends and usually uniseptate. Allescher gave the spore length as 9-25 microns, and Bond gives 8-30 microns. In the Alaska specimen the spores are 24-50 microns long, and in those from Great Whale River they are 44-90 microns long. Despite these differences, we unquestionably are dealing with a single species, which presumably is circumpolar (D. B. O. Savile).

ASTER

Downy Mildew (Basidiospora entospora). Infection was 75% on A. novae-angliae at Curry's Corner, Hants Co., N.S. First report from N.S. (D. W. Creelman).

Powdery Mildew (Erysiphe cichoracearum). A. novi-belgii vars. Blue Gem and Blutenschirn were severely attacked at the Botanical Garden, Montreal, Que. (J. E. Jacques).

BEGONIA

Grey Mould (Botrytis cinerea) caused severe rotting of leaves and flowers of a white-flowered begonia at Richelieu, Rouville Co., Que. (J. E. Jacques).

Powdery Mildew (?Erysiphe cichoracearum). A specimen with severe leaf necrosis was received from Perth, Ont., in April; a second case was said to have been observed (D. B. O. Savile). About 10% of the leaves were infected in a large window box at Ottawa in August (H. S. Thompson). Spotting occurred on petals and leaves of tuberous begonias in many window boxes at Montreal, Que., in June; and traces were seen on Angelwing begonias at the Botanical Garden (J. E. Jacques).

Bacterial Blight (Xanthomonas begoniae). Leaf lesions developed in March 1953 on rooted slips from an old plant at Ottawa, Ont. Isolations yielded a rather pale isolate, which, however, produced typical lesions 4 days after inoculation. Successful inoculation occurred through needle punctures and, particularly through the leaf margin (I. L. Conners, M. D. Sutton).

BERBERIS - Barberry

Bacterial Leaf Spot (Pseudomonas berberidis (Thornberry & Anderson) Stapp). A slight infection was recorded in a nursery at St. Lazare, Que., on B. thunbergii. Previously reported only from Ottawa, Ont. (P. D. S. 11: 96) (I. L. Conners).

Rust (Puccinia graminis). Only slight infections were recorded on B. vulgaris in Carleton and York Co., N. B. (J. L. Howatt). Twenty-five per cent of the leaves of a single bush at Parrsboro, N. S., bore aecia (D. W. Creelman, I. V. Hall). Rust was general on bushes at Southport, P. E. I. (R. R. Hurst).

Wilt (Verticillium dahliae). A trace caused slight damage to B. vulgaris var. atropurpurea in Queens Co., P. E. I. (R. R. Hurst).

CACTUS

?2,4-D Injury. A house cactus (genus?) was sent in from Saskatoon, Sask., on 8 Oct., with proliferation at the nodes; 2,4-D injury suspected (T. C. Vanterpool).

CALENDULA

Yellows (Callistephus virus 1) infected 17% of the plants in a border at the Station, Fredericton, N. B. (D. J. MacLeod). Infection was 12% at Rockland, Kings Co., N. S. (J. F. Hockey); and 100% at Kentville, appearing somewhat later than usual but completely ruining garden plantings (K. A. Harrison). Infection ranged from trace to 100% in Queens Co., P. E. I. (R. R. Hurst).

CALLISTEPHUS

Rust (Coleosporium solidaginis) severely damaged a large bed of C. chinensis at Ottawa, Ont. (J. A. Parmelee).

Wilt (Fusarium oxysporum f. callistephi) was destructive in a planting at Winnipeg, Man. (A. M. Brown). Specimens were received from Weston, and Toronto, Ont., and Valois, Que. In the last case chrysanthemums and snapdragons in the same bed were also attacked by a wilt; Fusarium was isolated from the China aster, but not from the other plants, although the symptoms suggested that it was responsible (H. S. Thompson).

Yellows (Callistephus virus 1) affected up to 50% of the plants in several gardens at Lethbridge, Alta. (M. W. Cormack). Specimens were received from Ile a la Crosse, a settlement in extreme northern Sask., but, in general, the disease was less prevalent than in many years (R. J. Ledingham). Infection was 72% in a garden at Fredericton, N. B. (D. J. MacLeod). Infection was 60% at Rockland, N. S. (J. F. Hockey), and was 100% at Kentville by mid September (K. A. Harrison). Yellows was a trace to 100% on all varieties in Queens and Prince Co., P. E. I. (R. R. Hurst).

CAMPANULA

Rust (Coleosporium campanulae) was heavy on wild C. rapunculoides in Verulam Twp., Victoria Co., Ont., in August (J. A. Parmalee). Infection was moderate to heavy on this host in a few gardens at Ottawa in September. It was also heavy near Thurso, Que., in plants spreading from a garden along

a highway cutting in June. In this location snow cover was probably heavy, enabling abundant uredinia to overwinter. The race attacking C. rotundifolia was also found in several wild colonies of this host in e. Ont. (D. B. O. Savile).

Wilt (Sclerotinia sclerotiorum) killed 20% of a seed planting of Canterbury bell, C. medium, at Keating, B. C., in July (W. Jones).

CHRYSANTHEMUM

Crown Gall (Agrobacterium tumefaciens) was found on one plant of C. morifolium originating from Ont., in a greenhouse at Victoria, B. C. (W. E. McKeen). Ten plants of marguerite, C. frutescens, in two window boxes at Vancouver were all infected, but without apparent damage (H. N. W. Toms).

Powdery Mildew (Erysiphe cichoracearum) was a trace on C. morifolium var. Dr. Enguehard in the Laboratory greenhouse, St. Catharines, Ont., in June (W. G. Kemp).

Rust (Puccinia chrysanthemi Roze) slightly infected C. morifolium in a garden at Saanichton, B. C., in November (W. Jones). Starting from a few rusted cuttings, originating from Leamington, Ont., this disease became general and quite severe in a greenhouse at Montreal, Que., by the time it was inspected on 24 Nov. (J. E. Jacques). These are the first reports of this rust to the Survey, and the only previous Canadian specimen in the herbarium is one collected at Vineland, Ont., 17 Dec. 1914, by W. A. McCubbin. The latter is responsible for the Ontario record in N. Am. Flora; but Arthur's statement, in the Manual of the Rusts that the species occurs "throughout the United States and Canada where the host is cultivated" does not seem to be fully applicable to Canada. The increasing popularity of garden varieties may, however, alter the picture (D. B. O. Savile).

CLEMATIS

Root Knot (Meloidogyne sp.). One plant of C. sp. in a garden at Westmount, Que., was so heavily infected that the leaves were chlorotic and wilted (N. P. Beaudoin).

Yellows (?virus). A specimen from Napanee, Ont., was conspicuously yellowed (H. S. Thompson, M. D. Sutton). Suspected yellows has been reported from Man. (P. D. S. 12:88), but there seem to be no proven virus diseases on Clematis.

CLIVIA

Anthracnose (Colletotrichum himantophylli Kabat & Bubak) was present on senescent leaves of Clivia (Himantophyllum) miniata, Amaryllidaceae, sent by Dr. H. T. Güssow from Victoria, B. C., in March 1953 (J. W. Groves, I. L. Conners).

DAHLIA

Crown Gall (Agrobacterium tumefaciens). Specimens were brought to the Laboratory, St. Catharines, Ont. in November (W. G. Kemp). Light infections, with slight damage, were found in the following varieties at Charlottetown, P. E. I.: Anode, Azura, Blue Horizon, Croyden's Radiance, Deuil de Roi Albert, Monarch of the East, Pink Giant, and Radiance (J. E. Campbell).

Ring Spot (virus). Infection was light at Charlottetown, P. E. I. (J. E. Campbell).

Stunt (virus). A trace was seen in a border at the Station, Fredericton, N. B. (D. J. MacLeod).

DELPHINIUM

Fasciation (?Corynebacterium fascians). A trace occurred in a garden at Saskatoon, Sask. (T. C. Vanterpool).

Powdery Mildew (Erysiphe polygoni) was severe in a planting at Winnipeg, Man. (A. M. Brown). Leaves and shoots received from Thurso, Que., were heavily mildewed. Traces occurred at the Botanical Garden, Montreal on the variety Mrs. Newton Lees (J. E. Jacques). It was heavy and caused severe damage to several varieties in gardens at Charlottetown, P. E. I. (R. R. Hurst, J. E. Campbell).

Bacterial Blight (Pseudomonas delphinii). Many small black lesions, with water-soaked margins were seen on the new leaves and stems of perennial delphinium at St. Catharines, Ont., on 29 April (W. G. Kemp). A few plants were severely spotted at the Botanical Garden, Montreal, Que. (J. E. Jacques). A moderate infection occurred at Charlottetown, P. E. I. (D. B. Robinson).

DIANTHUS

Leaf Spot (Alternaria dianthi) was moderately heavy on 22 varieties of sweet william, D. barbatus, at Deschambault, Que., on 24 Sept. (D. Leblond). As previously noted (P. D. S. 20:83. 1947) most records of Alternaria on D. caryophyllus seem to be assignable to A. dianthicola, but the predominant fungus on a specimen sent by Mr. Leblond is assignable to A. dianthi, and it seems to be an active parasite (J. W. Groves, D. B. O. Savile).

Rust (Uromyces caryophyllinus). A slight infection was seen in a greenhouse at Edmonton, Alta. (T. R. D.).

EUPHORBIA

Collar Rot (Pythium sp.). Pythium sp. was isolated from a collar rot of young cuttings of poinsettia (E. ?pulcherrima) sent in from Leamington, Ont., in December. Bacteria were also present but were apparently secondary (W. G. Kemp).

FILIPENDULA

Powdery Mildew (Sphaerotheca humuli) was severe on half the plants of F. rubra in a garden at Ottawa, Ont., on 26 June (H. S. Thompson).

GAILLARDIA

Yellows (Callistephus virus 1) affected 6% of the plants in a garden at Fredericton, N. B. (D. J. MacLeod).

GLADIOLUS

Leaf Spot (Curvularia lunata (Wakker) Boed.) was found on gladiolus for the first time in Canada when it was isolated from lesions on corms from

Montreal, Que. Inoculations produced both the corm rot and leaf spot symptoms. Since it was first reported in Florida in 1948, this disease has become widespread in the United States. It is regarded as primarily a disease of hot, humid climates. (J. A. Parmelee). It is possible that infected corms have been occasionally overlooked in previous years, because some of the incipient lesions conspicuously resemble those of hard rot (D. B. O. S.).

Scab (Pseudomonas marginata) was seen on corms received, 1 May, from Beloeil, Que. (J. E. Jacques). A 100% infection with severe damage was seen in corms in Kings Co., P. E. I., in April (R. R. Hurst).

Core Rot (Sclerotinia draytoni) caused very serious losses, estimated at $2000, to a grower at Montreal, Que., in the field in 1951, and in storage in the following winter. Examination of many of the corms in the spring of 1952 suggested that infection had in some instances spread down through the vascular tissue from the foliage into the corm (H. S. Thompson). Core rot destroyed 4% of a lot of corms, examined in April, in Queens Co., P. E. I. (R. R. Hurst). We have, after some delay tried to adopt uniformly Whetzel's system of nomenclature for the Sclerotiniaceae, which seems to be meeting with increasing acceptance by mycologists. The present organism should go in the genus Botryotinia, but no formal recombination appears to have been made for it. There has also been some question as to the identity of the Botrytis from which Sclerotinia draytoni was obtained. (See McClellan, Baker and Gould. Phytopath. 39:260-271. 1949). Dr. Drayton and Dr. Groves found single ascospore cultures of S. draytoni to be identical with B. gladiolorum; but Dennis and Wakefield described their organism as producing narrower conidia more like those of the inadequately described B. gladioli. There is reason to believe that differences in culture medium and mounting medium largely account for the apparent anomalies, and that S. draytoni is, in fact, the perfect stage of the core rot pathogen (D. B. O. S.).

Dry Rot (Stromatinia gladioli) was slight in a greenhouse at Sidney, B. C., and severe in a 1-acre commercial planting on Lulu Island. In the latter, loss was 20% in the varieties Allard Pearson, Bit of Heaven, Elizabeth the Queen, Invictus, Lady Jane, Paradise, Spotlight, and True Love (W. Jones, I. C. MacSwan). Dry rot caused severe losses to a grower in Montreal, Que. (J. E. Jacques).

Mosaic (viruses). A survey of a 4-acre field in the Niagara Peninsula, Ont., showed 20% of the 1366 plants to be infected with mosaic mottlings. Infected plants were found in the following varieties: Commando, Corona, Harvest Moon, Kestrel, Magnolia, Mighty Monarch, Mrs. Mark's Memory, Myrna, Rosa Van Lima, and Stardust. Infection ranged from 0.4% in Corona to 99% in Mighty Monarch (G. H. Berkeley). Phaseolus virus 2 caused a faint mosaic in 3 gardens at Fredericton, N. B. (D. J. MacLeod). Four mosaic-infected plants were seen in a garden plot of mixed varieties at Kentville, N. S. Commercial plantings seemed to be comparatively free from viruses owing to continual roguing (J. F. Hockey). G. H. Berkeley (Phytopath. 43:111-115. 1953) describes and illustrates the symptoms of several viruses on gladiolus in Ontario.

Storage breakdown (lack of oxygen) severely damaged 60% of a lot of stored corms at Charlottetown, P. E. I., examined in May (R. R. Hurst).

HYACINTHUS - Hyacinth

Soft Rot (Erwinia carotovora) had destroyed a small lot of bulbs submitted in May from East Royalty, Queens Co., P. E. I. (R. R. Hurst).

Yellows (Xanthomonas hyacinthi). Infection was 12% in Bismark and 33% in Renaissance, in Jan. 1952, in a greenhouse at Victoria, B. C. The bulbs had been imported in 1951 (J. Bosher).

HYDRANGEA

Powdery Mildew (?Erysiphe cichoracearum) caused a premature brown spotting of petals of H. arborescens var. grandiflora at the Botanical Garden, Montreal, Que. (J. E. Jacques).

Leaf Spot (Phyllosticta hydrangeae Ell. & Ev.). A specimen was received from Quebec, Que., on 3 Sept. (D. Leblond). Not previously reported to the Survey, but we have one specimen from Winnipeg, Man. (D. B. O. S.).

Oedema (physiological). Leaves and young shoots were stated by a grower at Bagotville, Chicoutimi Co., Que., to be severely affected in January (J. E. Jacques).

IBERIS - Candytuft

Rust (Puccinia subnitens). Aecial infection was a trace on I. umbellata in a greenhouse at Saskatoon, Sask., on 5 June; presumably from nearby Distichlis spicata (T. C. Vanterpool, D. B. O. Savile).

IRIS

Bacterial Leaf Blight (Bacterium tardicrescens) was general in German irises at the Botanical Garden, Montreal, Que. (J. E. Jacques).

Leaf Spot (Didymellina macrospora). At Gordon Head and North Saanich, B. C., leaf spot appeared to be more general than in 1951. The discoloration of the foliage materially reduced the market value of the cut bloom (W. Jones). Traces were found in every planting on Vancouver I. inspected for certification except for a heavy infection in one small plot. Traces occurred in all plantings in the lower mainland (N. Mayers). Specimens from Rawdon, Montcalm Co., Que., on 30 July, were severely spotted and the leaves partly killed (J. E. Jacques). Infection was a trace on all varieties in some gardens at Charlottetown, P. E. I. (R. R. Hurst).

Soft Rot (Erwinia carotovora) attacked odd plants at the Botanical Garden, Montreal, Que. (J. E. Jacques).

Mosaic (virus). Infection was 0.5% and 0.7% in two plantings of bulbous iris entered for certification on Vancouver I, B. C., and was a trace in all plantings on the lower mainland. It is still the leading cause of rejection for certification, but the percentage of plots passing has risen encouragingly (N. Mayers).

LATHYRUS

Fasciation (Corynebacterium fascians). Specimens of L. odoratus var. Early Spencer submitted to the Laboratory, Winnipeg, Man., were severely fasciated. Symptoms were typical of infection by C. fascians and bacterial rods were abundant in the tissues. A gram positive organism was isolated but its pathogenicity has not yet been proved (W. A. F. Hagborg).

Streak (Erwinia lathyri) caused severe damage to L. odoratus in two gardens at Lethbridge, Alta. (M. W. Cormack).

Leaf Spot (Ramularia deusta). R. lathyri Cooke & Shaw (Mycol. 44:803. 1952) appears to be an addition to the extensive synonymy for this species given by Baker et al. (Mycol. 42:403-422. 1950). See also P. D. S. 30:127 (D. B. O. Savile).

LILIUM - Lily

Mosaic (virus). All plants of L. canadense at the Botanical Garden, Montreal, Que., were infected and had to be discarded (J. E. Jacques).

Necrotic Fleck (?latent lily virus and Cucumis virus 1) affected most of the plants of a clone of L. candidum in a garden at Vancouver, B. C. Bolting rosettes showed all leaves flecked and older leaves necrotic on 30 April. See Brierley et al, Florists' Review, 4 Sept. 1947, fig. 1 (H. N. W. Toms).

?Rosette (virus). Specimens of L. ?monadelphum received from L'Assomption, Que., on 1 May, showed nearly normal lower leaves but a dense rosette of chlorotic leaves above. There was no downward curling of the leaves, perhaps because it was still early in the season. The bulbs and roots were sound. Thirty plants were said to be affected. The foliage was said to dry up, and the plants to flower sparsely and the blooms to slough off (D. B. O. Savile).

LOBULARIA

Yellows (virus) affected a few plants of sweet allysum, L. maritima, in gardens at Charlottetown, P. E. I. The vector could not be found (R. R. Hurst).

LUPINUS - Lupine

Leaf Spot (Ovalaria lupinicola). O. lupini Cooke & Shaw (Mycol. 44: 802. 1952) does not seem to be distinct from this organism. See P. D. S. 26:86. 1947 (D. B. O. Savile).

MERTENSIA - Lungwort

Grey Mould Blight (Botrytis cinerea) severely damaged all plants of M. virginica in a garden in Queens Co., P. E. I. (R. R. Hurst).

NARCISSUS

Smoulder (Sclerotinia narcissicola) was negligible in plantings entered for certification in B. C. (N. Mayers). Like S. draytoni this species is a typical Botryotinia, but no combination appears to have been made.

Basal Rot (Fusarium spp.). Traces were found in one commercial stock on Vancouver I., B. C., at shipping time. None was found in any plantings entered for certification in the lower mainland, but one grower found several infected bulbs in his stock (N. Mayers).

Scorch (Stagonospora curtisii). Primary infection was very light in B. C. Some secondard infection occurred in early June, but there was little further spread (N. Mayers).

Decline (virus) was seen in all 14 plantings inspected on Vancouver I., B. C.; in 6 infection was less than 2.5%, 5 were rejected for other causes

and not re-inspected, and in 3 infection was 3.5-4.6%. It was also seen in all 53 plantings in the lower mainland, but in 46 it was less than 2.5%; the remaining 7 ranged from 4.0 to 13.5% (N. Mayers).

Mosaic (virus) was a trace in 8/14 plots inspected on Vancouver I., B.C.; in the others it ranged from 0.25 to 1.4 (av. 0.65%). Traces, only, were seen in all plantings in the lower mainland (N. Mayers).

PAEONIA - Peony

Blight (Botrytis paeoniae) was severe in a garden at Lethbridge, Alta. (M.W. Cormack). Traces were seen in many gardens at Edmonton (T.R.D.), and moderate damage in one (A.W. Henry). All new growth was destroyed in an entire bed at Cole Harbour, Halifax Co., N.S. Infections of 10-20% caused moderate damage in two gardens at Kentville (D.W. Creelman, H.A.L. MacLaughlan). Blight was heavy in several gardens at Charlottetown, P.E.I., and one report was received from Summerside (R.R. Hurst).

Leaf Spot (Phyllosticta commonsii) was a trace at Kentville, N.S.; spores 6-8.5 x 3-5 microns (J.F. Hockey, D.W. Creelman). We have specimens or reports from Alta., Man. and Que., but not from N.S.

Ring Spot (virus). Plants in a garden at St. Catharines, Ont., produced shoots with striking yellow rings, mottles and irregular patches (W.G. Kemp). Infection was 15% in a planting of a white peony near Ottawa. The plants had been imported the previous year (H.S. Thompson). Two per cent of a plot at the Station, Fredericton, N.B., showed stunting and ring-spotting (D.J. MacLeod). All four plants in a garden at Charlottetown, P.E.I., were infected (R.R. Hurst).

Blossom Blight (genetic) affected several clumps in a garden at Quebec, Que., and was reported from Valleyfield, Marieville and Montreal. This trouble occurs commonly in peonies carrying more than one flower on a stem. Most affected varieties belong to P. emodi, P. veitchii and, especially P. lactiflora (albiflora). According to F.C. Stern (A study of the genus Paeonia. London. 1946), when only one flower develops on a stem of P. veitchii the remains of the others are present as aborted buds in the axils of the leaves. This abortion of flower buds seems, therefore, to be a natural character rather than a pathological effect. Its inheritance remains to be worked out, but it has probably been introduced by A.P. Saunders (Genetics 23:65-110. 1938) with a considerable number of garden hybrids (A. Blain and J.E. Jacques).

PELARGONIUM - Geranium

Crown Gall (Agrobacterium tumefaciens). A specimen was received from Saskatoon, Sask. (T.C. Vanterpool, H.S. Thompson).

Basal Rot (Botrytis cinerea). Infection was trace to 10% in cuttings of several varieties, notably Crerar and National, being rooted in greenhouses at Summerland, B.C., in November (G.E. Woolliams).

Wilt (Verticillium albo-atrum) caused the complete loss of well-grown, potted cuttings in a commercial greenhouse at Vancouver, B.C., in July. Lesions occurred at nodes and the bases of branches. The pathogen was isolated. See D.C. Torgenson (U.S.D.A. Pl. Dis. Reptr. 36:51. 1952) for report of this disease in Oregon (H.N.W. Toms).

Crinkle (virus) was seen in a number of potted plants being used as a source of cuttings in a commercial greenhouse at Hamilton, Ont. (W. G. Kemp).

PHLOX

Powdery Mildew (Erysiphe cichoracearum) became general and light to severe on P. paniculata at Vancouver, B. C., in July during dry weather. It became more severe in the fall (H. N. W. Toms). It was unusually heavy for the time of year on a few plants in a garden at Ottawa, Ont., on 23 July. Almost all leaves bore some lesions (I. L. Conners). Mildew was prevalent in gardens at Lakeside, Montreal, Mominingue and Repentigny, Que. (J. E. Jacques). Infection was 75-100% at Kentville and Kingsport, N. S., on 4 Aug. (D. W. Creelman). It was trace to severe in Queens Co., P. E. I., by 26 Aug. (R. R. Hurst).

Leaf Spot (Septoria phlogis) was heavy and caused much defoliation by 29 July in a planting of mixed varieties of P. drummondii at Ottawa, Ont. There are various records for Septoria leaf spots on this plant under S. drummondii, which is certainly synonymous with S. phlogis; or under S. divaricata, which supposedly has much smaller spores. Specimens suggest that there is a complete intergradation in spore size. The spores of the present specimen are typical of S. phlogis (D. B. O. Savile).

Blight (virus). A trace was found in two plots at the Station, Fredericton, N. B. (D. J. MacLeod).

RHODODENDRON

Rust (Chrysomyxa piperiana (Arth.) Sacc. & Trott.) was collected on R. californicum between Hope and Princeton in s. w. B. C. (W. Touzeau). This is the first definite record of the occurrence of this rust in B. C., but it has been intercepted at Vancouver on plants of R. californicum imported from Oregon. It might cause some trouble where this shrub is planted close to spruce. It may be noted in passing that C. roanensis was reported by J. P. Anderson (The Uredinales of Alaska and adjacent parts of Canada. Iowa State Coll. Journ. of Sci. 26:507-526. 1952) on R. lapponicum near Fort Nelson in extreme northern B. C.; but examination of a fragment of this collection, supplied by the late Dr. Anderson, shows it to be C. ledi var. rhododendri (D. B. O. Savile).

ROSA - Rose

Crown Gall (Agrobacterium tumefaciens). Slight infections were seen on a few varieties at Victoria, B. C. (W. Jones). A rambler rose, var. Shot Silk, at Vancouver, with canes up to 7 ft. 6 in. long, bore linear galls similar to those caused by A. rubi up to the 6 ft. level, rather than the usual spherical galls near ground level (H. N. W. Toms). Crown gall was a trace to heavy on climbing roses in gardens at Summerside and Charlottetown, P. E. I. (R. R. Hurst).

Grey Mould (Botrytis ?cinerea) prevented buds from opening in specimens received from Parkman, Sask. (T. C. Vanterpool). Grey mould caused severe damage in March in a nursery storage at Charlottetown, P. E. I., containing hundreds of valuable varieties. Poor ventilation was responsible, and when it was corrected a great improvement resulted (R. R. Hurst).

Black Spot (Diplocarpon rosae) caused premature defoliation of hybrid tea roses in Victoria Park, Niagara Falls, Ont., in August. It was also prevalent in many gardens at St. Catharines, in one instance causing complete defoliation by 26 Aug. (G. C. Chamberlain, W. G. Kemp). Traces were seen on Pelse's Rival at the Botanical Garden, Montreal, Que. (J. E. Jacques). It was heavy on specimens submitted from a nursery at Granby, Que., in late August (H. S. Thompson). A 50%, infection caused severe damage at Yarmouth, N. S., in September. It caused severe yellowing and defoliation at Kentville in early October (D. W. Creelman, J. F. Hockey). Black spot was moderately heavy in August at Charlottetown, P. E. I. (R. R. Hurst).

Stem Canker (Leptosphaeria coniothyrium) caused slight damage to var. Mrs. Sam McGredy at Victoria, B. C. (W. Orchard).

Rust (Phragmidium spp.). Leaves infected by P. sp. were received from a garden at Vancouver, B. C., in June (I. C. MacSwan). Specimens of P. speciosum were received from a garden at London, Ont. (F. J. Hudson, I. L. Conners). A 50% infection of P. speciosum caused severe damage at Murder Point, Lunenburg Co., N. S. (D. W. Creelman). P. rosae-pimpinellifoliae caused slight damage at Charlottetown, P. E. I. (J. E. Campbell).

Powdery Mildew (Sphaerotheca pannosa) was light on a few plants of Blaze, a large-flowered climber, at St. Catharines, Ont., in June. It was heavy and caused some leaf distortion on hybrid tea roses at St. Catharines in late August (W. G. Kemp). It was heavy and caused defoliation and weak terminal growth of Crimson Rambler at St. Catharines in August (G. C. Chamberlain). Mildew was heavy on specimens received from St. Jean Baptiste, Rouville Co., Que., in early July; and traces were seen on Pelse's Rival at the Botanical Garden, Montreal (J. E. Jacques). Specimens received from Avonport, Kings Co., N. S., on 9 July were heavily infected, with severe damage to petioles and buds (D. W. Creelman). Infection was heavy on a Crimson Rambler at Charlottetown, P. E. I., in September (R. R. Hurst).

Mosaic (virus) is seen annually on single plants of Karen Poulsen and Kirsten Poulsen hybrid polyanthas in a garden at St. Catharines, Ont., but seems to have little effect on their vigour (G. C. Chamberlain).

SAINTPAULIA - African Violet

Grey Mould (Botrytis cinerea) attacked the leaf blades and petioles of a plant examined at Montreal, Que. (J. E. Jacques).

Root Rot (various organisms associated) is becoming increasingly important at Toronto, Ont., and other localities. Fusarium and certain Phycomycetes have been found responsible in various degrees (H. S. Thompson).

Leaf Curl (virus), causing a downward curling of the leaves, has been seen at Toronto, Ont. Other symptoms, such as dwarfing of the leaves or suppression of leaf hairs, giving a shiny appearance to the foliage, may be associated (H. S. Thompson). The sudden and marked increase in popularity of African violets will inevitably give rise to disease problems. The root rot complex, which is being studied by Mr. Thompson, is a serious limiting factor in production of the plants.

SALVIA

Wilt (Fusarium oxysporum). Specimens received from Windsor, Ont., in August showed blackening of the stem base and vascular browning spreading in some plants to the branch tips. The infection rate was high. The organism, det. W. L. Gordon, was isolated consistently (W. R. Lapp, H. S. Thompson).

SOLIDAGO - Goldenrod

Powdery Mildew (Erysiphe cichoracearum) was very heavy by 2 Sept. on ornamental hybrids, especially Sunshine, at the Botanical Garden, Montreal, Que. (J. E. Jacques).

SYRINGA - Lilac

Grey Mould Blight (Botrytis cinerea) destroyed 30% of the blossoms at Kentville, N. S. Specimens were also received from Canard, Kings Co. (D. W. Creelman).

Powdery Mildew (Microsphaera alni). Traces were seen at the Botanical Garden, Montreal, Que. (J. E. Jacques).

Bacterial Blight (Pseudomonas syringae). Specimens showing typical infection were received from a single bush at Tusket, Yarmouth, Co., N. S. (D. W. Creelman).

TULIPA - Tulip

Fire (Botrytis tulipae). Primary lesions were recorded in 19/54 plots inspected on Vancouver I., B. C. Infection ranged from 0.2 to 2.5 (av. 0.69)%. Secondary infection was later seen in all plantings, the weather having been ideal for spread of the disease. On the lower mainland both primary and secondary fire was general. Heavy frosts, as low as 22° F., in April and May caused considerable damage in many varieties and made exact counts of fire impossible. In general there was a correlation between frost injury and fire damage, perhaps due to frost injury providing infection counts (N. Mayers). Infected blossoms, with many sclerotia on the petals were received on 10 June from Pepperlaw, Ont. Infection appeared to have been heavy (H. S. Thompson). Infection was about 20% in I. fosteriana var. Red Emperor in plantings at the National War Memorial, Ottawa. Leaf and stem lesions were severe. The tunics of the bulbs were firm and intact, but when they were cut off large sclerotia were found beneath. Despite the size of the sclerotia, cultures yielded typical B. tulipae (Constance A. Bowerman, D. B. O. Savile). Fire was stated to be common in a planting at Cheneville, Papineau Co., Que. (J. E. Jacques). Fire was heavy and widespread at Halifax, N. S., according to reports and specimens from the Plant Protection Division. Many entire beds were involved (D. W. Creelman).

Blue Mould (Penicillium sp.) caused severe rot of several bulbs in a lot of bulbs at Charlottetown, P. E. I., in September (A. Raynor, S. McAulay).

Root and Stem Rot (Rhizoctonia solani) caused considerable damage to stems and leaves of tulips in a cold greenhouse at the Station, Saanichton, B. C., in February. Infection took place below soil level in the early stages of growth (W. Orchard). Moore (Brit. Min. Agr. Fish. Bull. 117. 1939)

recorded R. solani causing a rot of plants from bulbs imported from Washington. Weiss and O'Brien (Index of Plant Diseases in the United States, part 4. 1952) report it from Mass., N. Y. and Wash. This appears to be the first report from Canada.

Gray Bulb Rot (Sclerotium tuliparum) destroyed about 500 bulbs of various varieties in a garden at New Westminster, B. C. Large patches in the beds were affected (I. C. MacSwan).

Break (virus). Traces were observed in most plantings inspected in Vancouver I., B. C., and all those on the lower mainland (N. Mayers). It occurred throughout the Okanagan Valley. Many plantings were free, but it varied from slight to severe in others (G. E. Woolliams).

Topple (physiological). In a greenhouse at Victoria, B. C., loss in January was 50% in White Sail and 10% in Her Grace, both imported from Holland (J. Bosher).

Bulb Rot (?wet ground). Tulips in a bed near Ottawa, Ont., failed to make normal growth. Three bulbs submitted were completely rotted; one also bore many sclerotia of what proved to be Botrytis tulipae, although the picture at first suggested Sclerotinia sativa. Heavy rain and ice in early winter is believed to have been responsible (I. L. Conners).

VIOLA

Leaf Spot (Ascochyta violae Sacc. & Speg.). A trace occurred at Keating, B. C., on V. tricolor var. hortensis (W. R. Orchard). Infection was moderate on the same host at Ste. Foy, Que. (D. Leblond). Not previously reported in Canada; but the organism may be a phase of Phyllosticta violae (P. D. S. 25:123).

Crown and Stem Rot (Myrothecium roridum). Infection was 5-10% in 3 fields of pansy at Keating, B. C., in August. The loss in seed production was ca. 8%. This disease is of constant concern to pansy seed growers in southern Vancouver I. (W. R. Orchard).

Powdery Mildew (Sphaerotheca humuli) was prevalent and caused moderate damage to pansies and violas at Saskatoon, Sask., late in the summer (R. J. Ledingham).

ZINNIA

Blight (Alternaria zinniae Pape). Infection was 100% and damage severe in a single block in a large planting at the Station, Kentville, N. S. Leaf lesions were large and very numerous, flower lesions moderately abundant, and stem lesions occasional. The pathogen fruited sparsely but regularly on leaves and florets. Appearance agreed well with that described by Dimock and Osborn (Phytopath. 33:372. 1943) (D. W. Creelman). First report to the Survey. The distribution in this outbreak strongly suggests that the pathogen was introduced with the seed.

Yellows (Callistephus virus I). A trace was found in the border at the Station, Fredericton, N. B. (D. J. MacLeod). All plants in a garden at Charlottetown, P. E. I., were severely damaged (R. R. Hurst).

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