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DIVISION OF BOTANY AND PLANT PATHOLOGY

THIRTIETH ANNUAL REPORT OF THE CANADIAN PLANT DISEASE SURVEY 1950

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FOREWORD

The present report follows closely the lines of previous ones. However the use of abbreviations for commonly occurring words has been extended. For many years the provinces have been referred to by the official abbreviations established for their names. In recent reports, where the range of infection or damage was stated for a province the words trace, slight, moderate, and severe have been abbreviated to tr., sl., mod., and sev. In the present report these words are abbreviated almost everywhere they appear as well as where the adverbial forms are used, e.g. for "sev. infected stands" read "severely infected stands". In addition, geographical areas referred to by the cardinal points of the compass are designated by a letter written in the lower case, e.g. n. Alta. for northern Alberta, s.w. Ont. for southwestern Ontario. The province of Saskatchewan is conveniently divided into nine areas, with the central area designated as central Sask. In consequence when e. Sask. is used the eastern third of the province is understood, comprising the three areas, n.e. Sask., e. central Sask. and s.e. Sask. A similar interpretation is given to n. Sask., s. Sask., and w. Sask.

Several special contributions are again included in the report. In the introduction appears "Plant-parasitic nematodes" by A. D. Baker. In the body of the text appear the following special reports: "Rust nurseries in Canada in 1950" and "Physiologic races of cereal rusts in Canada in 1950" by T. Johnson et al.; on flax diseases in Saskatchewan by Prof. T.C. Vanterpool and in Manitoba by W.E. Sackston; "Soybean diseases in southwestern Ontario in 1950" by A.A. Hildebrand; "Sunflower diseases in Manitoba in 1950" by W.E. Sackston; and on tobacco diseases in Ontario by A.H. Stover. The last is an unusually interesting report on diseases of tobacco.

Principal contributors outside the Division were Mr. S.F. Clarkson; Mr. O. Caron and Mr. D. Leblond; Mr. F. Godbout and Mr. Lavallee; Dr. J.E. Jacques; Prof. E.H. Garrard; Prof. T.C. Vanterpool; Dr. A.W. Henry; Mr. W. Lobay; Mr. W.R. Foster and Mr. I.C. MacSwan; and all District Potato Inspectors. No special report on plant diseases of Newfoundland is included this year, but we are indebted to Mr. G.C. Morgan, Plant Protection Division, for many valuable items. We wish to thank all contributors to the Survey, including those not mentioned by name. The value of the reports is wholly dependent on their submissions.

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New or Noteworthy Diseases

Owing to the cool, wet spring, the crop season in the Prairie Provinces was considerably retarded and the appearance of the cereal rusts was correspondingly delayed. The most significant development was the widespread occurrence of race 15B of wheat stem rust (Puccinia graminis var. tritici). With the appearance of this race, durums were severely rusted in southern Man., although the damage was not great. However, important wheat growing areas along the Red River in North Dakota and Minnesota were severely damaged. (cf. W.E. Brentzel. U.S.D.A. Pl. Dis. Reporter 34(11):340-341. 15 Nov. 1950). The varieties Carleton and Stewart, hitherto resistant to stem rust, were rusted as heavily as other commercial durum wheats. The rust resistant common wheats Thatcher, Regent, and Redman carried much lighter infections and damage to these varieties, if any, was slight. Elsewhere in Canada, heavy or even moderate infections of wheat stem rust appeared to be confined to a few localities in Ont.

When the previous, known distribution of race 15 is reviewed, it is clear that it has had sufficient distribution on cereals and grasses in the Great Plains to permit its rise to predominance under favourable circumstances. Possibly one of these circumstances is the incorporation of emmer "blood" into common and durum wheats. Emmer wheats, such as Yaroslav and Vernal, are more or less susceptible to race 15 and particularly so to its biotype 15B. The existence of this biotype coincident with the growing of great acreages of Carleton and Stewart (derived from Vernal) and of many Hope and H44 derivatives (derived from Yaroslav) appears to have been one of the primary causes of the rust epidemic of 1950.

Other cereal rusts, particularly wheat leaf rust (P. triticina) and oat stem rust (P. graminis var. avenae) were also of some importance. Race surveys demonstrated that race 7, of oat stem rust, which was rarely collected in previous years, is now widely distributed and three races, viz. races 34, 45, and 57, of oat crown rust (P. coronata var. avenae) have increased rapidly to become the predominent races this year. These race changes serve to emphasize the difficulty in breeding varieties that remain resistant for any length of time to these two rusts, which do cause severe losses in localized areas, wherever the alternate hosts, the barberry and buckthorn, have escaped. For this reason, the action of the Ontario Department of Agriculture to encourage local municipalities in the eradication of these pests within their confines deserves the fullest support, for much benefit will accrue if a good job of eradication is done.

The smut situation changed little in the past year. The winter wheat variety, Wasatch, has been tested in Interior British Columbia for the past three years and proved resistant to the strains of dwarf bunt (Tilletia caries form) present; it is now recommended for the area. Tests made by a new technique indicate that on account of favourable conditions for infection during the flowering period last summer in Sask. the amount of loose smut (Ustilago nuda) will be high in barley crops grown from untreated seed next year.

Browning root rot (Pythium spp.), one of the main root-rot diseases in the 1920's and 1930's in certain districts chiefly in Sask., has been of little or no economic importance in recent years. This decline seems to be connected

with the increased use of the combine whereby more straw is returned to the soil, increased use of phosphate fertilizers, and the growing of large acreages of Thatcher, one of the most resistant varieties of the common wheats to this root rot.

Bacterial wilt (Corynebacterium insidiosum) of alfalfa was found for the first time in Que. in 1950; as pointed out last year this disease is likely to be found wherever alfalfa is grown in Canada. An important new pest in Canada, the stem nematode (Ditylenchus dipsaci) of alfalfa, was found in small amounts at and about Lethbridge, Alta. An unusual phenomenon this year was the occurrence of heavy infections of rust (Puccinia sorghi) on fodder and sweet corn in Ont. Stalk rot, previously attributed to Gibberella zeae but apparently caused by a complex of organisms, was very destructive to corn in Ont. Rust (Melampsora lini) was the currently important disease of flax in Man. Races capable of attacking the variety Dakota increased rapidly in 1949 and caused heavy infection on this variety in 1950; however, no rust was found on Rocket or Cheyenne. From studies made at Harrow it appears that not only is pod and stem blight (Diaporthe phaseolorum var. sojae) present on soybeans in southwestern Ont. but also stem canker (D. phaseolorum var. batatis). The latter pathogen can attack the plants in mid-season, causing wilting and early death.

Bacterial ring rot (Corynebacterium sepedonicum) continues to be an important disease of potatoes in Canada although it was less prevalent in 1950 than in the previous year. No cases were observed in the current crop in P.E.I. and only a few fields were infected in B.C. Efforts to reduce its spread in several of the other provinces are only partially successful.

Black leg (Erwinia phytophthora) was more prevalent from northern Ont. eastward this year than usual on account of cool, usually moist conditions, particularly in spring. The cool season also favoured the development of rhizoctonia (Pellicularia filamentosa) on the potato plant.

Late blight (Phytophthora infestans) was relatively prevalent everywhere from Ont. eastward, causing fairly heavy losses from tuber rot in southwestern Ont., about Montreal and the Eastern Townships in Que., and on the south shore of N.S., with lighter losses elsewhere in N.S. and in N.B. and P.E.I. The newly developed blight-resistant varieties Canso and Keswick appear promising. Late blight was also fairly destructive to tomato in the same areas where it was severe on potatoes. One case of apparent overwintering in the greenhouse was observed near Kingsville, Ont.

Further search has revealed that wart (Synchytrium endobioticum) is much more prevalent in Nfld., especially on the East Coast, than was formerly realized. As a result of one year's tests for resistant varieties, the new late-blight resistant variety Keswick was found to be immune to the particularly virulent strain of wart in Nfld., while Katahdin, a mauve-flowered strain of Sebago, and Canso were highly resistant.

Recent studies at Fredericton have demonstrated that late leaf roll, bunch or purple top, and haywire are symptom phases of the same virus disease, best known by the names Bunch Top or Purple Top. The virus according to D.J. MacLeod is either an aberrant strain of Callistephus virus 1 or an entirely different virus (Solanum virus 17). The same worker presents field evidence of the presence of the western strain of aster yellows virus on celery and zinnia in N.B.

Three more cases of whiptail of cauliflower were reported this year and the benefit of an application of ammonium molybdate is recorded for one. Late blight (Septoria apii-graveolentis) of celery was unusually severe in Ont. and Que. unless the plants were well protected by a fungicide. Heavy infections of downy mildew (Peronospora pisi) were reported for the first time in Ont. Tobacco virus diseases have been epidemic since 1947 in the Old Tobacco Belt in Ont. Studies at Harrow in 1950 have shown that tobacco etch, although not previously reported in Canada, is the most prevalent of these diseases. Etch also severely affected pepper in the same area. Anthracnose (Colletotrichum phomoides) of tomato continues to be one of the most important diseases of canning crops because of the rapid deterioration of the fruit just before or after picking. Another outbreak of bacterial canker (Corynebacterium michiganense) of tomato occurred in Que.

The following records of diseases of fruit crops may be noted: Rust (Gymnosporangium clavipes) was heavier on apple in N.S. than ever in 26 years' observations. Canker (Tympanis conspersa) caused some damage in a neglected orchard in N.S. Scab (Venturia inaequalis) was heavy in parts of the Kootenays, B.C. The weather favoured scab in s.w. Que. and many sprays were needed to control it. Little leaf and rosette (zinc deficiency) have been seen on apple and other tree fruits in B.C. for several years. Fire blight (Erwinia amylovora) of pear was again serious in Creston Valley, B.C. Stony pit (virus) was seen for the first time in N.S. Blossom blight and brown rot (Sclerotinia fructicola) caused considerable loss to cherry, peach and plum in B.C., Ont. and N.S.
Spur blight (Didymella applanata) of raspberry was destructive in parts of Ont. Decline of strawberry and stunting of raspberry both apparently caused by viruses, are causing concern in parts of B.C.

Among tree diseases mention may be made of mistletoe (Arceuthobium americanum), which has long been serious on Pinus banksiana in Sask. In 1950 Wallrothiella arceuthobii was abundant on the Arceuthobium in one area. Scouting for Dutch elm disease (Ceratostomella ulmi) showed more infected trees in Que. than in 1949, and considerable southward spread. A few infected trees were scattered in e. Ont. and a well-established outbreak was found near Windsor.

The following reports of diseases of ornamental plants are worthy of note: Grey mould (Botrytis cinerea) was serious on Antirrhinum and Chrysanthemum, and was reported on other hosts at various points in eastern Canada; its prevalence was partly due to wet weather. Bunch top (Solanum virus 17) occurred naturally in N.B. on Antirrhinum and Petunia. Mosaic (Cucumis virus 1) was heavy on Antirrhinum majus in a greenhouse in Ont. on plants that were started outdoors near infected watermelon. Yellows (Callistephus virus 1) continues to be serious, especially in the Maritime Provinces, on Callistephus and several other genera.

Fasciation (Corynebacterium fascians) was found on gladiolus in Sask., the first positive record of this organism in Canada. Bacterial soft rot (Erwinia carotovora) was reported on gladiolus in Ont. in 1949. Yellows (Fusarium orthoceros var. gladioli) was serious on this plant in P.E.I., and core rot (Sclerotinia draytoni) was common in Ont., N.S., and P.E.I. Evidence was obtained that several viruses may be involved in the gladiolus mosaic complex. Leaf spot (Didymellina macrospora) was heavy on iris in parts of Ont. and Que. Decline (virus) continues to be the most serious disease of narcissus in B.C.

Maladies nouvelles ou d'importance notable

A cause du printemps froid et pluvieux, les semailles ont été considérablement retardées dans les provinces des Prairies et l'apparition des rouilles l'a été d'autant. Le fait le plus marquant de l'année fut la distribution généralisée de la race 15B de Puccinia graminis var. tritici, agent de la rouille de la tige du blé. A cause de l'apparition de cette race, les blés durum furent gravement rouillés dans le sud du Manitoba; toutefois, les dommages ne furent pas sérieux. Cependant, dans d'importants districts du Dakota Nord et du Minnesota, le long de la Rivière Rouge, le blé fut sérieusement affecté (Cf. W.E. Brentzel U.S.D.A. Pl. Dis. Reporter 34 (11): 340-341, 15 nov. 1950). Les variétés Carleton et Stewart, jusqu'alors résistantes à la rouille de la tige, furent aussi gravement atteintes que les autres variétés commerciales de durum. Les variétés résistantes de blés ordinaires, comme le Thatcher, le Regent et le Redman, ne furent que légèrement infectées et ne subirent que des dommages insignifiants, si tant est qu'il en aient subi. Dans les autres provinces du Canada, on n'a signalé aucune épidémie, même modérée, sauf dans quelques rares localités en Ontario.

En étudiant la distribution connue de la race 15, on réalise qu'elle a été suffisamment répandue dans les grandes plaines pour devenir la race prédominante, les circonstances favorables aidant. Il est possible qu'une de ces circonstances soit l'incorporation de "sang" emmer dans les variétés de blé commun et de ble durum. Les blés emmer, tels le Yaroslav et le Vernal, sont plus ou moins susceptibles à la race 15 et particulièrement susceptibles a son biotype 15B. L'existence de ce biotype et la culture sur de vastes étendues des variétés Carleton et Stewart (descendants de Vernal) et de plusieurs variétés dérivées des Hope et H 44 (descendants de Yaroslav) sont apparemment parmi les causes premières de l'epidémie de rouille de 1950.

Parmi les autres rouilles des céréales, la rouille des feuilles du blé (P. triticina) et la rouille de la tige de l'avoine (P. graminis var. avenae) ont eu une certaine importance. L'enquête sur les races de rouille a révélé que la race 7 de la rouille de la tige de l'avoine, que l'on ne récolta que rarement les années précédentes, est maintenant très répandue; les races 34, 45 et 57 de la rouille couronnée de l'avoine (P. coronata var. avenae) se sont multipliées rapidement et sont les races prédominantes. Ces fluctuations dans la prédominance des races nous donne une idée des difficultes inhérentes à la création de variétés résistantes qui conserveront pendant une période appréciable d'annees leur résistance à ces deux rouilles, responsables de pertes sérieuses dans toutes les regions où les hôtes complémentaires, l'épine-vinette et le nerprun, se sont naturalisés. C'est pour cette raison que les mesures qu'a prises le ministère de l'Agriculture d'Ontario pour encourager les municipalités à promouvoir l'éradication de ces ennemis dans leurs limites mérite tout l'encouragement possible. Ce travail d'éradication, s'il est bien fait, rapportera de gros dividendes.

La situation a peu changé, quant aux charbons, l'an dernier. La variété de blé d'automne Wasatch fût mise à l'essai durant les trois dernières années à l'intérieur de la Colombie Britannique, et elle s'est avérée résistante aux lignées de carie naine (Tilletia caries) qui y prévalent; on la recommande maintenant dans cette région. Des tests faits suivant une technique nouvelle laissent prévoir que, à cause de conditions favorables à l'infection durant la période de floraison en Saskatchewan l'été dernier, le pourcentage de charbon nu (Ustilago nuda) de l'orge sera élevé dans toute récolte provenant d'une semence non traitée.

La pourriture brune des racines (Pythium spp.) une des plus importantes maladies des racines durant les décennies 1920 et 1930, dans certains districts, surtout en Saskatchewan, n'a eu que peu d'importance ces dernières années. Cette régression paraît attribuable à l'usage de moissonneuses-batteuses qui retournent au sol une plus grande quantité de paille, a l'utilisation plus généreuse d'engrais phosphatés et à l'emploi de plus en plus généralisé de la variété Thatcher, une des plus résistantes à cette pourriture des racines parmi les blés communs.

La flétrissure bactérienne (Corynebacterium insidiosum) de la luxerne a été signalée pour la première fois dans Québec en 1950; comme nous le disions l'an dernier, on doit s'attendre à trouver cette maladie partout où se cultive la luzerne. Un nouvel ennemi de la luzerne, le nématode des tiges (Ditylenchus dipsaci) fut observé à Lethbridge et aux alentours. En Ontario, on a observé de graves infections de rouille (Puccinia sorghi) sur les maïs fourragers et sucrés, ce qui est plutot inusité. La pourriture des tiges, jadis attribuée à Gibberella zeae, mais qui est apparemment due à un complexe d'organismes, a causé des dommages graves au maïs en Ontario. La rouille du lin (Melampsora lini) fut la maladie importante de l'année au Manitoba. Les races capables d'attaquer le Dakota ont augmenté rapidement en 1949 et ont causé des infections graves de cette variété en 1950; toutefois, les variétés Cheyenne et Rocket étaient exemptes de rouille. D'après les travaux faits à Harrow, il ressort qu'en plus de la brûlure des tiges et des gousses (Diaporthe phaseolorum var. sojae), on a observé le chancre de la tige (D. phaseolorum var. batatis) dans le sud-ouest de l'Ontario. Ce dernier pathogène attaque les plants en mi-saison et cause un flétrissement et une mort prématurée.

La pourriture bactérienne du cerne (Corynebacterium sepedonicum) est toujours une maladie importante des pommes de terre au Canada; toutefois, elle etait moins répandue en 1950 qu'en 1949. Aucun cas n'a été signalé cette année dans l'Ile du Prince-Edouard, et quelques champs seulement étaient infectés en Colombie Britannique. Les efforts faits dans les autres provinces pour enrayer son expansion n'ont été que partiellement fructueux.

La jambe noire (Erwinia phytophthora) était plus répandue que d'habitude, cette année, dans le nord de l'Ontario en gagnant vers l'est, à cause du climat froid et humide qui a prévalu au cours du printemps. La saison froide a également favorisé le développement de la rhizoctonie (Pellicularia filamentosa) des pommes de terre.

Le mildiou (Phytophthora infestans) fut passablement répandu partout dans l'Ontario et dans les provinces à l'est de celle-ci. Cette maladie a causé des pertes appréciables par la pourriture des tubercules dans le sud-ouest de l'Ontario, aux environs de Montréal, dans les Cantons de l'Est, dans Québec et sur la côte sud de la Nouvelle-Ecosse; les pertes furent plus légères dans le reste de la Nouvelle-Ecosse, au Nouveau-Brunswick et dans l'Ile du Prince-Edouard. Les variétés résistantes Canso et Keswick, récemment développées, paraissent prometteuses. Le mildiou a également exercé ses ravages sur les tomates dans les mêmes districts. On a observé à Kingsville, Ont., un cas où la brûlure aurait apparemment hiverné dans une serre.

De nouvelles enquêtes ont révélé que la galle verruqueuse (Synchytrium endobioticum) est plus répandue, particulièrement sur la côte-est de Terreneuve, qu'on ne l'avait cru d'abord. Les résultats des essais d'une année sur la résistance des variétés à cette maladie indiquent que la variété Keswick résistante au mildiou est immune à la lignée particulièrement virulente de S. endobioticum présente à Terreneuve, tandis que la Katahdin, une lignée à fleur mauve de Sebago et la Canso sont très resistantes.

Des études récentes faites à Fredericton ont démontré que l'enroulement tardif, le "bunch top" ou "purple top" et le "haywire" sont autant de symptômes d'une seule et même maladie à virus connues sous le nom de "bunch top" ou "purple top". Le virus, selon D.J. MacLeod, est soit une lignée anormale de Callistephus 1 ou un virus tout-à-fait different (virus Solanum 17). Le même chercheur a démontré la présence dans les champs de la lignée de l'ouest du virus de la jaunisse de l'aster sur le céleri et le zinnia au Nouveau-Brunswick.

Trois autres cas de chou fleur en fouet furent rapportés cette année, et dans un de ces cas l'incorporation de molybdate d'ammonium au sol s'est avérée avantageuse. La brûlure tardive du céleri (Septoria apii-graveolentis) fut particulièrement grave en Ontario et dans Québec là où les champs n'étaient pas bien protégés. C'est la première fois qu'on rapporte en Ontario des infections graves de mildiou du pois (Peronospora pisi). Les maladies à virus du tabac ont pris une allure épidémique depuis 1947 dans la vieille région à tabac de l'Ontario. Des études faites à Harrow en 1950 ont montré que l' "etch", ou ciselure, bien qu'elle n'ait pas encore été signalée au Canada, est la maladie la plus répandue. Cette maladie a également affecté le piment dans le même district. L'anthracnose (Colletotrichur phomoides) des tomates est toujours une des plus importantes maladies des tomates pour conserverie à cause de la détérioration rapide des fruits juste avant ou après la récolte. Une nouvelle épidémie locale du chancre bactérien (Corynebacterium michiganense) s'est produite dans Québec.

Voici les maladies des fruits qui méritent une mention. La rouille (Gymnosporangium clavipes) du pommier fut plus grave en Nouvelle-Ecosse que durant les 26 dernières années. Le chancre (Tympanis conspersa) a causé des dommages dans un verger négligé en Nouvelle-Ecosse. La tavelure (Venturia inaequalis) fut grave dans certaines parties des Kootenays en Colombie Britannique. Le climat fut favorable à la tavelure dans le sud-ouest du Québec et il a fallu de nombreux arrosages pour la maintenir en échec. La petite feuille et la rosette (carence de zinc) se rencontrent depuis plusieurs années sur le pommier et sur d'autres espèces d'arbres fruitiers en Colombie Britannique. La brûlure bacterienne (Erwinia amylovora) du poirier fut encore une fois assez grave dans la vallée de Creston en Colombie Britannique. La pierre du poirier (virus) a fait sa première apparition en Nouvelle-Ecosse. La brûlure des fleurs et la pourriture brune (Sclerotinia fructicola) ont causé des pertes considérables de cerises, de pêches et de prunes en Colombie Britannique et en Nouvelle-Ecosse. La brûlure des dards (Didymella applanata) du framboisier fut destructive dans certaines parties de l'Ontario. Le déclin du fraisier et le rabougrissement du framboisier, tous deux apparemment dus à des virus, sont une cause de soucis dans certaines parties de la Colombie Britannique.

Parmi les maladies des arbres, on peut mentionner le gui (Arceuthobium americanum), qui depuis longtemps est grave sur Pinus banksiana en Saskatchewan. En 1950, Wallrothiella arceuthobii était abondant sur Arceuthobium dans une région. Le dépistage de la maladie hollandaise de l'orme a permis de dénombrer un plus grand

nombre d'arbres atteints de la maladie qu'en 1949 et une extension de l'aire de distribution vers le sud. Quelques arbres malades ont été observés ici et là dans l'est de l'Ontario de même qu'une épidémie bien établie près de Windsor.

Chez les plantes ornementales, les observations suivantes paraissent dignes de mention. La moisissure grise (Botrytis cinerea) fut grave sur Antirrhinum et Chrysanthemum et fut rapportée sur d'autres hôtes en divers endroits dans l'est du Canada; sa présence généralisée est due partiellement au climat humide. Le "bunch top" (virus Solanum 17) fut observé dans les jardins au Nouveau-Brunswick sur l'Antirrhinum et le Petunia. La mosaïque (virus Cucumis 1) fut grave sur Antirrhinum majus dans une serre en Ontario sur des plants qui avaient été partis à l'extérieur près de melons atteints de ce virus. La jaunisse (virus Callistephus 1) continue d'être importante, particulièrement dans les provinces maritimes, sur Callistephus et plusieurs autres genres.

La fasciation (Corynebacterium fascians) fut observée sur les glaïeuls en Saskatchewan. C'est la première observation certaine de ce parasite au Canada. La pourriture molle (Erwinia carotovora) fut rapportée sur le glaïeul en Ontario en 1949. La jaunisse (Fusarium orthoceras var. gladioli) fut grave ce même hôte dans l'Ile du Prince-Edouard, tandis que la pourriture des bulbes (Sclerotinia draytoni) fut observée en Ontario, en Nouvelle-Ecosse et dans l'Ile du Prince-Edouard. On a suggéré que plusieurs virus peuvent concourrir au complexe de la mosaïque du glaïeul. La tache des feuilles (Didymella macrospora) de l'iris fut grave dans certaines parties de l'Ontario et du Québec. Le déclin (virus) est toujours la plus serieuse des maladies des narcisses en Colombie Britannique.

The Weather and its Influence on Diseases

The main weather features on Vancouver Island during 1950 were the coldest January on record; wet weather in late winter and early spring; a dry May, June, and September, and a wet July, August, and October.

Owing to the cold winter, young conifers in a few nurseries were severely damaged, with injury occurring during the alternate thawing and freezing of the heavy snow cover. Well established hedges of Monterey cypress in the Victoria district are also showing the effects of severe winter injury. In many cases no recovery can be expected and it is doubtful whether this species will be in further demand for planting.

Fungus wilts of potatoes were unusually prevalent in some areas owing to dry soil in early summer, which augmented the drying of the fibrous roots, thus facilitating the entry of soil fungi, such as Fusarium and Verticillium spp. Early maturity of the plants followed and the tubers from such plants often showed stem-end discoloration and occasionally internal necrosis. In some districts heavy rainfall during a few days in July and August retarded this condition.

On the whole the season was unfavourable for the initiation and development of foliage diseases and economic losses due to them were negligible. For example, late blight was not observed on potato plants and tomatoes until after the October rains, which was too late to do any material damage (W. Jones).

Despite the most severe winter ever encountered in the lower mainland of B.C., crop losses from winter damage were surprisingly low. Record low temperatures of 0.0° F. and 3.4° F. were recorded at the Sea Island airport for January and February respectively, but the snow fall was heavy, a record 37 in. in January, and provided good cover for most small fruit plantations. Loganberries were an exception as there was considerable damage to these near the crown where the bend in the canes, as they lay on the ground, protruded above the snow.

The spring was late and wet. There was a record 6.79 in. of rain in March. However, when the weather finally broke it remained fine and spring planting, although delayed, went forward under good conditions. There was little loss from potato seed-piece decay and there were no serious outbreaks of early season diseases.

The fine weather continued and the summer was exceptionally dry. There was some loss to the berry crops on light soils due to drought at harvest time. Potato late blight did not make its appearance until late in the season and was at no time serious.

Harvest conditions were exceptionally good until October. October had the highest rainfall recorded in 13 years for that month (R.E. Fitzpatrick).

Surveys carried out by the British Columbia Department of Horticulture placed at 336,610 the number of fruit trees killed by the low temperatures of the 1949-1950 winter. This figure is not expected to be final because damage continued to appear throughout the growing season and further damage is expected to appear next winter. The record low at the Summerland Experimental Station was -22°F. on 25 January 1950.

Temperatures in January and February, 1950, were abnormally low throughout the Kootenays. However, only Grand Forks, the Arrow Lakes and Slocan Valley suffered serious tree damage. In the Arrow Lake and Slocan Valley districts, stone fruits were severely hit. Plantings of mature cherry trees, which constitute an important part of the fruit-growing economy of these districts, were killed or very seriously damaged. In the remaining districts of the West Kootenay there was little or no tree killing. Bud damage to peach and apricot reduced the crops in most districts. In Creston Valley, cherry and peach trees were damaged in a few orchards, and in most orchards the crop of apricots and peaches was reduced.

The Spring was late. Summer was hot and very dry, with no protracted rainy period during the usual seasons for apple scab and fire blight, and incidence of these diseases was low.

Moist weather during harvest in Oct. resulted in the appearance of gray mould in stored Delicious apples. Appearance of bull's eye rot and storage scab during the storage period is to be expected.

Mean temperatures during April and May were lower than normal in the Okanagan Valley, Thompson Valley and Grand Forks and plant growth was checked, which probably accounts for the presence of neck rot (Botrytis allii) of onion during May and early June on both spring and fall planted onions in the Vernon district. This is the first record of this kind of infection in the Okanagan Valley. About one-third of the plants were affected in some fields. After the weather warmed up during June, the plants outgrew the infection, although the bulbs of most affected plants were misshapen at maturity. The weather during June

to September, inclusive, was warm and unusually dry, and there was a scarcity of foliage diseases on all types of crop plants and native trees. Some of the more important diseases that were practically non-existent were apple and pear scab; downy mildews of onion, beet, and pea; and anthracnose on aspen, etc. Powdery mildews of various kinds, including those of apple, pear, peach, apricot, pea, cucumber, rose, and willow, etc., were largely absent. Data secured with respect to the occurrence of apple powdery mildew suggests that the incidence of this disease is correlated with winter temperatures, and the absence of this disease in the 1950 season was a direct result of exceptionally low subzero temperatures in January. It seems probable that the same factor may be responsible for the general absence of powdery mildew on other kinds of plants as well (H.R. McLarty).

The 1950 spring season in Alta. was much later than normal and, except in the extreme south of the province, was very dry. Winter injury to winter wheat in the Peace River district was so severe that most fields were ploughed down. The drought in the early part of the season, together with winter injury, damaged or destroyed many fields of alsike and red clover maintained for seed production. Beginning in early June, southern Alta. received ample rain for crop needs. After the middle of the month, good rains came to the eastern half of the province. The remainder received little rainfall until mid-July, resulting in spotty crop conditions and considerable second growth. Although weather conditions, particularly in the south, were favourable for stem rust it was almost impossible to find rust on spring wheat this year. Only traces of stem rust were reported on winter wheat. Common root rot of cereals was light, as in 1949. Leaf diseases of barley, especially net blotch, were much more prevalent than last year. In the period 14-19 Aug., and again a week later, slight to killing frosts occurred in all regions of the province. Damage was heaviest in the Peace River, Vermilion and Coronation districts (T.R. Davidson).

In Sask. the winter was very severe, with much damage to alfalfa, clovers and fall rye. The spring was cool and dry, and growth started slowly. At Saskatoon temperatures were normal in June, but low in July, Aug. and Sept. Sunshine was generally high and evaporation low during summer. Rain fell on 17 days from 20 June to 15 July. The principal hot spells were 10-14 June and 24-29 July; the former caused some heat-banding of cereals and the latter probably contributed to prematurity blight and melanism. The late spring and cool summer caused the killing frosts of 17, 19 and 23 Aug. to be disastrous. The frost-free period at Saskatoon was 70 days. Cool, moist weather through the usual harvest period delayed maturity, and seed is of poor quality. The season favoured loose smut of wheat and barley, common root rot, basal glume rot, black chaff, melanism and net blotch (T.C. Vanterpool, K.C. Russell).

In the Niagara Peninsula, Ont., conditions very favourable for the rapid and widespread development of brown rot blossom blight were provided by heavy fogs on the nights of 23 and 24 May during the latter part of the bloom period. These fogs remained for 10-12 hours and kept the trees dripping wet.

Infection periods for apple scab in the early season were few and not long enough to permit more than light, scattered infections. Primary lesions were evident on 28 May and resulted from the intermittent rains of 18-19 May. Light showers in June were not favourable for secondary infections and the terminal leaves and small

fruit remained very free from scab. A week of continuous wet weather, 26 Aug.-1 Sept. provided good conditions for infection and there was an outbreak of pin-point scab on the fruit at harvest. The rain at the end of Aug. favoured brown rot development in mid-season peach varieties, which were then maturing. Some growers reported the outbreak the worst ever experienced and were confronted with heavy losses and in grading. In addition the keeping quality of the fruit was poor and dealers and shippers experienced considerable loss due to rot.

The precipitation in the late season contributed to the development of bitter pit of apples and favoured an unusual development of powdery mildew on grapes. Hail on 17 June caused some damage to grapes in localized areas along the shore of L. Ontario (G.C. Chamberlain).

At Ottawa, Ont., sunshine was about 200 hours below average for the year, being slightly above average only in March and exceptionally low in Jan., July, Aug., Oct. and Nov. Jan. was extremely mild, the mean of 20.8°F. being 9° above average and 1.7° above that for March, which was 6° below normal. Snowfall was below normal in Jan. and rainfall very high. The ground was bare or nearly so much of the time and damage from ice and water was considerable. Feb. was 1° F. below average with heavy snow in the last 2 weeks. Further heavy snow in March maintained snow cover well into April, open fields not being bare until the middle of the month. April and early May were cold, and on 14 May a low of 23° F. was recorded. There were no more frosts and late May was warm. June temperatures were close to average, and rainfall about 2/3 average. July was slightly cool and rain totalled 5.74 in., over 2 in. above average, largely from a downpour of 2.68 in. on 17 July. Aug. was moderately wet and quite cool. Sept. was dry and very cool. Except for 19-26 May inclusive, there were no dry spells of over 6 days until Sept., then the period 25 Sept. to 8 Oct. was almost rainless, facilitating late harvesting. The highest temperature of the summer was 88° F., in sharp contrast with 1949 when maxima of 90-97° F. were recorded on 13 days. The season in general favoured apple scab and other foliage diseases. Oct. was moderately warm and dry, and Nov. mild and decidedly wet. A trace of snow lay at the end of Nov. Precipitation was average and temperature 2° above average in Dec.; snow cover was continuous from 8 Dec. and was 10 in. at the end of the year (D.B.O. Savile).

In Eastern Que., May was dry, cool at first, but hot during the latter part.

Winter killing of alfalfa, clover, orchard grass, strawberries, poplars, birches, etc. was particularly bad, because of insufficient snow covering and the prolonged thawing in Dec. and Jan. followed by severe cold.

The first ascospore discharge of Venturia inaequalis was noted on 10 May. The only fungous diseases that could be found during May in the Ste. Anne de la Pocatiere region were the rusts Cumminsiella sanguinea on Mahonia aquifolium, Cronartium ribicola on white pine, and species of Gymnosporangium on Juniperus.

In June, temperature was relatively low and precipitation higher than average. Aecial stages of cereal rusts were slow to form and were not as abundant as usual, except Puccinia coronata on Rhamnus alnifolia in a peat bog.

July was cool, except during the second week, which was very warm. Apple scab caused some concern in unsprayed orchards. Apple rust (Gymnosporangium clavipes) reappeared after having been apparently absent for eight years, apparently because of repeatedly dry Julys. Among bacterial diseases, crown gall was epidemic on raspberries and Rosa rugosa, and a few outbreaks of tomato bacterial canker were observed.

Aug. was cool and dry except for abundant rain at the end of the month. Cereal stem rusts were negligible and Helminthosporium diseases practically absent in the experimental plots. Powdery mildew and bacterial blight were relatively abundant on barley.

The rain that occurred at the end of the month permitted outbreaks of late blight of potatoes, but the drought that followed during Sept. prevented the development of the disease in the Lower St. Lawrence Valley. Moreover, killing frosts by mid Sept. marked the end of the growing season. Oct. and Nov. were characterized by cold rains and snow.

To summarize, conditions were favourable for vegetation but not for plant diseases (Albert Payette).

Average weather conditions prevailed in N.B. during the winter of 1950. Frequent snowfalls, usually followed by light rains, deposited 24 in. of snow in month of Jan., but only 6 in. of snow covered the ground by the end of the month. During Feb., 41 inches of snow fell and at the end of the month snow cover was 30 in. This was the greatest depth of snow during the winter. A fall of 0.76 in. of rain on 9 March cut the snow cover to 10 in. and by the end of the month open, level fields were bare. During April, 5.81 in. of rain fell and by 20 April the most shaded snow banks had disappeared. The ice ran out of the St. John River on 21 April. A province-wide rainfall of over 2 inches on 21 April caused considerable erosion of cultivated fields and much damage to highways.

The winter conditions were most disasterous to clovers, especially red clover. Even in the most favourably located fields little clover or alfalfa survived, and what did appeared to lack vigour. There was little noticeable killing of timothy and other grasses but the stands were thinner and less vigorous than usual. On the whole, apple orchards wintered well and there was little injury to cane or bush fruits. Due to freezing and thawing of the soil, strawberries suffered considerable injury. Ornamental shrubbery, especially honeysuckles, showed considerable winter injury but herbaceous perennials were unaffected.

Late April and the first three weeks of May were cool. High winds after the first week in May rapidly dried the land and by 15 May seeding became general. Growth was slow in meadows and pastures until the last week in May and trees were two weeks later in leafing out than in 1949.

The first ascospore discharge of the apple scab fungus occurred on 16 May. Rains during the last two weeks in June and the first week in July stimulated the growth of all crops, especially timothy, which had been suffering from the dry weather. Rain fell on 12 days during August and the rainstorms between 17 and 21 Aug., inclusive, caused much lodging in grain fields. Rain fell on only four days in Sept. Grain, although somewhat weathered, was harvested in good condition and the yields were at least 25% above average. The weight per bushel of oats was above average, probably due to slow ripening. Little rust of any kind was present in grain crops.

Late blight of potatoes threatened to become serious in Aug. but dry, cool weather in Sept. checked its spread. The foliage of potatoes and other garden crops was killed on 22 Sept. by frost. The root and vegetable yields were mostly above average.

Temperatures during Nov. were well above average and the rainfall for the month was an all-time record. The first three weeks in December were mild with a record high mean temperature. The St. John River froze on the latest date for 100 years (J.L. Howatt).

The early part of the 1949-50 winter in N.S. was mild with little snow cover. During Feb. a temperature of -15° F. was recorded and caused some bud damage to peach trees. Snow cover was consistant during the latter part of the winter. The weather during May was very favourable for agricultural work as the rainfall totalled 0.94 in. from six brief showery periods. There was no rainfall from 21 May to 3 June inclusive. June weather provided several periods favourable to the spread of apple scab, quince rust, Botrytis, etc. The summer was slightly cooler than average. A severe hail storm caused crop damage in the Kentville area on 13 July, and during 20-21 August the Valley received the tail-end lashings of a hurricane and approximately six inches of rain; some crop damage and soil erosion resulted. A three inch snowfall on 22 Oct. provided additional variety to the season's weather. Frequent showery weather during the late summer and autumn encouraged late blight of potatoes and tomatoes, brown rot of stone fruits, late infections of apple scab, and a variety of mildews (J.F. Hockey).

Low temperature injury to potatoes resulted from sub-zero temperatures in Feb. and March in P.E.I. Otherwise the 1949 crop stored well with no serious losses other than the usual considerable amount of Fusarium storage rot, the penalty for rough handling. The lack of adequate snow cover caused strawberry plantations to suffer severe injury and heavy crop reductions from crown injury, through freezing and thawing in March and early April. Weather was ideal for planting operations, all crops being seeded without serious interruptions. Lack of moisture in early summer delayed germination and prevented or delayed sprouting of potatoes. Thus seed-piece decay caused poor stands, even necessitating replanting of many fields, or their abandonment for potato reduction. Because of unseasonably high temperatures and drought in late May and June, killing of young turnips was extensive. Despite this early season drought, black leg of potatoes was widespread and in some instances severe. Traces of potato late blight were observed in the central and western sections of the Province on 18 July but, although some spread occurred, it did not become serious until after mid Aug. when a period of heavy rains and very high humidity provided ideal conditions for its development. The mean humidity for 19-25 Aug. was 84.0% and, for 26 Aug.-1 Sept., 86.9%. Total precipitation for these periods was 6.07 inches and the soil, which normally acts as a spore filter, was so saturated that conidia reached and infected many tubers. It is estimated that late blight rot caused a loss of 10% of the crop, most of which probably occurred during this extremely wet period. The loss from tuber rot would have been much higher but for the general use of vine killers (R.R. Hurst, L.C. Callbeck).

Plant-Parasitic Nematodes

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The sugar beet nematode, Heterodera schachtii (Schmidt), continues as an important pest of sugar beets in the Blackwell district of Ont. More attention is now being given to crop rotations in this area, and severe injury should occur less frequently. Surveys in 1950 did not reveal any appreciable spread of the parasite in the Blackwell area although new records were secured. No infestation has been found in the Glencoe area for several years, and the one small field there from which this nematode was originally reported in Canada is now out of beet production. Another small centre of infestation was reported in 1949 from near Jeannette's Creek, Ont. This pest has not been recorded elsewhere in Canada.

The potato-rot nematode, Ditylenchus destructor Thorne, has been studied further in P.E.I. Though this nematode can hardly be classified as a major crop pest, it becomes important when the good reputation of Prince Edward Island seed potatoes is involved. Much of the rather unjustified alarm over this parasite was due to an unfortunate tendency to confuse it with the golden nematode, Heterodera rostochiensis Woll., which has not been reported from Canada. Surveys for the potato-rot nematode in P.E.I. have increased the number of fields known to be infested, but these new findings indicate that infested areas are being progressively revealed as they are cropped with potatoes and not that there has been any recent spread of infestations. Soil fumigation with ethylene dibromide has been rather effective against this nematode, but it is also evident that repeated cropping with potatoes may reduce infestations to the vanishing point.

The oat nematode, Heterodera avenae Lind, Rostrup & Ravn, present in Ont. between Peterborough and Waterloo, continues to cause drop loss of importance in some areas. Surveys for this nematode have not been made for the past eight years and it has no doubt continued its spread. However, many growers are now better informed about this pest and in some cases injury has declined because of suitable crop rotation practices.

The stem nematode, Ditylenchus dipsaci (Kuehn), has been identified from alfalfa sent in from Lethbridge, Alta. The form (species?) attacking alfalfa is capable of causing important injury to this crop, and it has been previously reported from western United States.

The pea cyst-nematode, Heterodera goettingiana Lieb., has been reported from the Lower Fraser Valley and Victoria, B.C.

Meadow nematodes, Pratylenchus pratensis (deMan), have been identified from peach specimens received from Harrow, Ontario. Meadow nematodes are known to infest a wide variety of plants, and it is now considered that this species is a complex that will eventually be separated into several distinct species or varieties.

The records of root-knot nematodes in Canada are rather extensive and this nematode group is now separated into several species (of the genus Meloidogyne). It is very desirable that greater attention be given to cases of root knot to determine the species involved, so that we may know what forms are present in Canada and also meet the need for more information on the host ranges of the various species.

Of interest to zoologists and others is the recent publication of a book by Dr. T. Goodey: "Soil and Freshwater Nematodes".

Phenological Data - 1950

The great flood interferred with the collection of data at Winnipeg this year. Dates for shrubs and trees refer to specimens in the Winnipeg area on unflooded land on the fringes of the flooded area. The dates of seeding and harvesting of Thatcher wheat refer to plots at Headingly, some 20 miles northwest of where these records are usually taken.

At Saskatoon the early-season plants came into flower 10 days to two weeks late. At mid-season, the plants bloomed nearer the normal date but abundant rains and cool, cloudy weather caused the late-season plants to lag in flowering. Wheat sown 13 days after the average for early seeding was harvested 16 days later than average.

At Edmonton the season never lagged as much as at Saskatoon. It was, however, distinctly late in May. As the season progressed it caught up so that several species bloomed at or before the normal time. Wheat, sown 4 days late, was harvested 6 days earlier than normal (R.C. Russell).

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

Populas tremuloides	27/4	10L	Anemone canadensis	6/6	1L
Acer negundo	10/5	10L	Bromus inermis	16/6	3E
Prunus pensylvanica	23/5	8L	Phleum pratense	26/6	1L
Smilacina stellata	23/5	3L	Solidago canadensis	9/8	8L

Anthesis dates for marker plants at Ottawa, with the number of days departure from the average date of flowering, were as follows:

Acer saccharinum	18/4	6L	Carya cordiformis	11/6	2E
Ulmus americana	4/5	8L	Tilia americana*		
Acer saccharum	16/5	7L	Polygonum cuspidatum	30/8	3E
Pinus sylvestris	1/6	3L	Hamamelis virginiana	20/9	7E

*The marker plant did not flower in 1950.

At Ottawa the 1950 season opened on 18 April, with the flowering of Acer saccharinum. This date of anthesis was six days behind the average. The progress of the season continued from 6 to 8 days late until mid-May when it accelerated somewhat and as a result it was approaching average by early June. The season then continued approximately average for the remainder of June and throughout July (W.H. Minshall).

SUMMARY OF PHENOLOGICAL DATA TAKEN AT WINNIPEG, SASKATOON, AND EDMONTON, IN 1950

	Winnipeg		Saskatoon		Edmonton	
Pulsatilla ludoviciana	--	--	30/4	12 L	--	--
Populus tremuloides	10/5	14 L	6/5	12 L	1/5	7 L
Phlox hoodii	--	--	10/5	14 L	--	--
Salix petiolaris	--	--	16/5	11 L	--	--
Acer negundo	22/5	15 L	16/5	9 L	7/5	5 L
Betula papyrifera	--	--	20/5	10 L	16/5	7 L
Thermopsis rhombifolia	--	--	24/5	13 L	--	--
Prunus americana	27/5	13 L	--	--	--	--
Amelanchier alnifolia	30/5	18 L	24/5	10 L	24/5	8 L
Hierochloe odorata	--	--	27/5	9 L	--	--
Prunus pensylvanica	--	--	27/5	7 L	27/5	9 L
Viola rugulosa	--	--	24/5	3 L	29/5	8 L
Smilacina stellata	--	--	2/6	8 L	6/6	10 L
Prunus sp. (Chokecherry)	9/6	12 L	6/6	9 L	7/6	11 L
Crataegus sp. (Hawthorn)	7/6	11 L	4/6	7 L	3/6	3 L
Viburnum lentago	15/6	11 L	--	--	--	--
Cornus stolonifera	11/6	13 L	5/6	6 L	7/6	6 L
Elaeagnus commutata	--	--	11/6	7 L	10/6	6 L
Lonicera glaucescens	--	--	12/6	5 L	10/6	2 L
Viburnum pubescens	19/6	8 L	--	--	--	--
Achillea lanulosa	--	--	12/6	2 L	29/6	3 L
Anemone canadensis	--	--	16/6	6 L	28/6	3 L
Diholcos bisulcatus	--	--	13/6	3 L	--	--
Galium boreale	--	--	24/6	11 L	19/6	?
Rosa sp. (Prairie Rose)	--	--	4/7	15 L	--	--
Gaillardia aristata	--	--	8/7	14 L	--	--
Campanula petiolata	--	--	8/7	14 L	--	--
Bromus inermis	--	--	4/7	10 L	30/6	2 L
Chrysopsis hirsutissima	--	--	8/7	8 L	--	--
Symphoricarpos occidentalis	--	--	10/7	6 L	3/7	1 E
Psoralidium argophyllum	--	--	15/7	4 L	--	--
Phleum pratense	--	--	--	--	9/7	2 L
Lactuca pulchella	--	--	8/7	1 E	12/7	1 E
Chamaenerion spicatum	--	--	8/7	?	10/7	N
Agastache anethiodora	--	--	--	--	9/7	2 E
Cirsium sp. (Bull Thistle)	--	--	12/7	3 E	--	--
Solidago canadensis	--	--	--	--	18/7	N
Grindelia perennis	--	--	25/7	1 L	--	--
Oligoneuron canescens	--	--	7/8	12 L	--	--
Aster sp. (white)	--	--	6/8	8 L	--	--
Aster laevis (purple)	--	--	9/8	9 L	30/7	N
Wheat - sown	2/6	35 L	10/5	13 L	3/5	4 L
emerged	--	--	25/5	11 L	11/5	1 L
headed	--	--	7/7	4 L	24/6	7 E
harvested	29/8	23 L	28/8	16 L	8/8	6 E

I. DISEASES OF CEREAL CROPS

WHEAT

BLACK MOULD (Cladosporium herbarum and Alternaria tenuis).

Affected plants were received from 4 widely scattered places in Sask. (T.C. Vanterpool).

ERGOT (Claviceps purpurea) infection 1-tr. 1-sl./484 fields of spring wheat examined in Alta. (T.R.D.). Ergot infection was usually only tr. in the 14 fields found infected and mostly located in n. and n.e. Sask. Heaviest infections were 10-20% of heads at one end of a field adjacent to brome grass at Kenistino and 5 heads per 15 feet of row at edge of field at Prince Albert (H.W. Mead, T.C. Vanterpool). Ergot was more prevalent than usual in Man.; it was found on wheat, oats, barley, and rye as well as Agropyron spp., brome grass, and timothy (A.M. Brown).

POWDERY MILDEW (Erysiphe graminis) infection was 11-tr. 2-sl. 3-mod./29 fields of winter wheat in s. Alta. (M.N. Grant) and 86-tr. 44-sl. 8-mod./484 fields of spring wheat in Alta. (T.R.D.). Infection was also tr.-sev. on both hard red spring and soft white spring varieties grown under irrigation at the Lethbridge Station (M.N. Grant). A trace was found on winter wheat at Arkell, Ont., on 2 May. A mod. infection was already present in the plots, O.A.C., Guelph on 4 May and the disease was general in the plots by 30 May (J.D. Gilpatrick). Infection was mod. on the lower leaves and culms in a block of Rideau winter wheat at the Central Experimental Farm, Ottawa, on 6 July (V.R. Wallen). Powdery mildew was present on some Ottawa lines at St. Charles de Caplan, Que. (D. Leblond). It was also heavy in the rust nurseries (q.v.) at Kentville and Nappan, N.S.

HEAD BLIGHT (Fusarium spp. and Helminthosporium sativum). Isolations were made from 6 collections of head blight; only odd heads were affected. The organisms isolated from each variety and place were as follows: Man.-Gretna, Redman, F. avenaceum; Morden, durum, and St. Claude, Regent, H. sativum; Solsgirth, Lee, F. culmorum. Ont.- Guelph, Redman, F. avenaceum. N.S.- Kentville, Marquis, F. culmorum (W.L. Gordon). Head blight was severe in an acre plot at Lachevrotiere, Que. (D. Leblond).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Infection 5-tr. 17-sl. 5-mod. 1-sev./34 fields of winter wheat and 226-tr. 195 sl. 53-mod. 2-sev./484 fields of spring wheat examined in Alta. Root rot was slightly more severe in central and n. Alta. than in s. Alta. (T.R.D.).

Data taken from the survey records on common root rot indicate that the level of infection was somewhat lower in wheat in Sask. in 1950 than in the previous year. The mean disease rating for 293 fields of wheat was 11.19. The standard deviation, 6.29, indicates a high degree of variability in the ratings

from individual fields. The coefficients of variability were particularly high in crop districts 2, 7, 5, and 9 and relatively low in districts 8 and 3. The disease ratings for crops districts 1 to 9 were respectively 8.9, 10.6, 17.9, 14.3, 7.6, 10.9, 11.2, 10.6, and 10.0. First estimates of yields in bu. per acre for these districts were respectively 22, 17, 15, 5, 21, 13, 15, 25, and 19. Except for crop district 3, yield shows a good negative correlation with disease ratings (B.J. Sallans).

White heads (less than 1% of the total) were found scattered through a field of Redman at Rosenfeld, Man. The basal parts of the affected plants were severely diseased. Isolation yielded Fusarium graminearum, an organism not previously isolated from cereals affected by root rot in Man. (W.L. Gordon).

A trace of common root rot was present in a block of Rideau winter wheat at the C.E.F., Ottawa, Ont. (V.R. Wallen).

TAKE ALL (Ophiobolus graminis). Infection was 4-tr. 1-sl./34 fields of winter wheat and 38-tr. 10-sl. 3-mod./484 fields of spring wheat examined in Alta. Almost all the diseased fields of spring wheat were found in central and n. Alta. (T.R.D.). Traces of take all were observed in 8 fields out of 293 examined in Sask.; five fields were in e.-central and n.e. Sask., where take all has been known for some time, two in the Battleford area (n.w.) and one at Netherhill (w.-central) (H.W.M.). A mod. infection was observed in 2 fields in e.-central Sask. on 14 Aug., but 4 affected fields were located in the Prince Albert area (n.-central) on 21 Aug., infection being tr.-mod. One field, sl.-mod. infected, near Spruce Home, carried a similarly affected crop in 1949 (T.C. Vanterpool).

BASAL GLUME ROT (Pseudomonas atrofaciens). One case of basal glume rot and one of bacterial black point were seen in Sask. (T.C. Vanterpool).

STRIPE RUST (Puccinia glumarum). A sl. infection was found on winter wheat varieties at Creston, B.C., and a trace on winter wheat near Cardston, Alta. (M.N. Grant).

STEM RUST (Puccinia graminis). For a general account of the rust situation in the Prairies the reader is referred to the special report "Rust Nurseries in Canada in 1950", near the end of this Section.

Stem rust infection was 2-tr. 3-sl./29 fields of winter wheat in s. Alta. Stem rust was first found south of Lethbridge on Karkov on 14 July and in the Brooks area on Elgin on 8 Aug. It was almost impossible to find stem rust on spring wheat in s. Alta., although the artificial inoculation of hybrids grown on irrigated land resulted in mod.-sev. infection. A trace was found near Lethbridge on Lemhi soft spring wheat (M.N. Grant). No stem rust was observed in central and n. Alta. (T.R.D.). Infection was 21-tr. 1-sl. 3-mod./286 fields mostly on durum wheat in s.-central Sask., but a few of the infected fields were Thatcher (H.W.M.).

A light infection of stem rust was observed in a few plots of wheat at O.A.C., Guelph, Ont. (J.D. Gilpatrick). Although stem rust was late in developing, a heavy infection was recorded in some plots of Huron at the Station, Ste. Anne de la Pocatiere, Que. In an experiment to determine the value of dusting wheat with sulphur for the control of rust, no rust was observed in the dusted plots of Huron and Cascade whereas the undusted plots of Huron carried 10% of stem rust and 60% leaf rust and those of Cascade 30% of leaf rust. Significant differences in yield were recorded in favour of dusting with sulphur (A. Payette, F. Gauthier). Only a trace of stem rust was found in one field in Carleton Co., N.B.; 5 counties were surveyed (J.L. Howatt).

LEAF RUST (Puccinia triticina). Infection was 5-tr. 5-sl. 1-mod./29 fields of winter wheat in s. Alta. (M.N. Grant) and 84-tr. 14-sl. 12-mod./484 fields of spring wheat in Alta. (T.R.D.). Leaf rust was first observed on winter wheat south of Lethbridge on 14 July. Traces were general on winter wheat by 24 July when leaf rust was first observed on spring wheat in the same area. By 9 Aug. trace amounts were found in the Brooks area (M.N. Grant). In central and n. Alta. leaf rust was found only in scattered trace amounts (T.R.D.). Infection was 37-tr. 30-sl. 17-mod. 10-sev./286 fields in Sask. Rust was general in n., n.e., e., s.e. and s.-central Sask. and caused considerable damage to late crops (H.W.M.).

Leaf rust mod. infected Cornell 595 in the plots, O.A.C., Guelph, Ont., on 4 May and was general on all winter wheat varieties on 30 May (J.D. Gilpatrick). In a Foundation block of Thatcher at the C.E.F., Ottawa, infection varied from trace to 60% on 31 July (V.R. Wallen). The percentages of leaf rust recorded on the named varieties in the plots at Ste. Anne de la Pocatiere were as follows: Huron 45, Coronation II and Redman 40, Cascade 25 in the main trial; and Cascade and Regent 10, and Lee a trace in the observation plots (A. Payette). See also Rust Nurseries.

BROWNING ROOT ROT (Pythium spp.) was one of the major root-rot diseases in the 1920's and the 1930's, surpassing take all and equalling common root rot in economic importance in most years. Pathologists and farmers alike agree that the disease has been of little or no economic importance in recent years in districts where formerly it caused much concern. This year, browning root rot was reported in 5 fields only in Sask., in which the infection was sl.-mod. Over a score of fields were suspected of having the disease from the brown colour of the lower leaves but showed no root-tip lesioning, so characteristic of browning. What are the reasons for this phenomenal decrease? In early work on the disease, Vanterpool and his coworkers (Can. J. Research C, 13:220-250. 1935; ibid.18:240-257. 1940; and Sci. Agric. 20:735-749. 1940) showed that it could be reduced or prevented by the application of straw, farmyard manure, or phosphatic fertilizers to the soil, and that, of the common wheat varieties, Thatcher showed the most resistance. The evidence available indicates that most factors have operated in recent years in reducing the disease to minor importance. The replacement

of the binder and thresher by the combine has resulted in considerably more straw being returned to the land than formerly when much of it formed straw-piles and was burned or otherwise used. The number of combines in Sask. has increased from 6,000 in 1931 to 42,000 in 1950, a seven-fold increase. The increased use of phosphate fertilizer has been even greater. Whereas the chief fertilizer agency in Sask. sold 700 tons of phosphatic fertilizers in 1932-33, 30,000 tons were sold in 1949-50, a forty-fold increase. Again, Thatcher is now the most commonly grown wheat variety in Sask. These changes appear to be the chief factors in the decrease of browning root rot although the increased use of farm machinery and the employment of certain soil-erosion preventive methods have contributed in certain areas (T.C. Vanterpool).

SPECKLED LEAF BLOTCH (Septoria avenae f. sp. triticea). Infection was 3-tr. 11-sl./34 fields of winter wheat and 196-tr. 112-sl. 6-mod./484 fields of spring wheat examined in Alta. (T.R.D.). See also under Rust Nurseries.

GLUME BLOTCH (Septoria nodorum). Infection was 30-tr. 7-sl. 2-mod. 3-sev./267 fields of spring wheat examined in central and n. Alta. (T.R.D.). The disease was prevalent around Sibbald on Marquis and especially on Thatcher (A.W. Henry). Glume blotch was common on darkened heads of wheat and on leaves (? S. avenae var. triticea). Leaf mortality and shrivelling of grain was severe in many areas (H.W.M.). Affected material was received from Muenster, Nipawin, and Prince Albert (T.C. Vanterpool). Tr.-sev. infections were noted in some fields in York Co., N.B. (J.L. Howatt). A trace was found in a field of late wheat in Queens Co., P.E.I. (R.R. Hurst).

SPECKLED LEAF BLOTCH (Septoria tritici). A trace was observed in 2 fields and in the plots at O.A.C., Guelph, Ont. (J.D. Gilpatrick). See also under Rust Nurseries.

BUNT (Tilletia caries and T. foetida). Data on the prevalence of bunt in Western Canada (Table 1) were obtained from the records of the Board of Grain Commissioners. The percentage of cars graded smutty during the first quarter of the present crop year indicates that the prevalence of bunt has increased slightly in the past two years.

Table 1. Wheat Bunt in Western Canada

Class of Wheat	Aug. 1,1949 to July 31, 1950			Aug. 1 to Oct. 31, 1950		
	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty
Hard Red Spring	167,959	286	0.17	37,224	75	0.20
Amber Durum	6,513	54	0.83	2,688	5	0.19
White Spring	667	1	0.15	103	0	0.00
Alberta Red Winter	1,113	50	4.49	350	26	7.43
Garnet	3,072	0	0.00	532	0	0.00
Mixed Wheat	231	2	0.87	63	1	1.59
All Classes	179,555	393	0.22	40,960	107	0.26

Wheat bunt, both common and dwarf, was more prevalent in the North Okanagan area, B.C., than previous years. The winter wheat variety Wasatch has proved resistant for the three years that it has been under trial in the area and is now recommended and licensed for sale (W.R. Foster). Infection was 3-tr. 1-sl./29 fields of winter wheat and 2-tr. 3-mod. 2-sev./212 fields of spring wheat examined in s. Alta. No dwarf bunt was found (M.N. Grant). No bunt was observed in n. and central Alta. (T.R.D.). Bunt was observed in 10 fields out of 286 examined in Sask.; infection was a trace (less than 1%) in 6, sl. (1-4%) in 3 and mod. (5-10%) in one (H.W.M.). A survey of 28 fields in Man. revealed 4% bunt in 2 fields of Thatcher and a trace in one of durum (W.J. Cherewick, W. Popp).

TYPHULA BLIGHT (Typhula sp.) was again severe in Vanderhoof area, B.C. (P.D.S. 29:6) (W.R. Foster).

LOOSE SMUT (Ustilago tritici). Infection was 1-tr. 1-sl./29 fields of winter wheat in s. Alta. (P.M. Halisky) and 7-tr. 1-sl/484 fields of spring wheat in all parts of Alta. (T.R.D.). Out of 286 fields examined in Sask. 2 fields, both of durum wheat, showed a trace and 1% of heads infected (H.W.M.). Out of 28 fields examined in Man. 5 fields showed a trace to 1.5% loose smut (W.J. Cherewick, W. Popp).

BACTERIAL BLACK CHAFF (Xanthomonas translucens). As black chaff, the infection was 10-tr. 1-mod. and as a bacterial leaf blight it was 1-tr. 3-sl. 4-mod./212 fields of spring wheat in s. Alta. The leaf blight infections were found principally in the irrigated area near Brooks (M.N. Grant). The disease was found causing water-soaked lesions on the peduncles of Lee at Brandon, Man.; the organism was isolated and proved pathogenic to seedlings (W.A.F. Hagborg).

BLEACHED HEADS (non-parasitic), characterized by a blighting and bleaching of the heads and of the top third of the plant, began to be observed about the first week of August following high temperatures and hot winds, which prevailed 24-28 July. It was particularly noticeable about Ogema, Milestone, and Mossbank in the south, and Nokomis and Davidson in the central part of Sask. It was severe on durum wheat but relatively slight or absent on bread wheat. M.W. White, Agricultural Representative at Ogema, reported that several hundred acres of durum were affected in his district, in some fields nearly every plant being injured. He observed that some fields sown earlier or later than the damaged ones appeared to be unaffected. Although durum wheats are generally recognized to be more drought resistant than bread wheats, available evidence indicates that there are certain "critical periods" in the growth of the durum plants during which they are more susceptible to atmospheric drought or windburn than bread wheats (O.S. Aamodt and W.H. Johnston. Can. J. Research C, 14:122-152. 1936). The critical periods are the "shooting" and "soft dough" stages. It would appear that those fields showing severe blighting were in the soft dough stage when they were subjected to hot winds in late July, whereas those which largely escaped were in an earlier or later stage of development. Probably another contributing factor was the fact that the plants had not been gradually hardened to the extreme conditions. Of course, any trouble that interferes with efficient water absorption from the soil, such as root rot, will also render the plants more liable to blighting. Although root rot was present, the majority of the injured durum plants were free from disease. The primary cause of the trouble should therefore be attributed to high temperatures and windburn at the critical, early-ripening stage (T.C. Vanterpool).

Several specimens of Pelissier durum wheat were received from the Aneroid-Assiniboia area, Sask. The heads and peduncles had been killed in the flowering stage. The rest of the stem and leaves were normal in growth and colour. The injury is believed to have been caused by unfavourable moisture conditions during a period of hot dry weather at the peak of the plants' water requirements (H.W.M.).

DEEP SEEDING INJURY. Deep seeding combined with a cold spring caused distortion and poor emergence of the seedlings in several fields in Sask. In some instances the surface was difficult to penetrate on account of a crust (T.C. Vanterpool).

FROST. Severe frosts caused widespread damage to cereals in many parts of the Prairie Provinces. As a result, only 50% of the wheat crop is grading No. 1, 2, and 3 Northern instead of 85% of the wheat being in these grades as in a normal year (cf. The Wheat Review. Dom. Bur. Statistics Dec. 1950, p.6). The growing season began with a late cool spring, which delayed seeding. Growth remained slow throughout the summer, the crop being 2 or more weeks late at heading time. In fact the weather was so cool towards the end of the season that the crops failed to colour up normally before the destructive frosts of 16 and 18 August. Seed is of very poor quality, germination being very low particularly in coarse grains (I.L.C.).

HEAD DISCOLORATION or MELANISM (physiological) was prevalent especially in Rescue wheat and mostly in s. Sask. (H.W. Mead, T.C. Vanterpool). Head discolorations, apparently largely physiological in origin, but with the lesions invaded by saprophytes or weak parasites, were widely distributed in s. Man. At Portage la Prairie, severe head discolorations were present on several new varieties in the co-operative test of common wheat varieties. Most severely affected was C.T.713, for which the 5-plot mean rating was 38% compared to 16% for Redman (W.A.F. Hagborg).

HEAT BANDING (high soil surface temperatures). About 50% of the plants were found dying in a low-lying section of a field at Prince Albert on 20 June by Mr. MacKay, Agricultural Representative, and spotting was evident throughout the field. Several cereal crops were found similarly affected at Nipawin by J.B. Durant, Agricultural Representative. A few reports with specimens showing heat damage were also received (T.C. Vanterpool). A specimen was received from Kerrobert. These symptoms developed after a short hot period about 12-13 June. (H.W.M.).

2,4-D INJURY. Cases of head distortion, breaking of peduncles, breaking of culms near base, swelling of the basal node with abnormal development of adventious roots were found or reported from a few places in Sask. These abnormalities appeared to have been caused by 2,4-D. In some cases it was complicated by mechanical injury from tractor wheels or by other causes (T.C. Vanterpool).

OATS

ERGOT (Claviceps purpurea). Trace in a field in Queens Co., P.E.I. (R.R. Hurst).

ANTHRACNOSE (Colletotrichum graminicola). Severely infected plants were received from Nut Mountain, Sask. In 1949 oats yielded 105 bu. per acre in the same field. This year the plants started well but soon deteriorated. A second sample was received from White Fox (H.W.M.). A slight infection was observed on the lower leaves at Weirdale and trace at Star City. In light leaf infections, anthracnose lesions may be confused with aphid injury (T.C. Vanterpool).

POWDERY MILDEW (Erysiphe graminis). A trace was found in one field in s. Alta. (M.N. Grant) and one in central Alta. (A.W. Henry). Trace in a field at Cap St. Ignace, Montmagny Co., Que. (D. Leblond); 5-10% infection at Notre Dame du Lac, Temiscouata Co. (A. Payette). See also Rust Nurseries.

COMMON ROOT ROT (Fusarium spp.). Infection was 45-tr. 15-sl. 2-mod./212 fields in Alta. (T.R.D.). Infection was 2-sl. 9-mod. 3-sev./16 fields examined for root rot in Sask. (H.W.M.).

LEAF BLOTCH (Helminthosporium avenae). Infection was 52-tr. 8-sl. 1-mod./212 fields in Alta., being much more prevalent in s. Alta. than elsewhere (T.R.D.). Infection tr.-mod. in the co-operative oat test plots on irrigated land at Lethbridge (M.N. Grant). Traces in many of the trial plots of the Quebec Seed Board and mod. infection at St. Flavien (D. Leblond); sl. infection in a field at Notre Dame du Lac. (A. Payette). Heavy infection in a field at Woodville, N.S. (C.L. Lockhart). Trace infections were observed in 3 fields around St. John's, Nfld. (G.C. Morgan).

HELMINTHOSPORIUM BLIGHT (H. victoriae). A few plants prematurely blighted were found in the test plot of Garry at Lethbridge, Alta. Over half the isolations from tissue plantings after surface disinfection yielded H. victoriae. This report is believed to be the first of Helminthosporium blight in Alta. (M.N. Grant). The presence of H. victoriae was observed in 13 out of 125 growers' seed samples from the lower St. Lawrence when the seed was given the plate test at Ottawa (D. Leblond).

HALO BLIGHT (Pseudomonas coronafaciens). Trace was seen in one field at Balcarres, Sask., and affected specimens were received from Swift Current (H.W.M.). A slight infection was present on specimens from Archerwill (T.C. Vanterpool). A trace infection was found in a field at Headingly (T. Johnson). Trace infection on volunteer plants in a turnip field in Queens Co., P.E.I. (R.R. Hurst).

CROWN RUST (Puccinia coronata). Infection 13-tr. 2-sl. 1-mod./56 fields mostly in s.-central and s.e. Sask.; this infection was the heaviest for several years (H.W.M.). Infection in the Q.S.B. plots was mod. at Lachevrotière, Que., sl. at Ste. Anne de la Pocatière, tr. at St. Flavien, East Broughton, Frampton, St. Prosper and about Lake St. John and absent below Ste. Anne and in the Gaspé (D. Leblond). Infection varied from 0 to 50% in plots at Ste. Anne (A. Payette). No rust was observed during a survey covering 6 counties in N.B. (J.L. Howatt).

Crown rust appeared very late in the season in trace amounts in N.S.; most fields were entirely free of rust (J.F. Hockey). A 10% infection was recorded on Laurel oats at Charlottetown, P.E.I. (R.B. MacLaren). See also Rust Nurseries.

STEM RUST (Puccinia graminis) was common on Victory oats in the Comox valley, B.C., on 30 Aug.; it caused little damage (W. Jones). A heavy infection developed late in the season at the Ladner Substation (H.N.W. Toms). A light infection was noted on the variety Overland at Creston (P.M. Halisky). Infection was 10-tr. 6-sl. 7-mod. 1-sev./56 fields examined in Sask., nearly all being in the s.-central and s.e. (H.W.M.). A trace was noted in the Q.S.B. plots at Batiscan, Que. (D. Leblond). A 5% infection was noted on Laurel oats at Charlottetown, P.E.I. (R.B. MacLaren). See also Rust Nurseries.

BROWN STRIPE (Scolecotrichum graminis) was severe on a variety from Eastern Canada grown at the station, Lacombe, Alta. (L.E. Tyner).

SPECKLED LEAF BLOTCH (Septoria avenae). Infection was 4-tr. 1-sl./160 fields examined in central and n. Alta. (T.R.D.). The disease was present in Q.S.B. plots at most places in Que. being sev. at St. Charles de Caplan (Gaspe) and mod. in the Lake St. John area (D. Leblond). Speckled leaf blotch was present in the plots at Ste. Anne de la Pocatiere, infection varying from a trace to 40% depending on the variety (A. Payette). Infection was tr.-mod. in some fields in York Co., N.B. (J.L. Howatt).

SMUTS (Loose Smut, Ustilago avenae and Covered Smut, U. kolleri). Smut infection was 17-tr. 12-sl. 2-mod. 3-sev./212 fields examined in Alta. (T.R.D.). Covered smut was found in 33/56 fields examined in Sask.; infection was 21-tr. (less than 1%), 11-sl. (1-4%) and one with 18% of the heads smutted. Loose smut was found also in one field (H.W.M.). Covered smut infections ranged tr.-15% in 3 fields that were found affected 14-15 Aug. (T.C. Vanterpool).

The seedling-infecting smuts of coarse grains were rather scarce this year in the n. part of Man., but they were very prevalent throughout the s. part. This distribution was the reverse of their usual occurrence. Out of 113 fields inspected 35 were free of infection while the other 78 contained a trace to 29% smut, average infection for all fields inspected being 1.7% (W.J. Cherewick, W. Popp).

Covered smut was common in Que. Infection was 1-15% in 73 out of 125 fields examined; in one field at St. Martin de Beauce 25% of the heads were affected. Loose smut was rather rare (D. Leblond). In a field at Notre Dame de Lac, Temiscouata Co., 50% of heads were affected, about half being loose and half covered smut (A. Payette). Smut infection was tr.-12% in fields in York, Carleton, Victoria, Sunbury and Albert Counties, N.B. (J.L. Howatt). Most oat fields showed no smut, but infections up to 17% were seen in Kings and Annapolis Counties, N.S. (J.F. Hockey). No systematic survey was made in P.E.I., but 25% of covered smut was observed in a field

of hullness oats and 5% of loose smut in one of ordinary oats in Queens Co. (D. Robinson, L.C. Callbeck). Out of 40 fields visited in Nfld., infection was sl.-mod. in 5; 4 were in the Avalon peninsula and one in the Burin peninsula. The other 35 fields were practically free of smut. (G.C. Morgan).

BLAST (non-parasitic) was 48-tr. 136-sl. 9-mod. 2-sev./212 fields in Alta.; there was some damage in central and n. Alta. (T.R.D.). Blast was rated 5-tr. 3-sl. 2-mod. 1-sev./56 fields in Sask. The trouble was less prevalent than usual on account of the favourable growing season (H.W.M.). Blast was quite marked, particularly in late-maturing fields everywhere in Que. (D. Leblond).

CHLOROTIC BANDING. On account of high temperature at the soil surface, 60% of the plants were affected in a 2-acre field at Cloverdale, B.C.; the damage was slight as most of the plants recovered in the next 10 days. (cf. T.C. Vanterpool, Sci. Agric. 29(7):334-339. 1949) (I.C. MacSwan). Seedlings showing chlorotic banding and flagging of the terminal parts of the plant at the juncture of the leaves with the stem were received from 3 farmers at Hepburn, Sask., and one at Wolverine. Bright sunshine during a period of high air temperatures (83.5°-89°F.) 10-14 June resulted in high soil temperatures (T.C. Vanterpool). Two cases of chlorotic banding were received, one from Chelan, and one from Maidstone. In the latter case, the seed had been planted very deep ($3\frac{1}{2}$-6 in.) and the seedlings were probably more susceptible to high soil surface temperatures than those from seed planted at the normal depth (H.W.M.). Some leaf banding was observed in 4 acres of oats at upper Falmouth, N.S.; the plants made a satisfactory recovery (J.F. Hockey).

GREY SPECK (manganese deficiency). What appeared to be grey speck caused severe damage in 3 fields west of Sparling, Sask. When oats was grown in soil from these fields, the crop proved very susceptible to root rot caused by Fusarium culmorum, but whether high pH, manganese deficiency, or both, were responsible has not been determined (T.C. Vanterpool). A trace of grey speck was seen in volunteer oats in a turnip field in Queens Co., P.E.I. (R.R. Hurst).

RED LEAF (cause undetermined). A leaf discoloration in cereals, particularly oats, was very pronounced in the summer of 1950. It appeared to be widespread in e. Ont., throughout Que. and in the plots in the Maritime Provinces, particularly at Nappan. (cf. H.H. McKinney. U.S.D.A. Pl. Dis. Reporter 34(5):151-154. 1950) (D.G. Hamilton). Two samples of oat leaves, one showing marked development of pigment and another of normal-appearing leaves, were collected 31 July by D.G. Hamilton and I.L. Conners from plot 50 (oat line 3003-C15) (Chemistry Lab. no. 16961K). The following are the results of an analysis expressed on a dry weight basis:-

	Affected Material	Healthy Material
Nitrogen %	1.92	3.12
Phosphorus %	0.141	0.221
Potassium %	1.77	2.70
Magnesium %	0.115	0.138
Calcium %	0.70	0.47
Manganese p.p.m.	5.8	7.5
Iron p.p.m.	100	100
Zinc p.p.m.	21	17

(F.B. Johnston).

Red leaf was province-wide in N.B., affecting up to 50% of the plants in some fields (J.L. Howatt). Red leaf affected up to 50% of the plants in fields throughout P.E.I.; the disorder was attributed to dry weather in the early part of the growing season by workers of the Winnipeg laboratory to whom specimens were submitted (D. Robinson).

BRANCHING of INFLORESCENCE (2,4-D injury) was noted in a field at Moosomin, Sask.; instead of a single panicle being formed, the inflorescence was borne on 2-4 branches each bearing a small panicle (T.C. Vanterpool).

BARLEY

ERGOT (Claviceps purpurea). Infection was 9-tr./310 fields examined in Alta. (T.R.D.). A fairly general light infection was present in the Tisdale area, Sask., where the acreage of barley is large (H.W.M.). Ergot usually in trace amounts developed late in the season. However one field of Montcalm, foundation seed at Tisdale, became heavily infected; attempts to remove the ergotty heads as they appeared failed and the seed was sold finally as ordinary grain. Source of inoculum was infected grass about 50 yd. distant (T.C. Vanterpool).

POWDERY MILDEW (Erysiphe graminis). Infection was 1-tr. 1-sl./124 fields examined in central and n. Alta. (T.R.D.). Infection was mod. in the Q.S.B. plots at St. Urbain, Ste. Anne de la Pocatière, Notre Dame du Lac, Luceville, and St. Charles de Caplan, Que. (D. Leblond). Only a few varieties, notably O.A.C. 21, were sl.-mod. infected in the plots at Ste. Anne de la Pocatière, Que. Infection was also sl.-mod. in fields along the lower St. Lawrence (A. Payette). Infection was sl. on varieties examined at the Station, Charlottetown, P.E.I. (D.B. Robinson). See also Rust Nurseries.

STRIPE (Helminthosporium gramineum). Infection was 22-tr. 10-sl. 1-mod./310 fields examined in Alta. (T.R.D.).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Infection was 46-tr. 19-sl. 2-mod./310 fields examined in Alta. (T.R.D.). In one field examined in the grey soil area 50% of the plants were slightly affected (A.W. Henry). Infection was 4-sl. 31-mod. 9-sev./44 fields examined in Sask. (H.W.M.). In a field sown late with feed barley, cleaned but not treated, in poorly prepared land at Mont Carmel, Que. 50% of the seedlings were affected and 30% were destroyed (R.O. Lachance).

HEAD BLIGHT or DISCOLORATION (Helminthosporium sativum and Fusarium spp.). Odd heads found infected at two places in Man. were collected and isolations made. H. sativum and F. poae were isolated from Montcalm at Clandeboye and Titan at Brandon, and H. sativum only from Dorset at Brandon (W.L. Gordon). Head blight infection was tr.-mod. in 40/129 fields in Alta. Isolations were not made (A.W. Henry). Barley began to show severe discoloration of the head and grain in central, n. central and n.e. Sask. before any frost damage occurred. When the seed was planted H. sativum was the principal fungus isolated and H. teres second (T.C. Vanterpool). Head blight was quite prevalent in the Q.S.B. plots at St. Charles de Caplan, Que., with traces at most other stations (D. Leblond).

SPOT BLOTCH (Helminthosporium sativum). Infection was 30-tr. 10-sl. 2-mod./57 fields examined in s. Alta. (M.N. Grant). Uncommon in central and n. Alta., although a trace was observed in a few fields (A.W. Henry). A trace was recorded in a few fields in n. and w. Sask. (H.W.M.). Infection was heavy in a field at Westbourne, Man., with the 5 bottom leaves dead. A mod. general infection was present in a field at St. Francois-Xavier (G.J. Green). A trace was present on Plush in the Upton plots, Queens Co., P.E.I. (J.E. Campbell).

NET BLOTCH (Helminthosporium teres). Infection was 68-tr. 31-sl. 15-mod. 2-sev./310 fields examined in Alta. Out of 57 fields inspected in s. Alta. only 3 were infected. Infection was tr.-mod. in the plots at Lacombe (T.R.D.). Net blotch was commonly found in central Alta., although not so prevalent as scald; infection varied greatly (A.W. Henry). Net blotch was common in most areas of Sask., especially around Meadow Lake, White Fox, and Tisdale; it caused severe leaf mortality and lesioning of the spikelets. The disease was more common than usual in the University plots especially on barley hybrids (T.C. Vanterpool). A severe general infection was recorded at Letellier, Man. (W.L. Gordon). Leaf spotting, probably mostly net blotch, was slight in the Q.S.B. plots in Lake St. John area with traces at several other places in Que. (D. Leblond).

TAKE ALL (Ophiobolus graminis). Mod. infection in one field in the grey soil area in Alta. (A.W. Henry).

STEM RUST (Puccinia graminis). A field of Titan at Creston, B.C., was sev. infected (M.N. Grant). Infection was very light in 2 fields at Francis in s.e. Sask. (H.W.M.). Only a trace was found in the late-sown varieties in the plots at Ste. Anne de la Pocatière, Que. (A. Payette) and in the Q.S.B. plots in the Lake St. John area (D. Leblond). See also Rust Nurseries.

LEAF RUST (Puccinia hordei) was heavy on some varieties at the substation, Ladner, B.C. (H.N.W. Toms). Infection was mod. on Charlottetown 80; it was not found on varieties commonly grown in Sask. Small amounts of leaf rust occurred on several varieties in the plots at Ste. Anne de la Pocatière, Que. (A. Payette). Infection was light in the Q.S.B. plots at St. Flavien and traces at few other places in Que. (D. Leblond). Infection was a trace in the plots at the Station, Fredericton, N.B. (J.L. Howatt), and sl. on Charlottetown 80 and other varieties at Charlottetown, P.E.I. (R.B. MacLaren). See also Rust Nurseries.

SCALD (Rhyncosporium secalis). Infection was 68-tr. 81-sl. 13-mod. 13-sev./310 fields examined in Alta. Only one infected field was reported in s. Alta. Infection was sl.-sev. in the variety plots at Olds and Lacombe (T.R.D.). Scald was present in most of the 129 fields examined in central Alta.; infection was 0-sev. (A.W. Henry). Scald was common in n. and e. Sask., where a mixed infection of scald and net blotch occurred (H.W.M.). In the few fields observed infection was sl.-very sev. This year was favourable to scald in n.e. Sask. In the plots at the University, Saskatoon, Valentine appeared to be more resistant to scald and more susceptible to net blotch than the other varieties grown (T.C. Vanterpool).

SPECKLED LEAF BLOTCH (Septoria passerinii). Infection was 29-tr. 12-sl./251 fields examined in central and n. Alta. (T.R.D.). Out of 44 fields examined in Man. 8 and 11 Aug., 40 were infected, 15 heavily so. Although the disease was widely distributed throughout the province it was most prevalent and destructive in the n. and w. parts (G.J. Green). Infection was heavy in the Q.S.B. plots in the Lake St. John area, with traces at St. Ambroise and St. Urbain, Que. (D. Leblond). See also Rust Nurseries.

COVERED SMUT (Ustilago hordei). Infection was sl. in the U.B.C. plots at Ladner, B.C. (H.N.W. Toms). Infection was 15-tr. 11-sl. 3-mod. 1-sev./124 fields examined in central and n. Alta. (T.R.D.); and 8-tr. 5-sl. 3-mod. 2-sev./ 57 fields in s. Alta. Most of the latter fields were in the irrigated districts and were sown to Trebi (M.N. Grant). Out of 129 fields visited in central Alta., 27% were affected by covered smut (A.W. Henry). Infection was 15-tr. 6-sl. (1-4%)/47 fields in Sask. (H.W.M.). Only one field of the 100 examined in Man. was free of smut. The other 99 contained 0-35% covered and false loose smuts, average 1.7%, and trace-20% of loose smut, average 3.1% or a combined infection of 4.8% in all the fields of barley examined (W.J. Cherewick, W. Popp). A trace of covered smut was present in several varieties in the plots at Charlottetown, P.E.I. (R.V. Clark).

LOOSE SMUT (Ustilago nuda). Infection was sev. in a field of Sanalta at Salmon Arm, B.C. (G.E. Woolliams). Infection was 32-tr. 25-sl. 4-mod./181 fields examined in Alta. (T.R.D.). In a special survey of 129 fields in central Alta., 41% were infected with true loose smut (U. nuda); no false loose smut (U. nigra) was present (A.W. Henry). Loose smut was found in 17 out of 47 fields visited in Sask. Affected heads suitable for germination tests were obtained from only some fields, but what trials were possible showed that both U. nuda and U. nigra were present. Embryo tests of seed barley produced in 1950 in the experimental plots at Swift Current, Saskatoon, Melfort and Indian Head showed that conditions were relatively favourable for the spread of Ustilago nuda at flowering time. Therefore relatively heavy infections are expected to appear in next year's crop when untreated seed of local origin is sown (R.C. Russell). Loose smut infection was tr.-5% in fields of barley, chiefly Charlottetown 80, in P.E.I. (D. Robinson). In the plots at Charlottetown infection was 2.5% in Ottawa 3092A, 2% in Brandon 112 and Brandon 1136, with lesser amounts in 10 other varieties (R.B. MacLaren). A light infection was found in one field of O.A.C. 21 in the Avalon peninsula, Nfld. (G.C. Morgan).

BACTERIAL BLIGHT (Xanthomonas translucens). Infection was 3-tr. 2-sl./ 57 fields examined in s. Alta. A sev. infection occurred in 3 replications of 55 barley varieties watered by sprinkler irrigation at Lethbridge. Varietal disease ratings ranged from none to severe and were very consistent through the 3 replications (M.N. Grant). Infection was 6-tr./129 fields visited in central Alta. (A.W. Henry). Infection varied from 0 to 60% in variety plots at Ste. Anne de la Pocatière, Que. Some disease could be observed in fields in the district (A. Payette).

BARRENNESS OF HEAD (?frost). Barley heads with many of the lower spikelets blasted but sometimes with the lowermost normal and those immediately above affected were received from the Cariboo district, B.C. Injury probably occurred when the spikelets were still very immature; the stamens were nearly fully grown and the ovary still unfertilized. See Sorauer's Handbuch der Planzenkrankheiten: (Die nicht parasitären und Virus- Krankheiten) vol. 1, pt.1, ed. 6, p.543 (I.L. Conners).

CHLOROTIC BANDING (high soil surface temperature). Samples were received from Chelan, Sask., on 16 June, immediately after a spell of hot weather 12-13 June, which in turn came after continuous cool weather (H.W.M.).

FALSE STRIPE (non-parasitic) was rated 4-tr. 1-sl./57 fields examined in s. Alta. (M.N. Grant).

RYE

ERGOT (Claviceps purpurea). Infection was 3-tr. 3-sl./27 fields in Alta. (T.R.D.). Ergot was found in most fields inspected in Sask. infection being tr.-mod. The disease was sev. in the plots at Saskatoon and Swift Current (H.W. Mead). Five per cent of the heads were affected in a plot at Charlottetown, P.E.I. (J.E. Campbell).

ANTHRACNOSE (Colletotrichum graminicola). J.W. MacRae of the Ont. Department of Agriculture brought in on 14 Sept. a sample of rye seedlings from a 5-acre field at Mountain Station, Ont. The lower leaves were dead and anthracnose and leaf rust were heavy. The farmer stated the crop was a total loss (I.L. Conners).

POWDERY MILDEW (Erysiphe graminis). Infection was 2-tr. 1-sl./27 fields in Alta. (T.R.D.), and heavy in a plot at Charlottetown, P.E.I. (D. Robinson).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Infection was 10-tr. 8-sl. 4-mod. 2-sev./27 fields, being more severe in n. and central Alta. than in s. districts (T.R.D.). Of the 8 fields recorded in Sask. the disease rated as mod. in 4, and sev. in 4 (H.W.M.).

STEM RUST (Puccinia graminis). A trace was observed on Prolific at Lethbridge, Alta. (P.M. Halisky). See also Rust Nurseries.

LEAF RUST (Puccinia secalina). Infection was heavy in the moister part of a plot at U.B.C., Vancouver, B.C., on 2 Aug.; leaf rust was also present on fall rye there on 8 Nov. (H.N.W. Toms). Infection 1-tr./10 fields examined in s. Alta. (T.R.D.); heavy on the lower leaves of Horton's Winter Rye in the plots, O.A.C., Guelph, Ont. (J.D. Gilpatrick). Leaf rust was quite widespread and prevalent in N.S. (J.F. Hockey). See Rust Nurseries.

SPECKLED LEAF BLOTCH (Septoria secalis). Infection was 6-tr. 7-sl./27 fields examined in Alta. (T.R.D.).

STEM SMUT (Urocystis occulta). Infection was 2-sl./3 fields examined in southern Alta. (M.N. Grant).

RUST NURSERIES IN CANADA IN 1950

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

In Table 2 is shown the incidence of cereal rusts and of a number of other plant diseases on varieties of wheat, oats, barley, and rye grown at 33 places in Canada in 1950. Separate tables were prepared for the rusts and powdery mildew giving the disease intensity on each variety, but the complete report, mimeographed separately in November 1950, must be consulted for this information.

Twelve varieties of wheat, six of oats, five of barley and one of rye were grown. The varieties were: wheat - McMurachy, Lee, Carleton, Little Club, Marquis, Mindum, Thatcher, Yaroslav Emmer, Norka, Redman, Exchange, Frontana; oats - Bond, Trispernia, Ajax, Vanguard, Garry, Clinton; barley - Goldfoil, Peatland, Vantage, H. 106 (Wisconsin), Montcalm; and rye - Prolific.

Table 2. The incidence of certain pathogenic fungi on wheat, oats, barley, and rye grown at 34 localities in Canada in 1950.

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

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

The Cereal Rusts

Owing to a cool, wet spring the crop season in the Prairie Provinces was considerably retarded and the appearance of cereal rusts was correspondingly delayed. Leaf rust of wheat (Puccinia triticina) was not observed in Man. until 26 June. Stem rust (P. graminis) was first found on wheat on 24 July and on oats 27 July. In all three rusts, the initial outbreaks of pustules probably preceded these dates by a few days.

In the development of wheat stem rust, the feature of chief interest was the widespread occurrence of race 15B. This race is particularly adapted to durum wheats and caused severe rust on late-sown durums in southern Man., although in the rust nursery plots the durum varieties Carleton and Mindum escaped severe infection. Under field conditions, the varieties Carleton and Stewart, hitherto resistant to stem rust, were rusted as heavily as other commercial wheats. The rust resistant common wheats Thatcher, Regent, and Redman carried much lighter infection, and damage to these, if any, was slight. Stem-rust infection on wheat was either scarce or absent in western Sask. and Alta. Elsewhere in Canada the most severe stem-rust infection on wheat occurred in the nurseries at Mindemoya, Appleton, and Merrickville in Ont. It is uncertain, however, to what extent this infection represents the general situation in areas surrounding these stations. Stem rust was very scarce or absent on wheat in the nurseries in Alta. and B.C. and in the Maritime Provinces.

Leaf rust of wheat developed rather slowly, but late in the season the infection became very heavy on common wheats in Man. and eastern Sask. In western Sask. and in Alta. infection was mostly light or trace.

In most nurseries leaf rust infection was moderate or severe on wheat. The chief exceptions were in western Sask. and in Alta., where leaf rust was scarce or absent and in the Maritimes where the infection was generally light. A few comments may be made on the leaf rust reaction of some of the wheats. Exchange and Frontenac showed virtual immunity or a high degree of resistance at all stations. Although in Lee the majority of the plants were immune or highly resistant at all stations, about one-quarter of the plants showed considerable susceptibility particularly at stations in Eastern Canada and B.C. The durums Carleton and Mindum were highly resistant in the Prairie Provinces but showed only moderate resistance in several eastern nurseries and at Creston, B.C. Yaroslav Emmer displayed either immunity or high resistance at all stations, a fact of some interest in view of the present susceptibility of Hope, Redman and other wheats derived from crosses with it. Redman was wholly or moderately susceptible in the prairie region and in Ont., but it showed high resistance at the Pacific Coast and at least moderate resistance in eastern Que. and the Maritimes.

Stem rust infection became heavy on oats in the latter part of August and early September in southern Man. and considerable damage was done to late fields. The fact is reflected in the percentages of rust recorded in the Man. rust nurseries. Moderately heavy infection occurred also in several nurseries in Ont. and Que. In the nurseries located in the other provinces oat stem-rust infection was either very light or absent. It is worth mentioning that Clinton rusted rather severely in several of the nurseries in Man. and Ont. The susceptibility of this hitherto resistant variety is a consequence of the sudden widespread appearance of race 7 of oat stem rust.

Crown rust (Puccinia coronata) was not found on oats in Man. until 27 July and subsequent infection was only light to moderate. Trace to light infection occurred in eastern Sask. This rust did not occur in any nursery west of Melfort, Sask. Infection in most of the nurseries in Eastern Canada was light. The percentages recorded on the varieties Clinton and Bond, however, indicate the continued presence of race 45 and other races capable of attacking these varieties. These races became widely distributed in Canada in 1949.

Stem rust infection was not severe on barley in Man. The rust was also very light on barley varieties in the nurseries except at Mindemoya, Ont., where considerable rust was caused by P. graminis var. tritici on susceptible varieties. Rye stem rust (P. graminis var. secalis) caused light or trace infections in Man. and Sask. In the nurseries it was rather severe on Prolific rye at Merrickville and Appleton, Ont., and Fredericton, N.B., but it only caused a very light infection on the barley varieties.

Leaf rust (P. hordei) of barley was confined in the Prairie Provinces to trace or light infections in southern and central Man. In the nurseries, it was rather severe in several of the eastern ones.

Infection by leaf rust (P. secalina) was generally light and occasionally moderate on rye in Man. and Sask. with traces in Alta. The rust also occurred to a greater or less extent in most of the nurseries.

Other Diseases

Powdery mildew (Erysiphe graminis) was found on wheat in nurseries in all the provinces except Man. and Sask., but it was severe only at Kentville and Nappan, N.S. Powdery mildew of barley was absent from nurseries in Man., Sask., and the Maritime Provinces but was moderate to severe in some of the nurseries in B.C., Ont., and Que. Powdery mildew was found on oats only at Lethbridge, Alta., and on rye at Edmonton, Alta.

Observations on Septoria diseases of cereals showed the presence of Septoria nodorum on wheat at Creston, B.C., Guelph, Mindemoya and Appleton, Ont., and Fredericton, N.B. (Table 2). S. avenae var. triticea was present on wheat in many of the nurseries but was nowhere severe. S. tritici was found only at Lacombe, Alta. S. avenae occurred on oats at Agassiz, B.C., Winnipeg, Man., and in most of the eastern nurseries that were examined for its presence. S. passerinii was not found in any nursery west of Headingly, Man., but occurred in trace amounts in three eastern nurseries and was moderately heavy in one (Normandin, Que.)

Among other diseases that were noted mention may be made of a rather heavy infection of scald (Rhynchosporium secalis) on barley at Melfort, Sask.

PHYSIOLOGIC RACES OF CEREAL RUSTS IN CANADA IN 1950

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

The complete report, mimeographed separately in January, 1951, contains tables in which are presented the data derived from the surveys of the distribution, in Canada, of physiologic races of the following rusts of cereals: Puccinia graminis var. tritici, P. triticina, P. graminis var. avenae, P. coronata var avenae, and P. hordei. Only Table 2 of the original report is here reproduced as Table 3.

For cereal rust development in Canada in 1950, the report on the Rust Nurseries may be consulted.

Distribution of Physiologic Races of the Cereal Rusts

The 147 isolates of wheat stem rust (Puccinia graminis var. tritici) comprising the physiologic race survey were resolved into the following 10 races (number of isolates of each in brackets): 15B (82); 17 (2); 19 (1); 29 (3); 38 (1); 56 (53); 59 (2); 69 (1); 113 (1); 140 (1). Two of these, races 69 and 140, had not previously been found in Canada.

A striking feature of the survey is the widespread distribution of race 15B which had been collected only once in Canada prior to this year, viz., from Killarney, Man., in 1946. Infection by this race was concentrated in Man. and eastern Sask. but the limits of its distribution extended eastwards to the province of Quebec and westwards to the Rocky Mountains.

Although infection by race 15B was heavy in many places, especially in Man., where 58 isolates of this race were identified from 69 isolates collected, it probably did not occur as frequently in comparison with other races as this figure would indicate. Its exaggerated frequency is to be found in the large number of rust collections taken from durum wheat and from rust resistant common wheat varieties, such as Thatcher, Redman, Regent, and Mida. Such collections are almost exclusively composed of race 15B. Of the isolates from barley, in Man. and Sask., race 15B accounted for almost two-thirds. In the same area, less than half the isolates from susceptible common wheat and only one-quarter of those from Hordeum jubatum were identified as race 15B. It is therefore probable that race 15B composed less than half of the wheat stem rust present in the eastern prairie region where it was most prevalent.

The apparent scarcity of the formerly common races 17 and 29 is no doubt partly due to difficulties in detecting these races when they and race 15B are present in the same collection of rust. It is almost certain that these races occurred more frequently than is suggested by the survey data.

Table 3. Isolates of race 15 of wheat stem rust obtained from cereals and grasses in Canada 1919-1950.

Year	Province						Total no. isolates race 15	Total no. isolates studied (all races)	Race 15 as % of total isolates
	N.S.	Que.	Ont.	Man.	Sask.	Alta.			
1919	-	-	-	-	1	-	1	28	3.6
	no isolates 1920-1925						0	426	0.0
1926	-	-	-	1	1	-	2	378	0.5
1927	-	-	-	4	3	1	8	450	1.8
1928	2	2	1	11	5	-	21	391	5.4
1929	-	-	1	-	-	-	1	306	0.3
	no isolates 1930-31						0	387	0.0
1932	-	-	-	1	-	-	1	129	0.8
	no isolates 1933-36						0	612	0.0
1937	-	-	-	1	-	-	1	184	0.5
1938	-	-	-	1	1	-	2	291	0.7
1939	-	-	1	-	-	-	1	156	0.6
1940	-	1	-	-	-	-	1	234	0.4
1941	-	-	-	1	-	-	1	215	0.5
1942	-	-	-	1	-	-	1	99	1.0
	no isolates 1943-45						0	340	0.0
1946	-	1	-	1*	1	-	3	145	2.1
1947	-	1	2	-	1	-	4	123	3.3
1948	-	-	-	1	-	-	1	132	0.8
	no isolates 1949						0	100	0.0
Total 1919 1949	2	5	5	23	13	1	49	5126	1.0
1950	0	1*	5*	58*	16*	2*	82	147	55.8

*Isolates identified as race 15B

In view of this year's outbreak of race 15B it may be of interest to review the previous known distribution of race 15 in Canada. Table 3 summarizes the known distribution of race 15 on cereals and grasses since race surveys were first undertaken in 1919. It is evident that there were at least three periods 1926-1929, 1937-1942, and 1946-1948 in which race 15 had considerable distribution. Possibly the reason why it did not increase to the point of becoming a predominant race in the two earlier periods was the absence of cereal varieties that would exercise on it a preferential selection. It was during the second period, 1937-1942, that race 15B was first recognized as a distinct strain (biotype) of greater virulence than the general run of race 15. The fact that none of the isolates of race 15 found in Canada during this period are designated as race 15B does not prove that this biotype did not occur in the period 1937-1942, since the differential varieties now employed to distinguish it were not then in use.

Whatever the relation of barberry to the origin of race 15 (and there is abundant evidence that it is one of the races most commonly isolated from barberry) it is clear that it has had sufficient distribution on cereals and grasses in the Great Plains area to permit its rise to predominance if and when circumstances become favourable. Possibly one of the favourable circumstances is the incorporation into common and durum wheats of emmer "blood". Emmers like Yaroslav and Vernal are more or less susceptible to race 15 and particularly so to its biotype 15B. The existence of this biotype coincident with the growing of great acreages of Carleton and Stewart (derived from Vernal) and of many Hope and H44 derivatives (derived from Yaroslav) appears to have been one of the primary causes of the rust epidemic of 1950 (T. Johnson and G.J. Green).

Identification of races of Puccinia triticina was carried out by use of the full set of leaf rust differential hosts plus the variety Hope, which has been used for several years as a supplementary host to determine the virulence of rust isolates towards Hope and H44 derivatives. Hope is fully susceptible in the seedling stage only to those races or biotypes that are particularly virulent to the above-mentioned wheats. Races possessing this virulence are designated by the letter "a".

Each rust collection, after increase on the susceptible wheat Little Club, was inoculated to a "screening set" of four accessory hosts: Exchange, Lee, Gabo, and Frontana. Any large pustules noted, particularly on Exchange and Lee, were used for the establishment of further isolates to determine the race or races involved. The majority of the isolates studied, however, were randomly selected, two single-pustule isolates per collection being established from the first rust increase on Little Club. The survey as a whole therefore represents an attempt to combine the two objectives of discovering races potentially dangerous to present breeding material and of determining what races are predominantly present in the rust collections gathered.

The races were tabulated in accordance with the "Unified Numeration" of the key agreed on, in 1948, by American and Canadian workers with leaf rust. The old race numbers corresponding with the new ones are also given.

The 275 isolates were identified as follows (number of isolates in brackets): UN 1 = race 1 or 1a (23); UN 2 = race 15 or 15a (51); UN 3 = races 3 and 58 (50); UN 5 = race 5a (66); UN 6 = race 126 or 126a (60); UN 10 = race 11 (8); UN 11 = race 93 (2); UN 14 = race 128a (2); UN 16 = race 33 (10); UN 23 = race 124 (3).

The distribution of the races in 1950 was very similar to that of the preceding year. UN 3 (race 58) was the predominating race in Eastern Canada. In Man. and Sask., the bulk of the rust consisted of UN 2 (race 15a or 15); UN 5 (race 5a); and UN 6 (race 126 or 126a). As in the preceding year, the race distribution in Alta., particularly in the southern part of the province, was different from that in the other two prairie provinces. The predominant races in Alta. were UN 1 (race 1 or 1a), UN 16 (race 33) and UN 10 (race 11). The variety of races was greater here than elsewhere in the prairie region. The 40 isolates from Alta. consisted of 8 races whereas the 132 isolates from Man. and Sask. consisted of only 5 races. The race distribution in the B.C. collections (mostly from Creston in eastern B.C. and Agassiz in the Fraser Valley) was rather similar to that of Alta.

The race distribution in Man. and Sask. is evidently influenced by the Hope and H44 derivatives grown there and in the adjacent United States. In these two provinces 86% of the isolates were virulent to Hope wheat as against 37% in Eastern Canada and 20% in the Alta. and B.C. collections. The tendency that Hope or H44 derivatives have to select out certain races is shown by the fact that 32 of the 34 isolates from Redman wheat consisted of the Hope-virulent races 5a, 15a, 126a and 128a whereas only 14 of the 28 isolates from Thatcher wheat were virulent to Hope (T. Johnson and G.J. Green).

A study of 152 isolates of oat stem rust (Puccinia graminis var. avenae) resulted in the identification of the following races (number of isolates of each in brackets:) 1 (5), 2 (44), 4 (2), 5 (9), 6 (1), 7 (24), 8 (33), 10 (18), and 11 (16).

The chief feature of the physiologic-race survey is the widespread distribution of race 7, which, in previous years, was rarely collected on oats. This race, which made up 16% of the oat stem rust isolates, was common in the oat-growing areas from Sask. to eastern Ont., and was collected as far east as Ste. Anne de la Pocatière, Que. Its emergence as a common race is not a serious threat to most of the oat varieties now grown in Canada. It appears to be no more virulent than races 1, 2, and 5 to the older susceptible oat varieties or to the newer varieties Vanguard, Ajax, Exeter, Beacon, and Beaver that possess the so-called Richland type of stem rust resistance, which is highly effective against these races. Race 7, however, constitutes a threat to a number of oat varieties possessing the White Tartar type of resistance. Several varieties (e.g. Clinton, Mindo, Bonda, Zephyr) have been produced recently in the United States as a countermove to the increasing menace of races 8, 10, and 11. These varieties are likely to rust considerably if race 7 increases in prevalence.

The distribution of races in this survey is somewhat biased owing to the fact that many of the rust collections studied came from Ajax, Vanguard, and other varieties that are rusted chiefly by races 8, 10, and 11. This bias may be largely corrected by considering only collections made on Avena fatua and varieties susceptible to all races. Calculations made on this basis indicate that the race group 1, 2, 5 makes up 56.7% of the rust instead of 37.1% of the uncorrected totals and race group 8, 10, 11 26.7% instead of 44.1%. The figure for race 7 remains virtually unchanged at 15.0% instead of 15.8% (T. Johnson).

The following physiologic races of crown rust (Puccinia coronata var. avenae) were identified (number of isolates of each in brackets): 1 (2); 2 (20); 3 (15); 4 (6); 5 (2); 34 (64); 45 (39); 57 (8); 1948-1 (1).

A further increase has occurred in the relative prevalence of crown rust races that attack varieties possessing the Bond type of crown rust resistance (races 34, 45 and 57). Prior to 1947, these three races comprised only a negligible percentage of the crown rust isolates that were identified in Canada. However, since 1947, they have increased year by year until they now have become the predominant races of crown rust present in Canada. For the years 1947, 1948, 1949 and 1950 these races comprised 4, 20, 48 and 71 per cent, respectively, of all isolates identified in each of these years. These races were relatively more prevalent in 1950 in the Prairie Provinces, where they comprised 90 per cent of all isolates of crown rust identified, than in Eastern Canada, where they comprised 58 per cent of all isolates (B. Peturson).

Infestation of barley by leaf rust (Puccinia hordei) was more pronounced in Canada in 1950 than it had been in the previous three or four years. This condition might have been influenced by the late, comparatively cool season that retarded plant development thereby providing favourable conditions for the development of the rust.

In Eastern Canada and at Winnipeg, Man., leaf rust was particularly noticeable on the varieties Montcalm, Vantage, Goldfoil, and Peatland, in the Uniform Rust Nurseries. No leaf rust occurred on these varieties grown in Sask. and Alta., but at Agassiz and Creston, B.C., they were lightly infected. At Saskatoon, Sask., rust developed on the variety Charlottetown 80, although no rust was noted on any other variety grown in the same plot.

Wisconsin H. 106, grown at 33 stations throughout Canada was free from leaf rust, except at Williamstown, Ont., and L'Assomption, Que., where trace amounts of rust occurred on it.

A total of 37 collections of leaf rust were cultured on the standard differential hosts, and six physiologic races were isolated. These races were distributed provincially as follows (number of isolates in brackets): N.S., race 4 (2); Que., races 1 (1), 2 (1), 4 (6), 16 (4), 44 (3), 53 (2); Ont., races 4 (3), 44 (1); Man., races 4 (10), 44 (1); Sask., race 4 (1); B.C., race 4 (2).

Race 4, which has been common in previous years, predominated in 1950, while race 44, previously collected in Que., occurred this year in Ont. and Man.

All of the six races identified occurred in Que. Why there should be more races of this rust present in Que. is difficult to explain. In previous years new races have from time to time been isolated from rust collected on barley in this province, a condition that suggests the sexual reproduction of this rust. Within recent years the aecial stage of P. hordei was encountered in nature in England, on Ornithogalum spp. and produced experimentally in Portugal, on Dipcadi serotinum (both genera of Liliaceae). In Manual of the Flora of the Northern States and Canada (Britton), species of Ornithogalum are reported to have escaped from gardens in Pennsylvania and other states. Perhaps the aecial stage of this rust also occurs in Eastern North America, but considerable search would be necessary to confirm this assumption (A.M. Brown).

II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

BLACK STEM (Ascochyta imperfecta). Leaf and stem infection was tr.-sl. in all fields examined in s. Alta. during July. It was less prevalent after the second cutting (M.W. Cormack). A mod. infection was observed in a seed crop at Gordondale (A.W. Henry). Infection was 2-tr. 1-sev./84 fields examined in central Alta. and 1-tr. 1-sl. 6-mod./30 fields in the Faller district (J.B. Lebeau, D.A. McTavish). Every field was infected in central and w. Sask. Damage was mod.-sev. from heavy defoliation and killing of stems and branches. The disease was favoured by the cool and moist weather. Several mod. infected fields were seen in the irrigated areas in s.w. Sask. (H.W.M.). The disease caused some damage to fields left for seed in Man. (W.C. McDonald). A trace was found in the east field, C.E.F. Ottawa, Ont. (R.J. Baylis).

WINTER CROWN ROT (low-temperature basidiomycete) was not found in most areas in s. Alta.; sl. damage occurred in one field at Pincher Creek and in the plots at Lethbridge (M.W. Cormack). Damage was 9-tr. 15-sl. 2-mod./30 fields examined in the Peace River district. In central Alta., it was 20-tr. 23-sl. 31-mod. 4-sev./84 fields examined (J.B. Lebeau, D.A. McTavish). Winter crown rot was found causing sl. damage in all fields entered in n. Sask. It was also present in the irrigated areas in s.w. Sask. (H.W. Mead).

ANTHRACNOSE (Colletotrichum destructivum O'Gara). A trace to slight infection of what appeared to be typical leaf hopper injury was found at Ste. Anne de la Pocatière, Que. From material sent to M.W. Cormack he isolated from black lesions that were more or less girdling the stem a fungus, which he tentatively identified as C. destructivum, a fungus already known on alfalfa in the United States (cf. F.R. Jones and J.L. Weimer. U.S.D.A. Pl. Dis. Reporter 24:30-31. 1940) (R.O. Lachance).

BACTERIAL WILT (Corynebacterium insidiosum). Diseased material was received from the Salmon Arm district, B.C., from which bacterial wilt has not previously been reported (G.E. Woolliams).

Damage from bacterial wilt in Alta. was estimated as follows (M.W. Cormack, J.B. Lebeau, D.A. McTavish):-

District	Fields Examined	Fields Damaged Tr.	Sl.	Mod.	Sev.	Total
		%	%	%	%	%
Peace River	30	2	0	0	0	2
Central Alta.	84	2	3	1	1	5
Southern Alta.	50	14	36	26	10	86

In a detailed survey of 24 fields representing different districts of s. Alta., the average percentage of infected plants was 24 in stands seeded in 1948 and 7 in those seeded in 1949 (M.W. Cormack, E.J. Hawn).

In a survey of irrigated fields in s.w. Sask., on 18-19 July the older fields (5-7 years old) at Swift Current contained 60% of infected plants and were becoming unproductive; younger fields on higher ground were free of wilt. At Val Marie, old fields contained 50% of infected plants and were thin and weedy. At Eastend, older fields were unproductive and many had been seeded to wheat and oats. Alfalfa plants along the irrigation ditches were infected. On unirrigated land, a single infected plant was found in an old field at Snowden (H.W. Mead).

A survey of 24 fields was made the week of 14 August in s.w. Man. Bacterial wilt was prevalent in most fields, 5 years old, or older, resulting in distinct dwarfing of the plants and reduction of yield (W.C. McDonald). In one field in Simcoe Co., Ont., 60% of the plants were infected, causing 20% damage to the crop. In a second field in York Co., 5% of the plants were affected (W.G. Benedict). Summer and fall surveys in the Ottawa valley indicated that the symptoms of yellowing and wilting were absent this year on account of the cool wet weather. No new areas were identified and spread in the fields previously found infected appeared negligible (R.J. Baylis).

Bacterial wilt was found for the first time in Que. in 1950. The disease was in the Lower St. Lawrence district appearing to be quite common in Kamouraska Co., particularly at Ste. Anne de la Pocatière and St. Pascal. It was observed in 11 of the 72 fields examined. It is present both in the plots and fields at the Ste. Anne Station. The organism was isolated, identified, and its pathogenicity established in greenhouse tests. The smear technique as modified by R.J. Baylis was used in making the field diagnoses (R.O. Lachance).

ROOT ROT (Cylindrocarpon ehrenbergi) was common in Sask. as a secondary parasite in fields which had been injured by low winter temperatures (H.W. Mead).

Crown and root rots were present in most of the older fields among the 24 surveyed in s.w. Man., but the reduction of top growth of the infected plants was not as marked as in those attacked by bacterial wilt. The cause or causes of the rots were not determined (W.C. McDonald).

STEM NEMATODE (Ditylenchus dipsaci). An infestation of the alfalfa stem nematode, discovered in August in the plots at Lethbridge, Alta., by Dr. O.S. Aamodt, was confirmed by Dr. O.F. Smith of Nevada and by Dr. A.D. Baker at Ottawa. Scattered plants infested in varying degrees were found in both dry and irrigated plots. In a late fall survey of 45 fields in s. Alta., a sl. infestation was found in 2 fields both in the Lethbridge district (M.W. Cormack, W.D. McGinnis).

ROOT ROT (Fusarium spp.). A mod. general infection was found in all areas examined in Sask. It caused considerable killing of single plants at Saskatoon. F. scirpi var. acuminatum was isolated from stem bases and roots (H.W. Mead).

LEAF SPOT (Leptosphaeria pratensis (Stagonospora meliloti) was common and caused sl. damage in fields in the Snowden and White Fox areas, Sask. (H.W. Mead). Leaf spot occurred in many of the 24 fields examined in s.w. Man. (W.C. McDonald). A sl. infection occurred in one field examined in York Co., Ont. (W.G. Benedict).

DOWNY MILDEW (Peronospora aestivalis) was general in 1 field at Duncan, B.C. (W. Jones). Infection was mod. in the plots at Snowden, Sask., causing distortion and defoliation (H.W.M.). The disease occurred in several fields examined in s.w. Man. (W.C. McDonald).

YELLOW LEAF BLOTCH (Pseudopeziza jonesii). Infection ranged from tr.-sl. in the variety nursery at Lethbridge, Alta., in mid-June (J.E.J. Thomson). Infection was mod. in a field near Beaverlodge and a trace in one field in central Alta. (J.B. Lebeau, D.A. McTavish). The disease is favoured by hot, dry weather and for this reason was less prevalent this year in Sask. than for several years. It was present in 50% of the fields entered (H.W. Mead).

COMMON LEAF SPOT (Pseudopeziza medicaginis). Infection was sl. in the plots at Lethbridge and in most fields examined in s. Alta. It was mod. in one field near Monarch (M.W. Cormack). Infection was 8-tr. 8-sl. 8-mod./30 fields examined in the Peace River district and 12-tr. 1-sl. 1-mod./84 fields in central Alta. (J.B. Lebeau, D.A. McTavish). Common leaf spot was very prevalent in Sask., especially in the northern areas. It was found, frequently along with black stem, in over 60% of the fields visited, but it caused little defoliation (H.W. Mead). The disease occurred in many fields visited in s.w. Man. and appeared to be most destructive of the leaf spots (W.C. McDonald). Infection was heavy on first growth and light on the second in a field in Wellington Co., Ont. (W.G. Benedict). A sl. infection was seen in the east field, Division of Forage Plants, C.E.F. Ottawa (R.J. Baylis). A trace was noticed in a field in Queens Co., P.E.I. (R.R. Hurst).

WILT (Sclerotinia sclerotiorum). Infection was sl. on Grimm, Viking, Buffalo, Canauto, and Chartainvilliers in the rod rows at the Station, Saanichton, B.C. (W. Jones).

LEAF SPOT (Stemphylium botryosum). Sl. infection in a field at Westholme, B.C. (W. Jones).

RUST (Uromyces medicaginis). A trace was present in a field, C.E.F., Ottawa, Ont. (R.J. Baylis).

WITCHES' BROOM (virus). A trace infection was observed in 4 fields in central and n. Alta. (J.B. Lebeau, D.A. McTavish).

What appears to be witches' broom of alfalfa was found affecting 15% of the Astragalus mortoni plants growing in a small area on a dry rocky hillside at Soda Creek, B.C. The plant has no commercial or fodder value (N.S. Wright).

CROWN ROT (cause undetermined). Rotting of the crown buds occurred during the growing season in many fields in s. Alta. In a detailed survey of 7 fields seeded in 1949, the average percentage of infected plants increased from 1.3 in May to 75.6 in October. All plants examined in fields seeded in 1948 or earlier were damaged to varying degrees. Various fungi associated with the damage are being studied (M.W. Cormack, E.J. Hawn).

POTASH DEFICIENCY. Unmistakable symptoms of potash deficiency, i.e. leaflets with yellow edges and white dots, were found scattered throughout a 5-acre field in P.E.I.; significant damage resulted (R.R. Hurst).

WINTER KILLING (low temperatures) caused sev. damage about Saskatoon and in exposed fields in other areas of Sask. Ladak was hardier than Grimm (H.W. Mead). Five fields of alfalfa in the Avalon peninsula, Nfld., suffered considerable reduction in stand on account of heavy frost and very little snow cover last winter (G.C. Morgan).

YELLOWS (boron deficiency) was found in many localities in B.C., but was especially noticeable in the Salmon Arm district (G.E. Woolliams). Out of 72 fields examined in the Lower St. Lawrence valley, Que., 21 were found to be suffering from boron deficiency. All were on gravelly or sandy soils and the district also experienced a severe drought this season. Tr.-sl. amounts of a yellowing, reddening and bronzing quite similar to that caused by boron deficiency were also found in fields in this same area but no histological abnormalities typical of boron deficiency were observed. These symptoms corresponded quite closely with the description of leaf hopper injury given by W.E. Colwell and Chas. Lincoln (J. Am. Soc. Agron. 34:495-498. 1942). Also the irregular thickening of the stunted stems was observed (J.G. Dickson, Diseases of Field Crops 1947, p.293) (R.O. Lachance). Traces of yellows were found in a field in Queens Co., P.E.I.; according to the farmer he had never applied boron to this field (R.R. Hurst).

YELLOWS (cause undetermined). Tr. amounts were seen in a field in central Alta. (T.R.D.). Yellows was common on single plants or in patches in n. Sask. Soils in the area are deficient in some respects and respond well to sulphur-containing fertilizers (H.W. Mead).

YELLOWS (undetermined virus). A trace was found in 2 fields in Sunbury Co. and 3 in York Co., N.B.; 1% of the plants showed yellows in a field in Carleton Co. (cf. P.D.S. 28:18.) (D.J. MacLeod).

COMMON CLOVER

WINTER CROWN ROT (low-temperature basidiomycete). Infection was 1-tr. 2-sl./7 fields examined in the Sangudo district, Alta. (J.B. Lebeau, D.A. McTavish).

LEAF SPOT (Cercospora zebrina). A slight infection in a field of red clover in Kent Co., Ont. (W.G. Benedict).

SOOTY BLOTCH (Cymadothea trifolii). Slight infection in first season plants of alsike clover in a field in Norfolk Co., Ont. (W.G. Benedict). Infection was mod. on alsike clover in a low lying part of a meadow in St. John's West, Nfld. (G.C. Morgan).

POWDERY MILDEW (Eyrsiphe polygoni). Infection was 2-tr./18 fields of red clover examined in central Alta. (J.B. Lebeau, D.A. McTavish). Powdery mildew was heavy on first season plants of red clover in August in a planting in Essex Co., Ont. (W.G. Benedict). Tr. infection in a field of red clover in Queens Co., P.E.I. (R.R. Hurst).

ANTHRACNOSE (Kabatiella caulivora). Infection was 2-tr./18 fields of red clover examined in central Alta. (J.B. Lebeau, D.A. McTavish). Anthracnose was present in most fields in n. Sask., infection being sl.-sev. (H.W. Mead).

ROOT ROT (Plenodomus meliloti). The organism was isolated from alsike clover in a field showing a trace of root rot (J.B. Lebeau, D.A. McTavish).

LEAF SPOT (Pseudopeziza trifolii) was common on red clover in the Duncan district, B.C. (W. Jones). Infection was heavy on white clover on the river bank at Saskatoon, Sask., but damage was sl. (E.T. Reeder). Sl. infection on current-season and one-year old plants of red clover in a field and on one-year old plants of alsike clover in a "permanent pasture" in Essex Co., Ont. (W.G. Benedict).

RUST (Uromyces trifolii). Sl. infection on volunteer plants of alsike clover at Ladner, B.C. (H.N.W. Toms). Mod. infection on current season plants in a field in Middlesex Co., Ont. Sl. infection of rust (U. fallens) on second growth in one-year-old stand of red clover in Lambton Co. (W.G. Benedict). Trace of rust on red clover in a field in Queens Co., P.E.I. (R.R. Hurst). Rust (U. Trifolii) caused rather sev. defoliation in 2 fields of alsike clover in the Burin peninsula and a sl. infection in 2 in the Avalon peninsula, Nfld. (G.C. Morgan).

YELLOWS (virus, undetermined). A trace was found in 3 counties in N.B.: in 2 fields in Sunbury, 4 in York and one in Carleton (Cf. P.D.S. 28:21.) (D.J. MacLeod).

WINTER KILLING (freezing and thawing) affected an average of 22% of the plants in 14 fields surveyed in Queens Co., P.E.I. (R.R. Hurst). Clover fields were severely damaged by frost during the winter of 1949-50 everywhere in Que. In fact the loss was so great that there was distinct lack of pasturage and hay for feeding on many farms. The honey harvest was also greatly reduced (O. Caron).

SWEET CLOVER

ROOT ROT (Aphanomyces euteiches). A trace was found on seedlings of white sweet clover from fields in Essex Co., Ont. (W.G. Benedict). This pathogen caused sev. damage to peas in Essex Co. in 1948 (P.D.S. 28:45); it is also reported as the cause of a seedling root rot of white sweet clover and root rot of alfalfa in Wisconsin (F. Weiss. Check List in U.S.D.A. Pl. Dis. Reporter 30:41 and 37. 15 Feb. 1946) (I.L.C.).

BLACK STEM (Ascochyta meliloti). Infection was sl. in one field in s. Alta. and mod. in a roadside stand near Lethbridge (M.W. Cormack). The disease was common and sev. on many lines in the breeding nursery at Saskatoon; also common, causing mod. damage in all fields entered in n. Sask. (H.W. Mead).

LEAF SPOT AND ROOT ROT (Leptosphaeria pratensis (Stagonospora meliloti). A light infection both as a leaf spot and root rot was observed in a field in Lambton Co., Ont. (W.G. Benedict).

ROOT ROT (Phytophthora cactorum) caused sl. damage in a field at Hillspring and in several roadside stands in s. Alta. (J.E.J. Thomson). About 40% of the one-year-old stands of white and yellow sweet clover were affected in Essex Co., Ont., on 23 May and most of the plants succumbed to the disease in the affected fields (W.G. Benedict).

SEEDLING BLIGHT (Pythium spp., Rhizoctonia solani, and Fusarium spp.). Sweet clover was again a failure in seeded plots at Saskatoon, Sask. Chemical treatment of the upper soil with Arasan, etc., failed to check the blight (H.W. Mead).

DAMPING-OFF and ROOT ROT (Pythium spp.). About 4% of the seedlings were affected and died in a field of white sweet clover in Essex Co., Ont. Pythium irregulare, P. ultimum and P. ?spinosum were isolated (W.G. Benedict).

ROOT ROT (Rhizoctonia solani) caused stunting of 12% of the seedlings, killing some of them, in a field in Essex Co., Ont. The isolate proved to be the common brown strain when grown on P.D.A. (W.G. Benedict).

STEM ROT (Sclerotinia sclerotiorum) caused sl.-sev. damage in 50% of the fields in n.e. Sask. The disease caused white banding of stems at almost any point up to 4-5 ft. above ground. The sclerotia were present in most stems (H.W. Mead). A trace was found in bundles of cut sweet clover in a field in Sask.; sclerotia were present in the stem from which isolations were made. For pathogenicity trials with different isolates see under Rape (T.C. Vanterpool).

BLACK ROOT ROT (Thielaviopsis basicola). A trace infection was present on seedlings and chlamydospores were located on one-year-old plants in a field in Essex Co., Ont. To my knowledge this is the first time that T. basicola has been reported on sweet clover in Canada (W.G. Benedict).

MOSAIC (virus) is widely distributed throughout Interior B.C., being present in most areas; up to 10% of plants were affected in different stands (G.E. Woolliams).

CROWN ROT (cause unidentified). A trace-10% of the plants were infected in different parts of a field of yellow sweet clover at Poplar Point, Man. (T. Johnson).

BIRD'S-FOOT TREFOIL

STEM ROT (Sclerotinia trifoliorum) destroyed 10% of the plants of Lotus corniculatus and 75% of those of L. tenerum (?) in the rod rows at the Station, Saanichton, B.C. (W. Jones).

BROOMCORN MILLET

SMUT (Sorosporium panici-miliacei) affected 18% of the plants in a planting at Carman, Man. (W.A.F. Hagborg).

BUCKWHEAT

YELLOWS (Callistephus virus 1) was severe on tartarian buckwheat in Carleton, York, Sunbury and Queens counties, N.B.; infection being 30-65%. A trace also occurred on Silver Hull common buckwheat at the Fredericton Station (D.J. MacLeod).

CORN

EAR ROTS (Diplodia zeae, Fusarium graminearum and F. moniliforme) were present throughout Ont., but the infection was only a trace from D. zeae and F. graminearum and sl. from F. moniliforme (W.E. McKeen).

LEAF SPOT (Helminthosporum turcicum). A few lesions were present on most plants of all commercial varieties throughout Ont. on 31 July (W.E. McKeen). A specimen examined at Ottawa (DAOM 25062) agreed well with published descriptions and illustrations (D.B.O.S.).

RUST (Puccinia sorghi). All fields of commercial varieties were mod. infected throughout Ont., but damage was sl. Some inbred lines were resistant, whereas others were completely susceptible and were dead before they produced seed. In fact, certain inbreds were killed by mid-Aug. (W.E. McKeen). A mod. infection was observed at Centreville, N.S. 7 Aug.; the last sample taken was in 1938 (C.O. Gourley). The merest trace of rust was observed on fodder corn in Queens Co., P.E.I. (R.R. Hurst).

ROOT ROT (Pythium arrhenomanes) caused a marked stunting and dwarfing of corn plants in fields throughout Ont. and reduced the average yield by at least 5% (W.E. McKeen).

STALK ROT (complex of organisms). During recent studies on the diseases of corn in Ont., W.E. McKeen (Phytopathology 41:25. 1951) has found that a root and stalk rot of corn, previously attributed to Gibberella zeae on account of the pink to red discoloration of the infected tissues, was present in every field throughout Ont. in 1950. The disease has a markedly deleterious effect on the quality of the corn and yields may be reduced by 50-60%. Hybrids show a wide range of resistance; in fact, inbred Lc 19 proved completely susceptible. Infection begins when the ears are in the milk stage. First

indications of infection are watersoaking of some of the roots, blackening of the lower nodes and frequently of the bundles. These symptoms are followed by browning and watersoaking of the first and sometimes of the second internode above the crown and simultaneously a sudden drying of the leaves is noticed. A pink to red discoloration usually moves up the stem slightly back of the brown watersoaked zone and soon the pith is retted away leaving the bundles covered only by mycelium. A white, rod-shaped, Gram-negative, non-acid fast, motile bacterium was the first organism present, Pythium arrhenomanes followed in the brown, watersoaked area and Fusarium sp. was found in the reddish zone and externally on the epidermis of the lesioned area of the stem (I.L.C.).

SMUT (Ustilago zeae) was present in all varieties throughout Ont. in 1950, but the average damage was very slight (W.E. McKeen). One case of smut in fodder corn was brought to the laboratory from Queens Co., P.E.I. (R.R. Hurst).

RING SPOT (virus). One block of an inbred line in Essex Co., Ont., was completely affected by ring spot (W.E. McKeen).

FLAX

Prof. T.C. Vanterpool, University of Saskatchewan, Saskatoon, Sask., has prepared the following account on "Flax Diseases in Saskatchewan in 1950".

The relatively cool, bright growing season with good moisture up to the early frost of 17 August, appears to have been favourable for flax. The few fields that were examined in the north and east just before the frost were markedly free from leaf and stem spotting, even the basal leaves being quite green. The same was true for the flax plots at the Melfort Station. With the low inoculum potential, it is unlikely that there would have been any significant damage from disease if the frosts had not occurred.

RUST (Melampsora lini). A light infection except in some thick stands in low areas where it was moderate.

SEEDLING BLIGHT (Rhizoctonia solani). There was a heavy reduction in stand, amounting to 10% in some rows, on all varieties (Dakota, Redwing, Rocket, Royal and Victory) in the Illustration Station plots at White Fox. Phosphate fertilizer had no observable effect on the disease. Flax after fallow is more liable to this disease than flax after stubble. A sample was received from Lake Valley.

BROWN STEM ROT (Alternaria linicola, etc.). Isolates from typical lesions on the middle and upper parts of stems at Saskatoon yielded a higher percentage of A. linicola than in former years. Most of the other isolates

were A. tenuis. From the brown-stem lesions on the lower parts of the stem, Fusarium spp. and Alternaria spp. were isolated in about equal proportions. The difficulty of obtaining spores of A. linicola in culture is well known; in general, sporulating strains are more frequently obtained from stem lesions than from infected seed. Stem lesions on a sample from Wadena yielded Fusarium spp. and Alternaria spp. about equally, and one from Indian Head yielded A. linicola and A. tenuis on culturing. This trouble, however, was generally light.

HEAT CANKER (physiological). Observed in one plot on the west slope of ridges where the drill over-lapped. Damage was severe on such ridges, though a trace only was present in rows on the level or in the V-shaped furrows near by. The rows ran north and south.

2,4-D INJURY. Definite 2,4-D injury was observed on Rocket flax at Tisdale on 22 August. The tip of the main stem of the young plant had been killed and usually two side shoots had taken its place. Thus the maturity of the crop as a whole was delayed. This difference greatly increased damage from the early frost of August. Double or fused leaf of flax, thought to be caused by 2,4-D spray drift, was observed in several plots (cf. P.D.S. 29:28).

FROSTED SEED. Frosted flax frequently contains a high percentage of HCN which renders it poisonous to livestock. The content of HCN in the stem is higher than what in the seed. A preliminary test was carried out to determine whether the HCN in frozen seed would inhibit the growth of seed-borne fungi. Two samples of flax seed containing 210 and 350 p.p.m. of HCN respectively, and one sample free of HCN were plated on malt agar. The HCN content at these concentrations had no effect on the fungus colonies developing from the seed.

MISCELLANEOUS. Browning and Stem Break (Polyspora lini), and Pasmo (Septoria linicola) were not found in central and n.e. Sask. in our survey before the early frost. These diseases were also absent in the Irrigation Nursery at the University. In recent years pasmo has been present in this nursery and scattered through the e. and s.e. park-belt. A large sample of flax received from Indian Head on 19 October, showed a trace of pasmo, some die-back or top browning probably caused by heat or frost, and a browning and blackening of the peduncle reaching to slightly below the top axil. Bacteria only were isolated from these darkened peduncles; frost injury is suspected. A strain of Helminthosporium sativum (cf. W.L. Gordon P.D.S. 20:23; I.W. Tervet. U.S.D.A. Pl. Dis. Reporter 28:675-676. 1944; and I.W. Tervet. Phytopath. 27:531-546. 1937.) was isolated from a stem lesion on a specimen from Wadena. It proved to be moderately pathogenic on flax seedlings. Late Root Rot (Fusarium spp. and Rhizoctonia solani) was present in a sample received from Milden on 18 July.

The observations of W. E. Sackston were also summarized in a special report, "Flax Diseases in Manitoba in 1950".

The spring of 1950 was cold and wet in Man. and seeding was accordingly very late. This fact may in part account for flax acreage increasing from 134,000 acres in 1949 to 300,000 acres in 1950 (Qtly. Bull. Agr. Statistics 43(3):177, July-Sept. 1950). The weather continued relatively cool during July and August and precipitation was plentiful. Growth was good throughout the season. The frosts that killed much of the crop in Sask. affected only a small part of the flax-growing area in Man. Most of the flax crop continued to develop until the end of September. Individual growers harvested extremely good yields per acre and the provincial average was estimated at 10 bu. per acre.

Two main disease surveys were made; 66 fields were examined in s.w. and central Man. 31 July-4 August, when the plants varied from the pre-bud stage in some fields to full bloom in others. Seventy fields were examined in the major flax areas of Man. and e. Sask. 5-9 September. In most of the fields the bolls were green or just turning colour at this time, although in some the flax was ripening or ripe.

RUST (Melampsora lini) was the outstanding disease of flax in Man. in 1950. The wide distribution of races capable of attacking Dakota flax in 1949 (P.D.S. 29:28), indicated the rapidity with which inoculum of new races can increase and the prediction was made that damage might be severe in future years if weather conditions were favourable. Conditions were quite favourable for rust development this year, with consequent heavy infections on Dakota, now the main variety grown. No rust was found on Rocket and Sheyenne. Rust was present in 52 fields examined in the early survey. Leaf infection was trace in 39 fields; 1-5% in 10; 15-20% in 2; and 50% in 1 (plots of Dakota at the Morden Station). Rust pustules were found on a few stems. Rust was present in 58 fields examined in the late survey. Estimates of infection at this stage were based on the percentage of stem area bearing telia. There were traces of telia in 26 fields; 1-10% in 27; 15-20% in 4; and 50% in 1. In many fields telial infection was heavy on the pedicels.

STEM ROT (Fusarium spp. and Alternaria spp.) was seen in 13 of the fields in which rust was found in the late survey. Stem-rot infections were tr.-25%, although in some patches 80% of the stem area was affected. A. tenuis was isolated from most of the stem-rot tissues plated but Fusarium spp. also occurred. Alternaria and Fusarium colonies were also isolated from black seeds occurring in a field where stem rot was heavy.

PASMO (Septoria linicola). The pasmo pathogen was isolated from leaf spots collected in a field 4 August. There were traces of pasmo in 20 fields examined during the late survey; 2-5% in 6; 10-20% in 5; and 25%, 40%, and 50% in 1 field each. The flax was turning colour or beginning to ripen in most of the fields where light infections were found, but the crop was ripe in every field where infection was 10% or higher.

WILT and ROOT ROT (Fusarium oxysporum f. lini, etc.). Isolated plants showing root rot were collected in several fields. A. tenuis was plated out from some of the tissues, Fusarium spp. from others, and Verticillium, probably V. albo-atrum, from one plant. A trace of wilt was found in flax plots at Portage la Prairie. No wilt was encountered in the main surveys, but one case of wilt near Morris was reported by the Agricultural Representative there. When this field was visited 75% of the plants were affected by wilt, and at least 50% were dead. Pure cultures of F. oxysporum f. lini were isolated from affected roots, crowns, and stems. Greenhouse experiments with several varieties of flax and samples of soil from the wilt field indicated that the variety sown was crown, although the grower had believed it to be Certified or Registered Royal. The periodic occurrence of severe wilt damage when a susceptible variety of flax is sown indicates that wilt is controlled in Man. only by the use of resistant varieties. Wilt could become as important a problem here as it is in fibre flax fields in Que., which were visited with Dr. R.O. Lachance early in July. It will continue to be necessary to test all new varieties for wilt reaction before their distribution in Man., and to watch for the possible occurrence of new forms of the pathogen that may attack varieties that are currently resistant in the area. The wilt pathogen was isolated from specimens submitted for diagnosis from the breeding plots of the Cereal Division at the Central Experimental Farm, Ottawa.

BOLL BLIGHT (cause unknown). The close relationship between weather and boll blight was illustrated again in 1950. There were traces-10% in 43 fields, 15-20% in 9, and 30-40% in 8. In the two worst fields, insects and pasmo infection respectively were the cause of much of the blighting. It appears that the cool, moist conditions prevailing during the growing season permitted most of the bolls that were formed to develop normally. In seasons when the weather turns hot and dry after the flax has blossomed, the incidence of boll blight is much higher than in 1950.

MISCELLANEOUS. Traces of Seedling Blight were found in a few fields and in the plots at Headingly and Morden. Traces of Heat Canker were found in 4 fields, and 5% in 1. Leaf spots were seen in 23 of the fields during the early survey, affecting from a few up to 50% of the plants. Isolations in most cases yielded only Alternaria tenuis and other miscellaneous fungi, but two of three spotted leaves collected in one field yielded Septoria linicola and Colletotrichum linicola respectively. Traces of damage from 2,4-D were seen in several fields. Apparently less of this material was used on flax in 1950 than previously because of the late season, as fields were weedier than they have been for several years. Chlorosis of the leaves was seen in 12 fields in the early survey. In every case it was associated with low, presumably wet spots in the fields. It was severe in two fields, in one of which it was associated with stunting and death of the plants

Other Observations

WILT (Fusarium oxysporum f. lini) was found in fields of the flax fibre varieties Liral Prince, Liral Monarch, and Liral Dominion in Maskinonge, Chateauguay, and Soulanges counties, Que. Out of 15 fields examined infection was tr. in 4, 1% in 5, 5% in 1 and 10-15% in one. In some fields there were patches with 50% of the plants wilted (R.O. Lachance).

ROOT ROT (Fusarium spp.). Infection 1-tr./3 fields examined in s. Alta. (M.N. Grant).

RUST (Melampsora lini). Infection 2-sl./3 fields in s. Alta. (M.N. Grant). Six fields in central and n. Alta. were found free from any disease (T.R.D.).

HEAT CANKER (physiological). Trace present in 1 out of 3 fields examined in s. Alta. (M.N. Grant).

MANGEL

LEAF SPOT (Cercospora beticola). A very light infection was found in a field of Frontenac in Queens Co., Ont. (R.R. Hurst).

CROWN ROT (boron deficiency). An occasional root, quite seriously affected, was found in a field in Queens Co., P.E.I., as the roots were pulled (R.R. Hurst).

MUSTARD

STEM and POD SPOT (cause undetermined). A mod.-sev. infection was found on volunteer plants along the edge of a field near Milk River, Alta.; bacteria were very abundant in the diseased tissues (P.M. Halisky).

RAPE

STEM ROT (Sclerotinia sclerotiorum). About half the plants were lodged in a field of rape near Prince Albert, Sask. on 21 Aug. The lodged plants were attacked by stem rot; the stems were bleached, soft and many contained sclerotia. Sowthistle (Sonchus arvensis) was also attacked. The disease has already been reported from Man. by J.E. Machacek (P.D.S. 25:37).

Isolations were made from rape and the pathogenicity of the isolate was compared with isolates made from Sophia multifida Gilib. (= Descuraina sophia (L.) Webb.), and sweet clover (q.v.). In preliminary tests on filter paper in Petri dishes the Sophia and the sweet clover isolates completely inhibited the germination of Ladak alfalfa, Royal flax, Argentine rape, Sophia multifida, sowthistle and Arctic sweet clover; the rape isolate was lightly to moderately pathogenic to rape, Sophia, sowthistle and sweet clover, lightly to alfalfa and very lightly to flax; these findings were the results of 2 tests.

The affected Sophia multifida was growing in the same field in which the affected sweet clover was found; the pathogenicity tests indicate the isolates from these 2 hosts are the same. The large sclerotia formed in culture by both the rape and sweet clover isolates indicate that the species present is S. sclerotiorum (Cf. M.W. Cormack. Sci. Agr. 26:448-459. 1946) (T.C. Vanterpool). Subcultures of the isolates were sent to Ottawa for a check on their identity. They all appeared to be S. sclerotiorum; the isolate from rape differed from most cultures of the organism in producing abundance of spermatia (Constance A. Loveland).

SAFFLOWER

RUST (Puccinia carthami). Infection ranged from sl. to mod. in the variety plots under both dry land and irrigation conditions at Lethbridge, Alta. (M.W. Cormack, F.R. Harper). Infection varied from trace to heavy in the variety plots at Altona, Man., on 20 September; the readings were as follows:-

Line	Rust Infection	Claassen's Rating 1/
688-7-2	heavy 35%	
N-4	trace 1%	3
N-852	light 2-3%	3
Indian	heavy 30%	
N-5	light 5%	3
N-6	light 5%	3
N-10	light, 2-3%	
N-9	light+ 5-10%	4
N-3	scarce	2
2377	moderate 10%	
N-8	heavy 30-35%	4+

1/ C.E. Claassen. Neb. Agr. Exp. Sta. Circ. 87. 1949.

His ratings are: 4, very susceptible; 3, less susceptible than 4; 2, moderately resistant; 1, resistant.

No rust was found in an increase field of several acres, 2 miles from Altona (W.E. Sackston).

ROOT ROT or WILT (Pythium sp.), first reported in 1949 (P.D.S. 29:31) was more severe in the irrigated variety plots at Lethbridge, Alta., in 1950 than last year. Estimated damage ranged from 95% in one strain to 5-10% in several others which appeared to be markedly resistant. No apparent damage occurred in the same varieties when they were grown in the dry land plots. Although the symptoms are very similar to the root rot of safflower in Nebraska attributed to Phytophthora drechsleri (U.S.D.A. Pl. Dis. Reporter 34(10):306. 15 Oct. 1950), Miss G.M. Waterhouse, Commonwealth Mycological Institute, to whom a culture was sent, found the fungus to be a species of Pythium unknown to her and possibly undescribed, entirely distinct from Phytophthora drechsleri (M.W. Cormack).

SOYBEAN

Dr. A.A. Hildebrand has prepared a special report, "Soybean Diseases in Southwestern Ontario in 1950".

Again this season, as in the past several years, the incidence of disease and related troubles in soybeans in Kent and Essex counties was closely checked by periodic surveys. From early June until late September, MANGANESE DEFICIENCY was apparent in the field for the third year in succession and the cause of concern to many soybean growers over widespread areas in the two counties. While losses resulting from this cause are difficult to assess at all accurately nevertheless, it was evident that in many of the more seriously affected fields, stunting of plants and paucity of pods would result in yields far below those of comparable, unaffected stands.

During the first week in July, a late-planted, 15-acre field, variety Lincoln, near Leamington, was completely destroyed in the early seedling stage by Rhizoctonia solani. The destruction of seeds and seedlings by this pathogen, which apparently has not been reported heretofore on this host in Canada, was more extensive and complete in this field than in any individual stand of soybeans previously noted in s.w. Ont. According to M.F. Kernkamp (The Soybean Digest 9:54-55. 1949) root rots and damping off are potentially the most destructive diseases of soybeans in Minnesota and, of the various soil-borne pathogens involved, Rhizoctonia solani is one of the most important. Probably, significant predisposing factors in this initial occurrence of the disease in Ont. were not only the late planting-date, which coincided with hot, wet weather, but also the fact that the Rhizoctonia-susceptible crops, potatoes and spinach, had preceded the soybeans in the rotation.

POD and STEM BLIGHT, and STEM CANKER. During the current season, evidence has been steadily accumulating that not one but two fungi are causal agents of the disease previously regarded in Ont. as Pod and Stem Blight. Isolations from lesioned areas on stems have yielded in a few instances cultures of a fungus which forms pycnidia in culture, presumably a Phomopsis, but in most instances cultures of a fungus, which forms perithecia, presumably a Diaporthe. On steamed soybean stems mono-ascospore cultures of the Diaporthe produce only the perfect

stage, the perithecia being clustered in caespitose groups; consequently this fungus is homothallic. When monoconidial cultures of the Phomopsis isolates are grown in steamed soybean stems, only the pycnidia are produced. The latter fungus could be heterothallic, but appropriate pairings of different isolates have yet to be made to test this hypothesis.

Such an interpretation is supported by the results of recent investigations of soybean diseases in Iowa by A.W. Welch and J.C. Gilman (Phytopathology 38:628-637. 1948). They found two members of the genus Diaporthe that differed in pathogenicity and type of perithecial development. One was heterothallic with scattered single perithecia and the other was homothallic with caespitose clusters of perithecia. The former produced typical Phomopsis conidia; the latter lacked conidial stages. The heterothallic form was recognized as Diaporthe phaseolorum var. sojae; the homothallic as Diaporthe phaseolorum var. batatis. The latter variety, found to be capable of actively attacking soybean stems and of girdling them with resultant wilting and death of plants, causes the disease now referred to in the United States as Stem Canker. The former variety is less pathogenic, attacks mainly mature plants, produces linear rows of pycnidia on branches and stems, and causes the disease known under the old designation as Pod and Stem Blight.

On the basis of the evidence presented above, it seems highly probable that both D. phaseolorum var. sojae and D. phaseolorum var. batatis occur on soybeans in s.w. Ont. and may, upon investigation, be found to cause two distinct diseases as in the United States.

While the exact identity of the disease or diseases may, at the moment, be in doubt, there is no uncertainty as to the widespread occurrence of infected plants and the losses that are being incurred. Killing of plants, first noted on a limited scale about mid-July, became increasingly serious as the season progressed and during September the disease or diseases had reached epidemic proportions. Infection varied from a trace in some stands to virtually complete killing of plants over several acres in others. The variety Hawkeye was extremely susceptible and Lincoln, Monroe, and A.K. Harrow appeared only slightly less so. On Pelee Island, stands of Harman showed only scattered-plant infection while in closely contiguous plantings of Hawkeye and Lincoln over 30% of the plants were affected. In a number of instances soybeans have been grown in unbroken succession for 12 years or more. On both the island and the mainland, however, the severity of the disease or diseases seems to be more closely correlated with the stage of development and with the variety of the host than with repeated cropping or any other factor than can be determined at the moment.

BROWN STEM ROT (Cephalosporium gregatum). With a single outstanding exception, brown stem rot was not nearly so readily apparent in commercial stands this year as last. Small areas of infection were found during September in a number of fields. The exception was a field of the variety Adams, in which, by 22 September, almost all the plants were infected. Adams on the average matures one day earlier than Lincoln, (the latest maturing variety grown commercially in Ont.). The effect of the disease was to cause Adams to appear as if it were maturing very much in advance of Lincoln and, even, of A.K. Harrow, another later-maturing variety.

The readiness with which this disease can be spread by infested soil was convincingly demonstrated in the laboratory plots this year. Early this spring, infested soil from now-abandoned experimental plots was spread over the surface of the soil in a new location, on which soybeans had not been previously cultivated. Six different varieties were planted both on the infested area and on a contiguous plot of the soil. On the infested soil all 6 varieties became virtually 100% infected, while in the disease-free neighbouring plot only trace infection could be found.

Other diseases of sporadic occurrence noted in the course of the survey included: Mosaic (Soja virus 1); Bud Blight (virus of tobacco ring-spot group); Downy Mildew (Peronospora manshurica); Brown Spot (Septoria glycines); an undetermined Powdery Mildew; Bacterial Blight (Pseudomonas glycinea); Fusarium Blight (F. oxysporum f. tracheiphilum); and Sun Scald (non-paresitic).

Other Observations

LEAF SPOT (Cercospora daizu). A trace of this leaf spot was observed in the plots, C.E.F., Ottawa, Ont. (R.J. Baylis).

POD and STEM BLIGHT (Diaporthe phaseolorum var. sojae). All soybean plantings at the C.E.F., Ottawa, were carefully examined in view of the reported high infections in s.w. Ont. At Ottawa, however, only 3 affected plants were found, 2 on 23 August and one on 29 August. The Phomopsis stage only was present. The disease was present in similar amounts in 1949 (R.J. Baylis).

MOSAIC (virus). About 1% of the plants of Early Blackeye were affected in the Horticultural plots, C.E.F., Ottawa, Ont. The affected plants were stunted and some showed an "etch" pattern on the leaves, which suggested that more than one virus was present (K.M. Graham).

SUGAR BEET

LEAF SPOT (Cercospora beticola) occurred sporadically throughout the sugar-beet area in s.w. Ont., but it was not a factor in limiting the quality or yield of roots (A.A. Hildebrand).

BLACK ROOT (various fungi) was much less prevalent in the sugar-beet areas of s. Alta. than in 1949. In samples taken from 48 representative fields before thinning in May, an average of 63% of the plants were infected and 6% were damaged or killed. Phoma betae predominated among the isolates and was obtained from diseased plants in all except 10 of these fields. Aphanomyces cochlioides was obtained from only 4 fields, mainly in low-lying areas. Most

of the infected plants were eliminated during the thinning operation and the remainder of the season was apparently unfavourable for disease development. In the second inspection in July, infection was tr.-sl. in 15 and mod. in one of the 48 fields. Root-rot damage was also negligible in the fields before harvest and in the storage piles (M.W. Cormack).

Black root was present as usual in s.w. Ont. this year but to a much more limited extent than in certain years. During the past 2 years the number of infected fields has not increased in proportion to the greatly expanded acreage. For this reason the disease has not attracted so much attention as formerly (A.A. Hildebrand).

BORON DEFICIENCY was noted in fields of sugar beets in s.w. Ont., especially in areas in Middlesex Co. (A.A. Hildebrand). All the sugar beets were affected in the Joliette district, Que., with a loss of half the crop. Fertilizer containing borax is generally recommended for sugar-beet fields in Que., but these recommendations had not been followed by these 3 growers (E. Lavallee).

SUNFLOWER

Observations in Man. were the subject of a special report by W.E. Sackston.

Cold, wet weather in the spring delayed seeding of sunflowers so late that only about 23,000 acres were sown. Cool, wet weather in July and August further delayed the development of the crop and reduced yields. Twenty-eight fields were visited in the third week of August, when the sunflowers varied from the early green bud stage to full bloom in different fields. In the third week of September, 2 crossing blocks, 5 commercial fields and 11 fields of Foundation stock were examined for disease. W.A. Russell, Dominion Experimental Station, Morden, assisted for part of the early survey and J.A. Fehr, Co-operative Vegetable Oils, Ltd., Altona, in the late survey.

RUST (*Puccinia helianthi*) was not as heavy on sunflowers as in 1949. Some of the outlying fields examined in the early survey were free of rust. Traces-5% of rust were present in 17 fields, 5%-20% (on the lower leaves) in 3; 30% on lower leaves of some plots at Morden, and 70% on lower leaves in 1 field. When Foundation fields were examined late in the season, infection was trace-5% in 4 fields of Sunrise, and traces-5% in 6 of the female inbred S37-388, and 70% in 1 field. Traces occurred in the 2 crossing blocks, both in outlying areas, and traces were found in 1 commercial field, and 5, 10, 15 and 50% respectively in the other 4 fields, all of them in the main sunflower area.

WILT (Sclerotinia sclerotiorum) was found in 12 fields in the early survey. Infection was tr. in 10 fields, 3% in 1, and up to 35% in the plots at Morden. In the late survey, traces were found in 7 Foundation fields, and 5% in 1. Traces were present in 1 of the 2 crossing blocks and in 4 commercial fields, and 20% in 1 other field, in which all the plants in large patches were dead. Previous crops in this field included sunflowers in 1946, oats in 1947, flax in 1948, and wheat in 1949. The grower had particular difficulty in controlling red root pigweed (Amaranthus retroflexus) in this field, and was under the impression that the presence of the weed was related to the severity of the disease.

MISCELLANEOUS. Downy Mildew (Plasmopara halstedii) was conspicuous in patches in the plots at Morden, early in the season, but it was not seen in commercial fields. The lower leaves of many plants in commercial fields were covered with small spots, which were apparently caused by drifting soil during a period of strong winds early in July. Leaf Mottle (cause unknown) was recognized on only 1 plant. Stalk Rot (cause unknown), which was conspicuous in 1949 (P.D.S. 29:35), affected only 1 or 2 plants. 2,4-D injury was observed in several fields adjacent to treated grain fields. One 6-acre portion of a commercial field, and one field of Foundation stock, had to be plowed down because of severe damage by 2,4-D. Traces of neck rot and head rot were found in the plots at Morden, and in 1 commercial field. Sclerotinia sclerotiorum was isolated from the Morden material, and a fungus, later identified by Miss C.A. Loveland as Botrytis sp. of the cinerea type, was recovered from the material. Septoria Leaf Spot (S. helianthi) was not found.

Other Observations

DOWNY MILDEW (Plasmopara halstedii) was observed in 3 separate fields on the farm, School of Agriculture, Ste. Anne de la Pocatiere, Que. In one large field where the disease was most severe sunflowers had not been grown for at least 15 years. In another field where the disease was severe no sunflowers had been grown since 1940 whereas in the third field the last crop of sunflowers was in 1945. Not a trace of downy mildew was found on any of the weeds growing in these fields. The rate of infection may be considerably augmented, when a second seeding is made in the same year in the same soil after the first crop is pulled out, if the results of a small test are indicative. Infection in the first crop was estimated to be 35-40%, whereas the second crop showed infection varying between 80-86% depending on the variety tested (C. Perrault).

RUST (Puccinia helianthi). A mod. infection was noticed in 2 fields of the School of Agriculture, Ste. Anne de la Pocatiere, Que. Traces were present in a third field owned by the School, but at some distance from the others (C. Perrault).

WILT (Sclerotinia sclerotiorum). An occasional plant was found wilted in one of the 3 fields of the School of Agriculture examined at Ste. Anne de la Pocatiere, Que. (C. Perrault).

CULTIVATED and OTHER GRASSES

AGROPYRON - Wheat Grass

Powdery Mildew (Erysiphe graminis) was fairly heavy on A. repens at Vernon River, P.E.I., on 8 Sept. (J.E. Campbell).

Leaf Rust (Puccinia clematidis). Infection was heavy on A. trachycaulon var. trachycaulon at Ladner, B.C., and on A. repens at Point Grey (H.N.W. Toms).

Stem Rust (Puccinia graminis) was sev. on A. repens at Guelph, Ont.; nearby common barberry had borne an abundance of pycnia and aecia (J.D. Gilpatrick).

Stem Smut (Ustilago hypodytes) was found on a few plants of A. repens in a low-lying area near Okanagan Lake, at Summerland, B.C. (G.E. Woolliams)

AGROSTIS

Stem Rust (Puccinia graminis) was general on A. stolonifera at Ladner, B.C., on 17 Aug. (H.N.W. Toms).

ARRHENATHERUM ELATIUS - Tall Oat Grass

Smut (Ustilago avenae) affected 10% of the plants of A. elatius in rod rows at the Station, Saanichton, B.C. (W. Jones).

BROMUS - Brome Grass

Ergot (Claviceps purpurea). Infection was 5-sl./12 stands of B. inermis examined in s. Alta. (M.W. Cormack).

Leaf Spot (Selenophoma bromigena). Infection was 5-tr. 5-mod./12 stands of B. inermis in s. Alta. (M.W. Cormack). Infection was general in all older fields of B. inermis in Sask., the damage being mod.; infection was light in younger fields (H.W. Mead).

CALAMAGROSTIS

Leaf Gall Nematode (Ditylenchus graminophilus). Mod. infestations were again present on C. canadensis in some of the localities in Kamouraska Co., Que., where the nematode was found for the first time last year (A. Payette).

DACTYLIS GLOMERATA - Orchard Grass

Purple Leaf Spot (Mastigosporium rubricosum) was general and caused considerable damage to the late foliage at Saanichton, B.C.; the fungus was sporulating on 6 March (W. Jones).

Brown Stripe (Scolecotrichum graminis) was prevalent on the leaves in the fall at Saanichton, B.C. In March no leaf infection was evident, but conidia and conidiophores were abundant on overwintered leaves (W. Jones). A sl. infection was present on clone plantings at the Agassiz Farm on 31 July (H.N.W. Toms).

ELYMUS - Rye Grass

Stripe Rust (Puccinia glumarum). Common on E. glaucus along roadside in North Saanich, B.C. (W. Jones).

HOLCUS LANATUS - Velvet Grass

Twist (Dilophospora alopecuri). Sl. infection in a low area at Sidney, B.C. (W. Jones).

Leaf Smut (Entyloma crastophilum). Only 2 leaves were found affected at the substation, Ladner, B.C.; this is a new record for Canada (H.N.W. Toms, D.B.O. Savile).

Leaf Rust (Puccinia coronata). Slight infection was found at Point Grey, B.C., 3 Aug. (H.N.W. Toms, D.B.O. Savile).

HORDEUM - Barley

Powdery Mildew (Erysiphe graminis). Mod. infection on a plant of H. jubatum near Lacombe, Alta. (A.W. Henry).

Smut (Ustilago bullata). Sev. infection found on H. jubatum on a farm at Vernon, B.C. (G.E. Woolliams).

LOLIUM PERENNE - Perennial Rye Grass

Ergot (Claviceps purpurea) infected 25% of the heads of some clones of L. perenne at the Farm, Agassiz, B.C. A trace was also present on volunteer plants in the grass plots, U.B.C., Vancouver (H.N.W. Toms).

PHLEUM PRATENSE - Timothy

Stem Rust (Puccinia graminis var. phlei-pratensis). Infection was sl., Ladner, B.C. on 7 Aug. (H.N.W. Toms); sev. on timothy at Guelph, Ont. (J.D. Gilpatrick); heavy late in the season in Queens Co., P.E.I. (R.R. Hurst).

Brown Stripe (Scolecotrichum graminis) was heavy on Climax timothy, C.E.F., Ottawa. No damage to seed set was apparent, but the plants were a very reddish yellow colour near maturity. When the seed was tested for disease it was found that the fungus was seed-borne, a finding nor previously reported (R.J. Baylis).

POA

Leaf Rust (Puccinia poae-sudeticae) was found on P. compressa on the range plots at Kamloops, B.C., on plants taken there from Vancouver (V.C. Brink, H.N.W. Toms).

LAWNS and TURF

Fairy Rings (Marasmius oreades) were found widely distributed this year in coastal B.C. (W.R. Foster).

111. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

BASAL ROT (Fusarium oxysporum) caused stunting of growth of young Martha Washington plants in a 50 ft. row at Vernon, B.C. (G.E. Woolliams).

WILT (Fusarium spp.). Affected specimens were received from a farm at Exeter, Ont.; the entire planting of 100 acres was reported to be unthrifty and unproductive. All plants had a degenerate root system. Isolations yielded several species of Fusarium, including a pathogen (F. oxysporum) of asparagus seedlings (C.D. McKeen, K.M. Graham).

FASCIATION (cause undetermined). A plant in a private garden at Dorn Ridge, N.B., was severely affected (D.J. MacLeod).

BEAN

GREY MOULD (Botrytis cinerea). Infection tr. in Golden Wax and Round Pod Kidney Wax in a garden in Queens Co., P.E.I. (R.R. Hurst). Grey mould caused some damage in all fields of Golden Wax and Improved Logan in the Cannan district, Kings Co., N.S., but halo blight, very heavy rains, and wind damage made it difficult to estimate the amount (K.A. Harrison).

ANTHRACNOSE (Colletotrichum lindemuthianum). Infection was tr.-sev. in the plots, O.A.C., and in gardens around Guelph, Ont. In plots at O.A.C. inoculated with 4 different isolates of the organism the standard commercial varieties were sev. infected, but new varieties received from Cornell University were relatively free of disease (J.D. Gilpatrick). Anthracnose was reported to have been sev. for 4-5 years in a garden in Algonquin Park (H.N. Racicot).

Anthracnose was not common in the Montreal district, Que., in 1950, but one $\frac{1}{2}$ acre field of Pencil Pod was nearly 100% infected at Ste. Dorothee, Laval Co. (E. Lavallee). The disease was severe in $\frac{1}{4}$ acre planting near Hull for the second successive year; no rotation was followed (K.M. Graham). Anthracnose completely destroyed 4 rows of late planting in a small garden at Kentville, N.S. (K.A. Harrison); sev. infected specimens were received from Digby (H.N. Racicot). Infection was tr.-sev. in wax beans in gardens in Queens Co., P.E.I. (R.R. Hurst) and a trace on Improved Golden Wax in a garden at Torbay, Nfld. (G.C. Morgan).

HALO BLIGHT (Pseudomonas phaseolicola). In most fields examined in the B.C. Interior infection was only sl., the severest being on Ashley Wax (75%), which was grown from seed produced in a sev. infected field in 1949 (G.E. Woolliams). Damage was sev. in several plantings at Lethbridge, Alta., but it was confined to localized areas in the Station plots (M.W. Cormack). Only tr. infections were noted at Lacombe and Edmonton (T.R.D.). Infection was rather sev. on the leaves with few spots on the pods in a planting of several acres in Wentworth Co., Ont. (J.K. Richardson). Halo blight affected 10% of the plants with trace on pods in a $\frac{1}{4}$ acre planting of Masterpiece at Ottawa (V.R. Wallen). The disease affected only single hills in a planting near Hull, Que., but the damage was severe on the 5% affected (K.M. Graham).

The Cannan district, N.S., usually harvests 4000 hampers of beans. Damage from halo blight is estimated to have reduced the 1950 crop to less than 1000 hampers. The principal variety is Golden Wax and plantings of this variety in other communities were not nearly so severely affected. One grower with 4 acres sprayed with bordeaux 7-8-100 felt that the treatment had paid on the younger plants. Improved Logan seemed to be damaged less than Golden Wax (K.A. Harrison).

POD ROT (Pythium ultimum) affected a few pods where they came in contact with the ground in a garden in Saskatoon, Sask. The organism was isolated (T.C. Vanterpool).

STEM ROT (Sclerotinia sclerotiorum) caused a sl. infection in several fields in the Thompson River Valley, B.C. (G.E. Woolliams). A mod. infection developed in a garden in Saskatoon, Sask., but too late to do much damage (T.C. Vanterpool).

RUST (Uromyces appendiculatus). Infection sl. on Kentucky Wonder in a home garden in Kings Co., N.S. (K.A. Harrison), and mod. on a specimen brought to the laboratory from Queens Co., P.E.I. (R.R. Hurst).

COMMON BLIGHT (Xanthomonas phaseoli). Diseased specimens were received from North Battleford, Sask. (T.C. Vanterpool). The disease was sev. in a plot at Saskatoon, and the crop was a total loss (E.T. Reeder). A mod. infection in a planting at Carman, Man. (W.A.F. Hagborg). Infection was heavy on the leaves of 30% of the plants in a plot of Ottawa BA-1 at Ottawa, Ont., on 8 Aug., while the pods at the time showed only a trace (V.R. Wallen). A 25% infection was seen on Brittle Wax at Farnham East, Que. (E. Lavallee).

BACTERIAL BLIGHT (Xanthomonas phaseoli and Pseudomonas phaseolicola). Numerous cases were observed in Sask.; in some the infection was sl.-mod. but more commonly it was sev. with the crop a failure (R.J.L.). A disease of field beans, which we diagnosed as bacterial blight, caused so much damage to the seed in the Hensall region of Huron Co., Ont., that it was unsaleable. The most severely affected beans came from low-lying farms where the drainage was poor; upland farms bordering Lake Huron produced high-quality beans (A.A. Hildebrand).

MOSAIC (virus). A tr. infection was found in nearly all bean crops inspected in B.C. Interior (G.E. Woolliams). Half the plants were infected in a $\frac{1}{2}$ acre plot of Ottawa BA-1 at Ottawa, Ont.; numerous plants stunted and malformed with no seed set by some (V.R. Wallen). A few affected plants were found in most of the 20 bean fields examined in the Montreal area, Que.; the highest infection was 0.5% in a field at Stanbridge East. The disease seems on the increase (E. Lavallee). Mosaic affected 20% of the plants in Ace and Yellow Eye at the Station, Kentville, N.S. (K.A. Harrison).

YELLOW MOSAIC (Phaseolus virus 2). A trace in a field of Pencil Pod Black Wax at Lavington, B.C. (G.E. Woolliams). Three plants showed yellow mosaic in a garden at the Station, Fredericton, N.B.; a nearby plot of gladioli showed a faint mottling of the leaves (D.J. MacLeod).

CHLOROTIC BLOTCHING followed by delayed greening was observed on beans in the Field Husbandry plots, at the University, Saskatoon, Sask., on 16 June following high soil surface temperatures 10-14 June. Seedlings that were through the ground by 10 June were not damaged (T.C. Vanterpool).

2,4-D INJURY resulted in some damage to 3 fields near treated grain fields at Cannan, N.S. (K.A. Harrison). Injury from 2,4-D was also noticed in B.C. (W.R. Foster).

BEET

LEAF SPOT (Cercospora beticola). Infection was sl. on leaves in a plot of Detroit Dark Red at Ottawa, Ont. (V.R. Wallen); tr.-mod. on beets in gardens in Queens Co., P.E.I. (R.R. Hurst); and sl. in 2 plots and mod. in 3 out of a small number visited in Nfld. (G.C. Morgan).

DOWNY MILDEW (Peronospora schachtii) was general in plantings of stecklings of Detroit Dark Red near Victoria and at the Station, Saanichton, B.C. The fungus was sporulating freely on 6 Dec. (W. Jones, J. Scholefield).

LEAF SPOT (Phoma betae). Infection was sl. on a few steckling plants of Detroit Dark Red at the Station, Saanichton, B.C., on 6 Nov. (W. Jones); sl. on D.D.R. #16 in a small plot at Ottawa on 30 Aug. (V.R. Wallen).

SCAB (Streptomyces scabies) more or less affected most of the beets in the plots at St. Martin, Laval Co., Que. (E. Lavallee). Infection was heavy in a box of roots brought in for examination from Queens Co., P.E.I. (R.R. Hurst). Farmers claim that scab was fairly heavy in central Nfld., while infection was sl. on the e. and w. coasts; 10 plots ($\frac{1}{4}$ acre) in Conception Bay produced roots carrying fairly heavy scab (G.C. Morgan).

RUST (Uromyces betae) was fairly general on stecklings of Detroit Dark Red grown for the 1951 crop on Vancouver I., B.C.; the rust was sporulating abundantly on 6 Nov. (W. Jones).

ROOT CANKER (Boron deficiency) affected half the roots of Detroit Dark Red in a planting at the Station, Saanichton, B.C.; damage was considerable (W. Jones).

BROCCOLI

CLUB ROOT (Plasmodiophora brassicae) affected a few plants in a garden at Victoria, B.C. (W. Jones).

BRUSSELS SPROUTS

DOWNY MILDEW (Peronospora brassicae) was found on all sprouts examined from one crop grown in B.C. (W.R. Foster).

2,4-D INJURY. Two cases of injury observed in B.C. were traced to the use of improperly-cleaned knapsack sprayers (W.R. Foster).

CABBAGE

GREY MOULD (Botrytis cinerea) was causing a sev. rot of 3% of the heads in a damp storage at St. Phillips, near St. John's Nfld., in April (G.C. Morgan).

SOFT ROT (Erwinia carotovora) sev. affected 15% of the heads of Danish Ballhead in one storage at St. John's, Nfld., following a severe chilling (G.C. Morgan).

YELLOWS (Fusarium conglutinans). In late August, 85% of the plants of Danish Ballhead were affected in a 2-acre field at Wheatley, Ont. Many plants were already dead and others severely affected; the crop was virtually a total loss (C.D. McKeen).

DOWNY MILDEW (Peronospora brassicae). Tr. infections were seen on the outer leaves of Danish Ballhead in two fields at Mount Pearl, Nfld. (G.C. Morgan).

CLUB ROOT (Plasmodiophora brassicae) was general in the Lower Fraser Valley, B.C., especially in delta truck gardens; the early crop escaped, but the later plantings were sev. damaged (I.C. MacSwan). About 3% of the plants were affected in a Chinese market garden at Cloverdale (H.N.W. Toms). Club root was again general on Montreal and Jesus Islands, Que. Losses were very high in many

fields of cabbage and cauliflower; this disease is the worst problem facing the vegetable growers of the area (E. Lavallee). Near Hull, 5-10% of the plants of E.J. Wakefield and Danish Ballhead were already sev. clubbed by 11 July (K.M. Graham). Every plant was affected in a garden at the Station, Kentville, N.S. (K.A. Harrison). Sl. affected plants were brought to the laboratory from Queens Co., P.E.I. (R.R. Hurst). Club root is a very serious disease in Nfld., causing much loss in cabbage especially in the Notre Dame Bay and South Coast areas; losses in late cabbage crops up to 80% this year. No crop rotation is practised (G.C. Morgan).

BACTERIAL LEAF SPOT (Pseudomonas maculicola). Two affected heads from a shipment from the southern U.S. were received from Belleville, Ont. In one head the bacteria had penetrated to the centre of the head; in the other only the outer part was affected. The organism was isolated (D.S. MacLachlan).

WIRE STEM (Rhizoctonia solani) is prevalent on cabbage, cauliflowers and turnips in hot beds in the Montreal district, Que., and losses are heavy, although bed treatment with Arasan is used more and more with very satisfactory results (E. Lavallee). Wire stem destroyed 20% of the cabbage plants in one late seeding and 75% in another in Nfld. (G.C. Morgan).

BLACK ROT (Xanthomonas campestris) caused mod. loss in a field of cabbages at Lumsden, Sask. (R.J. Ledingham). Diseased specimens were received from Brantford, Ont. (E.H. Garrard).

FASCIATION (cause undetermined). Two plants in a garden at the Station, Fredericton, N.B., showed sev. fasciation (D.J. MacLeod).

CARROT

SOFT ROT (Erwinia carotovora) affected 10% of the roots of Chantenay in a crop on muck soil, which was quite wet, at Okanagan Mission, B.C. (G.E. Woolliams).

RHIZOCTONIA (Pellicularia filamentosa (R. solani). At harvest a few carrots sev. infected with sclerotia were found in the garden at Saskatoon, Sask., in which the perfect stage was found on potato (q.v.) in August. The sclerotia could be easily removed; penetration of the mycelium into the carrot must have been sl. (T.C. Vanterpool).

RHIZOPUS ROT (Rhizopus sp.) was observed on carrots in storage at Edmonton, Alta. (A.W. Henry).

BLACK ROT (Stemphylium radicinum (M.D. & E.) Neerg. (= Alternaria radicina M.D. & E.) caused reduction of yield in some stands set out for seed in the B.C. Interior. Losses varied from sl. to 25-30% (G.E. Woolliams). The disease was affecting 10% of the roots in a lot in storage at Berwick, N.S., on 18 Nov. (K.A. Harrison).

SCLEROTINIA ROT (S. sclerotiorum) completely destroyed the crop from a small garden at Gaspereaux, N.S., by 29 Nov. (K.A. Harrison).

BACTERIAL BLIGHT (Xanthomonas carotae) was found, as usual, on seed crops in Interior B.C., but it did not cause much damage (G.E. Woolliams).

YELLOWS (Callistephus virus 1) was present in only sl. amounts in Interior B.C. and caused little damage to seed crops (G.E. Woolliams). A few plants were found affected in a field at Taber, Alta. (M.W. Cormack) and in plantings at Edmonton (T.R. Davidson). Yellows infection was tr.-26% in commercial fields in York, Sunbury, Queens, Westmorland and Carleton Counties, N.B.; the damage was sev. in the field showing 26% (D.J. MacLeod). Traces only were recorded in Kings Co., N.S.; yellows spread very slowly in carrot fields this year (K.A. Harrison). Several fields of carrots showed signs of yellows in Nfld. As noted by Hockey (P.D.S. 29:xx) the fall dandelion is very prevalent and is affected with yellows (G.C. Morgan).

CAULIFLOWER

DOWNY MILDEW (Peronospora brassicae). About 25% of the plants were affected in a 2-acre field of Snowball at Surrey, B.C. The current symptoms were numerous dark spots with a paling of the intercostal tissues to give a pronounced mottle to the affected leaves, which finally die (I.C. MacSwan, W. Jones).

CLUB ROOT (Plasmodiophora brassicae). An affected plant received from Gibsons Landing, B.C. (I.C. MacSwan). About 25% of 1400 plants were affected in a planting in Montreal, Que.; the land was being cropped to cauliflower for the second year after an excellent crop the first (K.M. Graham). Club root was prevalent on young plants in a garden near St. John's, Nfld.; plants were sev. affected in a field at Mount Pearl (G.C. Morgan).

BACTERIAL SPOT (Pseudomonas maculicola). A single affected head was seen on the market at Ottawa, Ont., on 23 Sept.; where it was grown is unknown. Sunken black spots were present on the peduncles and pedicels (K.M. Graham).

WIRE STEM (Rhizoctonia solani) affected flats of transplants in a greenhouse in St. John's, Nfld.; loss was about 25% of the plants (G.C. Morgan).

WHIPTAIL (molybdenum deficiency). A 2-acre field was sev. affected at St. Martin, Laval Co., Que.; losses were heavy (E. Lavallee). Two plants showed severe whiptail in a private garden in Fredericton, N.B.; the soil was acid, pH 5.0 (D.J. MacLeod). Whiptail was observed affecting several varieties in a planting in Queens Co., P.E.I., on 15 Aug. Snowball and Dan America were most severely affected while Stokes and Ewing were least affected. Applications of ammonium molybdate to 24 plants at the rate of 20 lb. per acre in late August had a noticeably beneficial effect (D. Robinson).

CELERY

EARLY BLIGHT (Cercospora apii) was more prevalent than usual on celery (Salt Lake variety) in the laboratory plots, St. Catharines, Ont., and caused considerable damage. Early blight was about as heavy as late blight in these plots (J.K. Richardson). Early blight was found in only 2 fields located at St. Martin, Que.; the same two were affected last year. They are on muck land and no crop rotation is practised (E. Lavallee).

LATE BLIGHT (Septoria apii-graveolentis). A mod. infection developed on the outside rows that did not receive adequate coverage with a fungicide in a 5-acre field in B.C. (I.C. MacSwan). Sev. infection observed in a market garden at Edmonton, Alta. (L.E. Tyner). Infection was considerable on both the yellow and green varieties particularly in poorly sprayed fields in Lincoln, Wentworth and Simcoe Counties, Ont. The Bradford Marsh was very severely attacked, resulting in considerable loss at harvest (J.K. Richardson). Late blight was general in celery fields in Laval Co., Que. The disease appeared earlier than usual and its prevalence varied with the number of spray applications and the thoroughness with which the sprays were applied (E. Lavallee).

STEM CRACKING (boron deficiency), which used to be found here and there in Laval Co., Que., is no longer a problem since all growers use fertilizers containing borax (E. Lavallee).

YELLOWS (Callistephus virus 1, western strain). A commercial field in Sunbury Co., N.B., showed 2% yellows; zinnias growing near this field showed 4% of the plants affected. These two hosts are highly resistant to the common eastern strain of the virus (D.J. MacLeod).

CHINESE CABBAGE

CLUB ROOT (Plasmodiophora brassicae) affected a few plants at the Station, Saanichton, B.C., (W. Jones) and 1% of the plants in a small bed at Cloverdale (H.N.W. Toms).

CUCUMBER

LEAF SPOT (Alternaria sp.). A few plants were found affected in the test plots, U.B.C., Vancouver, and in a garden at Mission, B.C. (H.N.W. Toms). The disease was widespread in plots and gardens in Kent Co., N.S., infection being tr.-sev. (K.A. Harrison). The etiology of this disease is virtually unknown; cf. P.D.S. 28:42 (I.L.C.).

GREY MOULD (Botrytis cinerea) was sev. in several greenhouse crops in April and May at Leamington, Ont. Up to 20% of the plants were destroyed in 3 houses. Stem lesions were unnoticed by the growers until the plants wilted (C.D. McKeen).

SCAB (Cladosporium cucumerinum) was present in many cucumber crops both in the greenhouse and field at Leamington, Ont., but, as usual, it caused little damage (C.D. McKeen). A severe case was reported from Pembroke, Ont. (K.M. Graham). At St. Laurent, Montreal Island, Que., 200 cucumber beds were very severely affected, losses amounting to $4000. The beds situated at the same spot last year were also diseased (E. Lavallee). Scab caused sl.-sev. damage in Queens Co., P.E.I., depending on the field (K.K. Hurst).

BACTERIAL WILT (Erwinia tracheiphila) was, as usual, present in tr. amounts in many fields in the Harrow-Leamington area, Ont. (C.D. McKeen). Diseased specimens received from Guelph, Ont. (E.H. Garrard). The disease was sev. in a field in Frontenac Co. (D.S. MacLachlan). Tr.-mod. infections were seen about Ottawa (H.N. Racicot). With a big increase in acreage of pickling cucumbers in Kings Co., N.S., most fields showed a few vines that had died from bacterial wilt (K.A. Harrison).

POWDERY MILDEW (Erysiphe cichoracearum) developed in late June or early July in several greenhouse crops at Leamington, Ont.; sulphur dusts kept the disease under control (C.D. McKeen). The disease was present on the lower leaves of a greenhouse crop in Lincoln Co. in January; damage was sl. (G.C. Chamberlain).

WILT (Mycosphaerella citrulina) sev. infected a greenhouse crop at Leamington, Ont., destroying half the crop. Previously the disease has been found on mature or senescent plants but in 1950 comparatively young plants were attacked and rapidly destroyed. Poor control was obtained by spraying or painting the lesions with a ferbam paste, a treatment that has proved highly effective against grey mould (C.D. McKeen).

ANGULAR LEAF SPOT (Pseudomonas lachrymans). Sl. infection observed in a field at Edmonton, Alta. (L.E. Tyner). Leaf and fruit infection was sl. in plantings at Lethbridge and Taber and mod.-sev. in a field, which was irrigated by sprinkler, at Medicine Hat (M.W. Cormack).

DAMPING-OFF (Pythium ultimum) caused losses of tr.-5% in the early greenhouse crop (C.D. McKeen).

STEM ROT (Sclerotinia sclerotiorum). A tr. was observed in one greenhouse at Leamington, Ont. (C.D. McKeen). Stem rot caused sl. damage in a greenhouse at Falmouth, N.S., in April. The stem cankers were the result of infection from diseased corollas that had lodged in the leaf axils. Several clumps of apothecia were found in the greenhouse soil (J.F. Hockey, K.A. Harrison).

MOSAIC (Cucumis virus 1) affected about 10% of the plants in the Horticulture variety plots, C.E.F., Ottawa, Ont. (K.M. Graham). Mosaic affected 25-35% of the plants in about 30 beds placed in the same spot for many years at St. Jean, Que. (E. Lavallee). Two plants were found affected in a commercial field in Sunbury Co., N.B. The virus was transmitted from one plant by sap inoculation to Nicotiana tabacum, Capsicum annuum and Vicia faba. The symptoms that developed in each host were typical of Cucumis virus 1 (D.J. MacLeod). A trace of mosaic was observed in one planting in Queens Co., P.E.I. (R.R. Hurst).

FOOT ROT (cause unknown) was found in several greenhouse crops about Leamington, Ont., and a trace was found early in the season in one field at Harrow. Species of Fusarium have been isolated, but none of the isolates proved pathogenic under a wide variety of conditions (C.D. McKeen).

EGGPLANT

DAMPING-OFF (Rhizoctonia solani). This pathogen has been found to be responsible for most of both the pre- and the post-emergence damping-off in eggplant. Losses of 60% of the seedlings have been observed in stands at Harrow, Ont., in recent years. Soil treatment with Arasan has proved rather ineffective in its control in eggplant (C.D. McKeen).

WILT (Verticillium albo-atrum). The pathogen was isolated from diseased plants in the plots at the Station, Summerland, B.C. (G.E. Woolliams). Up to 20% of the plants were affected in several fields at Harrow, Ont. (C.D. McKeen). The only case observed this year was in a garden at Simcoe, Ont., where 3/4 of the plants were affected and the crop was considerably reduced (J.K. Richardson). Wilt affected about 5% of the plants in the variety plots, C.E.F., Ottawa, Ont.; the pathogen was isolated (K.M. Graham).

HOP

DOWNY MILDEW (Pseudoperonospora humuli). A slight infection was observed at Sardis, B.C., 8 Jan.; the infection was less than normal (W. Jones).

Weather conditions were favourable for the growth of hops in the spring of 1950 in the hop-growing district about Fournier, Ont. At the Hop Illustration Station there, downy mildew spikes were not numerous and disease was very effectively controlled by roguing of the diseased spikes until all vines were trained on the poles. Effective control was then maintained by the following schedule: (1) the fixed copper, C.O.C.S., (8 lb. per 100 gal. water) applied 15 June at the rate of 160 gal. per acre and 450 lb. pressure with a tractor-drawn power-take-off sprayer equipped with 4 spray guns; (2) the same applied 24 June at 500 lb. pressure, 160 gal. per acre; (3) the same plus

nicotine applied 1-3 July; (4) and (5) bordeaux 4-4-40 applied 13 and 21 July, 180 gal. per acre (on account of incomplete coverage with the 4th spray, the yards were dusted with C.O.C.S. 40 lb. per acre during the evening of 21 July or morning of 22 July); (6) bordeaux 4-4-40 applied 24 July, 150 gal. per acre; and (7) C.O.C.S. dust, 40 lb. per acre 29 July.

Most growers dust rather than spray their hops. Where applications were made at regular intervals and sufficient material was used to obtain good coverage, a satisfactory crop was harvested. Where any neglect occurred, particularly in late July, considerable losses occurred from downy mildew. High winds and rains, often over consecutive days, during this period made it difficult to maintain a protective cover. A combination of spraying and dusting gave the best control under these circumstances (A.E. Barrett).

RHIZOCTONIA (R. solani) caused considerable damage at Sardis, B.C., to young shoots, which developed from below the soil line after the plants were pruned. The growth of the plants was checked. The organism was isolated and its pathogenicity proved (W. Jones).

JERUSALEM ARTICHOKE

STEM ROT (Sclerotinia sclerotiorum) affected about 25% of the stems growing in 40 sq. ft. of a home garden at Vancouver, B.C.; about 18 in. of the stem above g ound was covered by a mycelial felt, studded with sclerotia of moderate size and with small sclerotia in the pith. Although the stems were beginning to die back naturally, healthy stems were still green and turgid (H.N.W. Toms).

KALE

CLUB ROOT (Plasmodiophora brassicae) affected a few plants in a garden in Victoria, B.C. (W. Jones).

LETTUCE

GREY MOULD (Botrytis cinerea). A few heads were badly rotted in a garden in Saskatoon, Sask. (T.C. Vanterpool). The disease severely affected about 10% of the plants in a garden in Queens Co., P.E.I. (R.R. Hurst).

DOWNY MILDEW (Bremia lactucae) was general in a seed crop at the Station, Saanichton, B.C., causing mod. damage. The fungus was sporulating 3/4 way up the stems (W. Jones).

BOTTOM ROT (Rhizoctonia solani) caused 50% of the crop to be lost in a small planting at Leamington, Ont. (C.D. McKeen).

WILT (Sclerotinia sclerotiorum) affected 20% of the plants in a seed crop at Okanagan Mission, B.C., causing their death after they blossomed (G.E. Woolliams).

YELLOWS (?Callistephus virus 1) affected 1% of the Grand Rapids plants in the Horticulture plots, C.E.F., Ottawa, Ont.; the symptoms were a blanching and stunting of the leaves and delay in the emergence of the buds (K.M. Graham). A light infection of "white heart" was present along one side of a field planted for a fall crop at Grand Pre, N.S. (K.A. Harrison).

BLACK HEART (boron deficiency). Affected plants showing microscopic symptoms of boron deficiency were received from North Sydney, N.S.; inner affected tissues free from micro-organisms (H.N. Racicot). This disorder was found severely affecting 7 plants in a garden in Queens Co., P.E.I. I believe that this is the first report of this disorder in lettuce in P.E.I. (R.R. Hurst).

TIP BURN (physiological). Many scattered reports received and samples examined in July and August in Kings Co., N.S. Several growers lost up to 60% of the crop grown too late into the summer (K.A. Harrison).

BACTERIAL ROT (unidentified bacterium) severely affected about $\frac{1}{4}$ acre of New York lettuce at Charlottetown, P.E.I., 15 Sept. The outer leaves turned brown and became dry from the margin inwards. The inner leaves showed a wet, dark, marginal rot invaded by a gram negative bacterium. Land fertile and crops rotated (D. Robinson).

MELON

LEAF SPOT (Alternaria cucumerinum) was observed in several fields near the end of the cropping season in the Harrow-Leamington area, Ont.; damage was sl. (C.D. McKeen).

POWDERY MILDEW (Erysiphe cichoracearum) appeared in several fields at Leamington, Ont. Little damage occurred in the earlier crops, but defoliation was mod. in the later-maturing ones (C.D. McKeen).

WILT (Fusarium bulbigenum var. niveum) was present in many fields in the Harrow-Leamington area, Ont., and is becoming widespread. On many farms only the resistant variety Iroquois can be grown profitably (C.D. McKeen). Although in the one field observed wilt affected about 10% of the plants in the Ancaster district, growers stated the disease was becoming quite common (J.K. Richardson).

DAMPING-OFF (Pythium irregulare). Several rows of melons and watermelons were almost wiped out in the seedling stage at Saskatoon, Sask. Isolation yielded some Fusaria but chiefly Pythium irregulare (R.J. Ledingham, T.C. Vanterpool).

WILT (Verticillium albo-atrum). The fungus was isolated from affected specimens received from Osoyoos, B.C. (G.E. Woolliams).

MOSAIC (virus). In general, infection was sl.; however, in one field at Leamington, a 50% infection was recorded. No explanation was found for this high infection (C.D. McKeen). In 2 fields of about 5 acres in the Ancaster district, 75 and 80% of the plants were infected and the crop was almost a total loss. Aphids were abundant, which may have been a contributing factor (J.K. Richardson). About 1% of the plants were affected in the Horticulture plots, C.E.F., Ottawa, Ont. (K.M. Graham).

LEAF SPOT (cause undetermined). This apparently new trouble that was so widespread in Essex Co., Ont., in 1949 (P.D.S. 29:48) was observed in parts of 2 fields in 1950. Although the spots show certain characteristics of a bacterial infection, experimental results to date have indicated that it is not of bacterial origin (C.D. McKeen).

ONION

BLACK MOULD (Aspergillus niger). A few affected Sweet Spanish onions were received from Chatham, Ont. (C.D. McKeen).

NECK ROT (Botrytis allii). Mod. infection in a garden at Ladysmith, B.C. This species has been isolated from many diseased samples (W. Jones). A decay of the outer scales of the bulbs appeared in both fall and spring planted onions in early June after prolonged and exceptional cool weather this spring. The disease was fairly general in the Vernon district (G.E. Woolliams). Up to 15% of the Sweet Spanish onions harvested by a large grower near Chatham, Ont.; became affected before or soon after they were placed in storage (C.D. McKeen). Neck rot caused in storage a loss of 15% of the sets of Kenearly grown at the Station, Kentville, N.S. The variety is one developed at the Station to mature the same season when the crop is sown in the field (K.A. Harrison). One sev. diseased lot brought to the Laboratory, Charlottetown, P.E.I. (R.R. Hurst).

BULB ROT (Fusarium sp.) caused sev. damage in one planting in the Winnipeg area, Man.; F. oxysporum f. cepae was readily isolated from the infected bulbs (E. Robertson, W.L. Gordon). A low percentage of Spanish onion bulbs were affected at harvest in one field at Kingsville, Ont., and in another at Chatham (C.D. McKeen).

DOWNY MILDEW (Peronospora destructor). Infection was sev. in a truck garden on Salt Spring Island, B.C., and mod. on a White Portugal seed crop at Saanichton (W. Jones). The disease was sev. on a bulb crop of White Portugal and in smaller amounts on other varieties in the test plots, U.B.C., Vancouver, B.C. (H.N.W. Toms). Owing to a warm dry season downy mildew was virtually absent from the B.C. Interior. It did occur in the Grand Forks district, where two pockets of infection were found in adjacent seed crops (G.E. Woolliams). Infection was mod.-sev. in 1½ acre field near Toronto, Ont. (K.M. Graham).

PINK ROOT (Pyrenochaeta terrestris) greatly reduced the yields in many fields in the Leamington marsh, Ont. There is considerable evidence to indicate that several other organisms are involved in the pink root complex in onions grown on muck soils in s.w. Ont. (C.D. McKeen).

ROOT ROT (Pythium irregulare) was found affecting a small percentage of the Spanish onion seedlings grown in flats in Essex Co., Ont. Remarkably good control was obtained by treating the seed-bed soil with Arasan prior to planting (C.D. McKeen).

SMUT (Urocystis cepulae) affected 1-3% of the onions seeded in the Leamington marsh, Ont. (C.D. McKeen).

CHEMICAL INJURY (excess boron). As a result of faulty field application in the spring, parts of a field planted to seed onions at Grand Forks, B.C., showed injury and many plants eventually died (G.E. Woolliams).

PARSNIP

GREY MOULD (Botrytis cinerea) destroyed part of one root in storage at Centreville, N.S. (K.A. Harrison).

SCLEROTINIA ROT (S. sclerotiorum) was isolated from plants growing in the greenhouse at Edmonton, Alta. (T.R. Davidson).

PEA

LEAF and POD SPOT (Ascochyta pisi). Infection was tr.-sl. in the variety plots and in several plantings at Lethbridge, Alta. (M.W. Cormack). Infection was tr.-sl. on most varieties at Lacombe. About Edmonton the disease became mod.-sev. in some plantings by harvest time (S.G. Fushtey). Infection was mod. in 2 plantings of Lincoln in the Winnipeg area, Man. (W.A.F. Hagborg).

A survey revealed infection to be tr. in 5/22 fields in s.w. Ont., tr.-sl. in a 30-acre field of Glacier at Alliston and mod.-sev. on 25% of the plants in 20-acre field of this variety at Rosemont. Infection was sev. and plants killed in artificially inoculated plots at O.A.C., Guelph; of 61 varieties

tested Scotch, O.A.C. 181, and A-100 appeared to have some resistance to 4 different isolates of A. pisi. Leaves and stems of a volunteer stand of vetch were found sev. infected at Scotland; tr. also at Selkirk, and in a roadside stand of vetch at Thurso, Que. (J.D. Gilpatrick).

A survey for leaf and pod spot were made in fields of peas in eastern Ont., principally the Ottawa Valley. Most of the crop examined was grown from foundation or registered stock. Over most of the area growing conditions were excellent except in the Renfrew district where the pea crop was a failure as a result of extremely dry conditions in the early part of the growing season. No disease was found in 18 fields comprising 16 varieties of garden peas. Of the 20 fields of field peas examined, 3 of Valley and 5 of Chancellor were free of disease while infection was 6-tr. 1-sl./12 fields of Arthur. Many fields of canning peas, largely Canner King, were examined in Prince Edward Co.; all were free of A. pisi and yields appeared the highest in years (V.R. Wallen, A.J. Skolko).

A tr. of leaf and pod spot was found in a small field of Fenland Wonder being grown for seed at Tupperville, N.S. (K.A. Harrison).

POWDERY MILDEW (Erysiphe polygoni) was present in varying amounts on practically all varieties in August in the B.C. Interior (G.E. Woolliams). Infection was mod. at Craigmyle, Alta. (A.W. Henry), and sev. in the plots at Lethbridge in late August on all except early maturing varieties (M.W. Cormack). Powdery mildew was prevalent in the O.A.C. plots and in gardens at Guelph, Ont., in August (J.D. Gilpatrick). Infection was sl. in a field of Valley in the Ottawa district (V.R. Wallen) and a tr. in a field of Fenland Wonder in Kings Co., N.S. (K.A. Harrison).

ROOT ROT and WILT (Fusarium spp.) caused sev. damage to Laxton's Progress in a home garden on Salt Spring Island, B.C. (W. Jones). A spotty infection affecting 1% of the plants was present in 5 acre field of Surprise on Westham Island (I.C. MacSwan). Root rot caused sev. damage in one planting at Lethbridge, Alta. (M.N. Grant). Of the 22 fields examined in s.w. Ont., no root rot (F. solani var. martii) was found in 4, and a few plants were diseased in most fields, but infection was 1% in 4 fields, 5% in 1, 50% in a 30-acre field of Glacier at Alliston (J.D. Gilpatrick). Tr. in small plot of Ottawa PE-8 at Ottawa (V.R. Wallen). Root rot was sev. in a garden patch of Fenland Wonder at Kentville, N.S.; plants kept dying throughout the season after they were 3 in. high; less than half a crop was harvested (K.A. Harrison).

NEMATODES (Heterodera sp.). A few elliptical depauperate areas up to 20 ft. long, were present in a 3-acre field of canning peas at Ladner, B.C. Some of the weeds in these areas were affected by root-knot (I.C. MacSwan, H.N.W. Toms). Reported as H. goettingiana Lieb. by A.D. Baker.

MYCOSPHAERELLA BLIGHT (M. pinodes). A tr. was found in a garden at Guelph, Ont. (J.D. Gilpatrick).

DOWNY MILDEW (Perenospora pisi) was general, causing sev. damage, in a home garden on Salt Spring Island, B.C. (W. Jones). Tr. found at Lethbridge, Alta. (A.W. Henry). Infection was tr. in 30 acres of Glacier and mod. in 12 of Glacier at Elmvale, Ont.; and mod. in 16 acres of Pride at Minesing (J.D. Gilpatrick). As J.D. Gilpatrick and L.V. Busch (U.S.D.A. Pl. Dis. Reporter 34(11):340-341. 15 Nov. 1950) note, heavy infections have not been reported previously in Eastern Canada (I.L.C.).

BACTERIAL BLIGHT (Pseudomonas pisi). Tr. infection in the variety plots at Lacombe, Alta. (S.G. Fushtey). Infection was sl.-mod. in a field of Glacier heavily infected with Ascochyta pisi at Alliston, Ont. (J.D. Gilpatrick).

LEAF BLOTCH (Septoria pisi). A tr. was found in a plot of Linton in the Ottawa district, Ont. (V.R. Wallen).

RUST (Uromyces fabae) was recorded as follows: single leaf in plot at Vancouver, B.C. (H.N.W. Toms); tr. in garden at Guelph, Ont. (J.D. Gilpatrick); sl. infection in 2-acre field of Arthur in the Ottawa district (V.R. Wallen); infection heavy in a late planting of Fenland Wonder in Kings Co., N.S. (K.A. Harrison).

MOSAIC (Pisum virus 1). A tr. was found in garden in Sunbury Co., N.B.; 1% of the plants were affected in a garden at the Fredericton Station. The virus was identified by standard methods (D.J. MacLeod).

PEPPER

ANTHRACNOSE (Colletotrichum sp.) affected up to 20% of the fruits that ripened late in many fields in Essex Co., Ont.; sweet and semi-hot varieties were more affected than pimento or hot types. The Colletotrichum was not determined specifically (C.D. McKeen).

SOFT ROT (Erwinia carotovora). The sl. damage caused in Essex Co., Ont., in 1950 was in striking contrast to the sev. damage in 1949 and was largely confined to fruits that ripened in July. The sl. infection this year is attributed to the cool season, which was unfavourable for the corn borer as this insect is largely responsible for transmission of the disease in s.w. Ont. (C.D. McKeen). Soft rot caused the loss of 15% of the fruits of Harris Earliest at Kentville, N.S., following slug injury to the fruits (K.A. Harrison).

DAMPING-OFF (Pythium sp. and Rhizoctonia Solani) occurred in small amounts in several greenhouses about Harrow, Ont. Treating the soil used in both the seed beds and the transplanting beds has markedly reduced losses from this disease in recent years (C.D. McKeen).

WILT (Verticillium spp.). V. albo-atrum was isolated from diseased specimens from a home garden at Lillooet, B.C. (G.E. Woolliams). Up to 5% of the plants were affected in several fields about Harrow, Ont. (C.D. McKeen).

ETCH (virus). A virus disease, apparently new to Ont., seriously affected the pepper crop in s.w. Ont. All pepper fields examined were affected, losses varying from 10% to almost 100%. Studies to date indicate the virus is a strain of the tobacco etch virus. Greenhouse experiments confirmed field observations that aphids were largely responsible for its transmission (C.D. McKeen). See Virus Diseases under Tobacco (I.L.C.). Mosaic was quite common on most varieties in plantings in the Niagara district. Several plants of the new variety V35 in a garden in Lincoln Co. showed symptoms of a ring spotting, distinct from those caused usually by mosaic (J.K. Richardson).

MILD MOSAIC (Solanum virus 2). Three plants in a garden near a plot of Green Mountain potatoes affected by rugose mosaic (Solanum viruses 1 and 2) at the Station, Fredericton, N.B., showed a mild mosaic. The virus was identified by standard methods (D.J. MacLeod).

STREAK (Solanum virus 1, S strain). Two plants were found affected in a garden at the Station, Fredericton, N.B. The virus was identified by standard methods (D.J. MacLeod).

BLOSSOM-END ROT (non-parasitic). Affected specimens were received from a market garden on Lulu Island, B.C.; the summer was dry (H.N.W. Toms). Blossom-end rot affected up to 10% of the fruit of all varieties in most fields in s. Essex Co., Ont.; most of the damage occurred in August, the hotest part of the season (C.D. McKeen).

SUN SCALD (non-parasitic) caused the loss of 5% of the fruit in a field at Sheffield Mills, N.S.; a good set of fruit was obtained, but foliage was scanty (K.A. Harrison).

POTATO

The Division of Plant Protection, Science Service, supplied the data in Tables 3 to 7 on Seed Potato Certification. All fields entered for certification were planted with Foundation or Foundation A seed.

There was a further increase in the acreage devoted to the seed potato industry in 1950, but, as the percentage of fields passing inspection was less, actually fewer acres passed than in 1949. If the figures for rejection in 1950 are compared with those of last year it will be seen that the only disease less prevalent in 1950 was bacterial ring rot. The amount of mosaic and black leg increased very materially.

Table 4. Seed Potato Certification:
Number of Fields and Acres Inspected, 1950

Province	Number of Fields		Fields Passed %	Number of Acres		Acres Passed %
	Entered	Passed		Entered	Passed	
P.E.I.	8,412	6,871	81.7	35,581	29,628	83.3
N.S.	545	480	88.1	1,119	920.1	82.2
N.B.	3,589	3,194	89.0	27,056	23,049.2	85.2
Que.	1,389	841	60.5	3,676	1,971.8	53.6
Ont.	804	660	82.1	2,575	2,113.8	82.1
Man.	133	121	91.0	607	525	86.5
Sask.	78	76	97.4	137	115.5	84.3
Alta.	290	243	83.8	1,672	1,138.7	68.1
B.C.	963	806	83.7	2,929	2,471	84.4
Total	16,203	13,292	82.0	75,352	61,933.1	82.2

Previous Yearly Totals

1949	15,476	13,739	88.8	72,706	65,051	89.4
1948	15,635	12,504	80.0	70,561	57,392	81.3
1947	14,616	12,605	86.2	60,385	53,474	88.5
1946	14,198	11,628	81.9	66,665	55,256	82.8

Acres Entered		Acres Passed	
1950	75,352	1950	61,933
1949	72,706	1949	65,051
Increase of 2,646 or 3.6%		Decrease of 3,118 or 4.8%	

Table 5. Seed Potato Certification: Acreage Passed by Varieties, 1950

Variety	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.-Alta.	B.C.	Total
Katahdin	4831	291	17899	45	1421	5	39	24,531
Sebago	11336	58	340	1.5	61	2	5	11,803.5
Irish Cobbler	8460	137	1323	128	166	197	5	10,416
Green Mountain	4605	105	2108	1787	107.2	2	127	8,841.2
Netted Gem	18	2	85	5	13	1093	1651	2,867
Bliss Triumph	46	248	728			57		1,079
Pontiac	90		441			162	0.5	693.5
Chippewa	99	29	26		273	0.1	22	449.1
White Rose			70			7	234	311
Warba	20	8	15	0.3	17.3	65.5	118	244.1
Early Epicure						0.1	140	140.1
Sequoia	106	0.1					1	107.1
Columbia Russet						37	69	106
Canus		0.1	0.8	2.2	13	59	8	83.1
Others*	17	42	13.5	2.7	42.2	92.5	51.5	261.4
Total	29628	920.2	23049.3	1971.7	2113.7	1779.2	2471	61,933.1

*These varieties with the acreage of each were: Early Ohio 54.6, Early Rose 31, Rural Russet 28, Canso (391) 23, Carter's Early Favorite 21, Great Scot 16, Red Warba 14, Rural New Yorker (Dooley) 13, McIntyre 8.1, Garnet Chili 8, Keswick (431) 7.25, Mohawk 7, Pawnee 6.2, White Bliss 6, Burbank 4.5, Sir Walter Raleigh 4, Gold Coin 4, Up-to-date 3, Clarka #3 2, and Arran Victory 0.75.

Table 6. Seed Potato Certification: Fields Rejected on Field Inspection, 1950

Province	Leaf Roll	Mosaic	Ring Rot in field	Ring Rot on farm	Black Leg	Wilts	Adjacent Diseased Fields	Foreign Var.	Misc.	Total
P.E.I.	84	456	-	-	245	124	86	195	351	1,541
N.S.	4	19	6	11	3	2	7	7	6	65
N.B.	49	143	92	34	16	-	14	33	14	395
Que.	28	149	140	59	98	-	45	10	19	548
Ont.	41	12	14	6	27	7	9	6	22	144
Man.	-	-	8	2	-	-	-	1	1	12
Sask.	-	1	-	-	1	-	-	-	-	2
Alta.	-	-	2	5	33	-	1	1	5	47
B.C.	38	16	-	-	34	2	13	15	39	157
Total	244	796	262	117	457	135	175	268	457	2,911
Rejections as a percentage of fields:										
Entered	1.5	4.9	1.6	0.7	2.8	0.9	1.1	1.7	2.8	18.0%
Rejected	8.4	27.4	9.0	4.0	15.7	4.6	6.0	9.2	15.7	100%

Table 7. Seed Potato Certification: Average Percentages of Diseases found in Fields, 1950

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	.33	.02	.07	.39	.03	.08	.04	.30	.14
Leaf Roll	.14	.06	.13	.08	.04	.03	.04	.02	.15
Mosaic	.25	.19	.21	.37	.01	.08	.16	.01	.09
Fields passed: (final inspection)									
Black Leg	.02	.01	.04	.10	.01	.03	.01	.03	.04
Leaf Roll	.01	.03	.04	.02	.02	—	.01	—	.02
Mosaic	.01	.03	.05	.04	.01	.02	.01	—	.02

The variety picture also shows many changes. Sebago has become the most widely grown variety in P.E.I. with the result that the certified acreage of Sebego was only second to Katahdin, the most popular variety in N.B., whereas Irish Cobbler and Green Mountain have now dropped to the third and fourth places respectively. Katahdin appears to yield better than Green Mountain and to produce a crop equal to the latter variety in quality in the warmer sections of the eastern United States and possibly in southwestern Ont. This variety thus enjoys a firmer export market than other varieties. Sebago is very popular with the restaurant trade and manufacturers of potato chips. Moreover it appears to be less susceptible to late blight, an important advantage in P.E.I.; on the other hand it is susceptible to wilt and storage dry rot. Although no precise figures are available on how far Katahdin and Sebago have replaced the high-quality varieties Green Mountain and Irish Cobbler in the table stock trade in eastern Canada, the replacement must be considerable to the detriment of quality. Many other old varieties besides the leaders are also declining in importance to be replaced by new varieties. Of the latter mention should be made of two new seedling varieties produced at the Station, Fredericton, N.B., under the co-operative potato breeding project of Science Service and Experimental Farms Service. These varieties named Canso (#391) and Keswick (#431) are resistant to late blight, the former being particularly promising.

EARLY BLIGHT (Alternaria solani) infection was 100-sl. 20-mod. 3-sev./997 fields inspected in B.C., particularly in fields in the Grand Forks and Cariboo districts (H.S. MacLeod). The disease was general on the new varieties Keswick and Canso, the former being much more susceptible than our standard varieties. It was also quite common in gardens in Vancouver Island where growing conditions were dry (W. Jones). Early blight developed late in the growing season and infection was tr.-mod. throughout central and n. Alta. Early varieties were most sev. infected (T.R. Davidson, J.W. Marritt). The pathogen was isolated from plants showing severe top burning and other atypical symptoms from a field near Coutts (M.W. Cormack). Early blight appeared in most districts in Sask. and caused partial to complete defoliation in a few fields of early potatoes that had escaped the mid-August frosts (A. Charlebois). Infection was a tr. on early varieties in the Winkler area, Man., and mod. in fields in the Rainy River and Thumber Bay districts, Ont. (D.J. Petty). From 16 isolations made from affected tubers received from Minnedosa, Man., 27 February, 13 colonies of A. solani were obtained; according to A.A. Dilworth, Agr. Representative, the tubers appeared normal when dug, "but during the winter they have been turning black and losing their moisture" (H.N. Racicot).

Early blight was found in many fields in the London district, Ont., but it caused little damage (F.J. Hudson). The disease also caused little damage in district 2, except in a field in Durham Co., where the injury was mod. (W.L.S. Kemp). Late blight was even less prevalent than usual in district 3. However in a trial plot, which was not sprayed with a fungicide, Keswick was almost completely destroyed by September (H.W. Whiteside). In e. Ont., early blight was observed in 24/74 fields examined, but in none was it severe (O.W. Lachaine). Although the disease may not have been of importance in commercial

plantings in e. Ont., diseased specimens were received by 27 July and those arriving about mid-Aug. were mod.-sev. infected (H.N. Racicot). A mod. infection was noted in most fields in n. Que.; elsewhere it occurred in negligible amounts except in isolated cases where infection was sev. by 15 Aug. (B. Baribeau). Early blight was present in most parts of N.B., but infection was sl. in nearly all fields. Tuber rot was observed in a few bins during the winter and spring shipping season, but the loss was negligible (C.H. Godwin). Early blight was very sev. in certain fields of Early Rose, Irish Cobbler and Canso in Kings and Colchester counties, N.S. The disease appeared early following dry weather in the early summer; many fields showed every leaf infected and then died down early (K.A. Harrison). Although early blight was possibly present in more fields in N.S. in 1950 than in 1949, sev. infections were noted in only a few. The most severe infections reported were in Keswick and Canso, particularly in the former (R.C. Layton). Infection was generally light in P.E.I. and damage was negligible (S.G. Peppin). A trace of rot was present in one 1949 lot in storage on 2 Feb. (R.R. Hurst). Early blight was found in 20 fields in Avalon Peninsula, Nfld. It was late in developing and was less prevalent than last year. In several bins last winter a rot attributed to A. solani infected about 5% of the tubers (G.C. Morgan).

LEAF SPOT (Botrytis cinerea) was common in many fields in N.B.; it developed under humid conditions when the withered flowers adhered to the leaf surfaces (J.L. Howatt).

BLACK DOT (Colletotrichum atramentarium) was found affecting Irish Cobbler potatoes in a garden at Bon Accord, Alta.; seed was obtained from N.B. (A.W. Henry). The fungus was very conspicuous on vines at harvest in a garden at Saskatoon, Sask., but the damage was considered nil (T.C. Vanterpool). Tr. to 25% of the stalks were affected in a field of Irish Cobbler in Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL RING ROT (Corynebacterium sepedonicum). B.C. continues virtually free of ring rot. Traces were found in 9 farms in the Lower Fraser Valley. Only table stock was grown on these farms. On 3 farms the same Katahdin seed was used, the original seed being secured from P.E.I. and planted on one of the farms in 1949. As the 1950 crop was the second to be grown from this seed lot, it is impossible to be certain of the source of infection despite the fact that no ring rot was detected in fields from other seed lots on one or other of the three farms. The source of infection in the other infected fields was also obscure although in two the disease appeared in Katahdin seed from P.E.I. grown for the first time in B.C. in 1950. Potato crops in 4 other farms were placed under detention because machinery had been used from affected farms. The crops under detention are being disposed of in paper bags to special markets and their sale is expected to be completed by 31 January 1951 (I.C. MacSwan, W.R. Foster). Ring rot was found in tubers from a crop of Sequoia entered for certification at Ladysmith in February. The original seed was grown in P.E.I. in 1949 (W. Jones).

As a result of the Provincial survey conducted with the assistance of Science Service, Dominion Department of Agriculture, bacterial ring rot was found

on 130 farms (1515 acres) out of 1229 farms (12,124 acres) in Alta. The percentage of farms infected was only slightly less than in the previous year, viz. 10.5% in 1950 compared to 11.2% in 1949. This figure is still high compared to the average low of 6.6% for 1946-48. The increase of the past 2 years is attributed to the presence of many new growers particularly in the Lethbridge area; very few are acquainted with the disease and the control regulations in force. The high price ($3.00 or more per bu.) for seed potatoes in the spring led many growers to obtain inferior seed. In fact, a large quantity of commercial potatoes was shipped in from other provinces and used for seed. All diseased stock are now moving under the control of the Provincial Department and about a quarter has been disposed of. Outlets are difficult to find and part of the affected stock may have to be fed to livestock.

In following up some ring rot cases this year the source of infected seed could be traced unmistakeably to the use of old sacks. Up to the present no attempt has been made to control their movement, but growers have been warned of the danger of using sacks of unknown origin.

In continuation of last year's policy the Department has purchased a supply of Foundation A seed, for sale to growers who must secure new seed to replace their own affected stocks. Growers who have had ring rot for 3 consecutive years are being asked to reduce their acreage or stop growing potatoes entirely for a year or two. Also all potatoes brought into Alta. are now subject to inspection for ring rot. It is hoped this tightening of the regulations will materially reduce ring rot in 1951 (W. Lobay). A trace was found in 2 fields entered for certification in Alta.; 5 others were rejected because of its presence in other fields on the same farm (J.W. Marritt).

Bacterial ring rot was not found in any fields entered for certification in Sask. Despite the short season, the disease was found in bins of table-stock Canus at Lumsden (A. Charlebois). Specimens showing the disease were received from 10 widely separated points in Sask. (R.J. Ledingham). A tr. was found in Man. in a seed stock from Minnesota comprising 7 fields; the disease also occurred in one field of Man. seed (D.J. Petty). A single plant was found affected in one field inspected in s.w. Ont. (F.J. Hudson). In district 2, 9 cases were found, 2 in the field and 7 in other potatoes on the same farm. One of the 2 cases in the field was attributed to infected seed, and the other from custom-used implements (W.L.S. Kemp). Ring rot was found in 8 inspected fields in district 3, with additional cases noted at harvest and on bin inspection. A clean up campaign was organized in n. Simcoe Co. by our staff and the provincial department of agriculture. All farms of seed growers were visited and the disinfection was supervised of all potato machinery before planting and of all potato storages and harvesting equipment before harvesting. A special circular was sent all growers in the district with instructions for other disinfections especially if machinery were to be used co-operatively (H.W. Whiteside). Ring rot was found in the field on 6 seed growers' farms and on one other on bin inspection in s. Ont. (O.W. Lachaine). During the eighth annual survey for bacterial ring rot in Ont., about 2500 farms were visited and ring rot was found on 362 (14%). This figure is considerable less than last year when 590 (26%) of the 2250 farms inspected were affected. Of this year's positive reports 65% were from farms on which ring rot had not been previously reported (D.S. MacLachlan).

Bacterial ring rot was definitely less prevalent in Que. in 1950 than in recent years and the percentage of plants infected was low in the affected fields. This improvement resulted from the use of better seed for planting. However, 140 (10%) of the fields entered for certification were rejected for ring rot. The disease is more prevalent in w. Que. than in e. Que. The use of second-hand bags is believed to be an important factor in introducing the disease into new localities.

The Teton variety was tested in trials supervised by the Seed Potato Certification staff for the second year in Temiscouata, Kamouraska and Chicoutimi counties and at the Station, Ste. Anne de la Pocatiere. The seed was provided by N.M. Parks, Division of Horticulture, C.E.F., Ottawa and Carter's Seed Co., Washburn, Me. The Teton was planted only on farms where ring rot had been present for the past 5-6 years; with Green Mountain in a nearby field on each farm. On the 16 farms in the test, a total acreage of 5.6 acres of Teton yielded 1232 bu. or an average of 220 bu. per acre. Inspection at digging time revealed less than 1% of stem-end discoloration and pear-shaped tubers, the same amount of common scab, and no ring rot, late blight, or black leg except on one farm where black leg was present and 5 tubers affected by ring rot. The Green Mountains in the neighbouring row were severely affected by ring rot. Under our climatic conditions, Teton is equal to Green Mountain and highly acceptable to the growers.

Its high resistance to ring rot and also its resistance to potato virus 2 would make the variety very valuable to many growers who are sustaining serious losses from this bacterial disease (B. Baribeau).

Bacterial ring rot was the chief cause of rejection of fields inspected in N.B., as 126 fields (1900 acres) or 7% of the acreage was rejected. This figure represents a decrease from last year although the number of new growers was considerable (C.H. Godwin). The bacterial ring rot survey in N.S. was confined to checking farms where ring rot was found last year and adjacent farms and to a third inspection of as many of the certified seed fields as possible. The disease was reported on 7 farms, on four of which certified seed was being grown. Our own inspection revealed 17 cases, 6 in the fields entered for certification and 11 in other fields on the same farm (R.C. Layton). Bacterial ring rot was not found in the current crop in P.E.I.; however, 3 cases in addition to the 8 reported last year were found in the 1949 crop; Sebago was affected in one and Katahdin in two (S.G. Peppin, R.R. Hurst). Bacterial ring rot is suspected to occur in Nfld., but its presence has yet to be verified (G.C. Morgan).

BLACK LEG (Erwinia phytophthora) was found in 196 (19.7%) of the fields inspected in B.C. and caused the rejection of 34 fields (88.6 acres). The disease seems to have increased in importance in recent years although there was little change this year over last; the growing season was slightly drier than normal in most districts (H.S. MacLeod). Black leg, the principal cause of rejections in Alta., was found in 92 (31.7%) of the fields inspected and 33 were rejected. The disease was rather prevalent in s. Alta., particularly in the Brooks area (J.W. Marritt). Black leg was seen in 4% of the fields inspected in Sask. and caused one to be rejected. A mod. infection occurred in 2 table stock fields at Lumsden; the growers claimed that Foundation A seed was planted (A. Charlebois). In one field in the Kinley area over 31% of the plants were affected by black leg (R.J. Ledingham). The disease was seen in 12% of the fields inspected in Man.

and 20% in n.w. Ont.; no fields were rejected (D.J. Petty). Specimens were received from a field at Virden, Man. where many of the plants were wilting and dying (H.N. Racicot).

Black leg was present in many fields of early potatoes in the Leamington area, Ont.; losses were tr. to 2-3% (C.D. McKeen). Two fields were rejected on account of black leg in s.w. Ont.; an occasional plant was affected in other fields inspected (F.J. Hudson). Black leg caused the rejection of 7 fields in district 3; the seed planted was mostly from the Maritimes (W.L.S. Kemp). Black leg was late in developing but was more prevalent than usual in district 3, 12 fields being rejected for this reason. The weather conditions were ideal for its development. In one field where several consecutive plants in the row were affected the seed corn maggot was found working in the stems (H.W. Whiteside). Black leg caused the rejection of 4 fields in e. Ont.; the highest infection observed was 7% (O.W. Lachaine). Black leg was general in Que. and was found in 613 (44.1%) of the fields inspected causing 98 fields (418 acres) to be rejected, this being the worst outbreak ever experienced. The highest infections recorded were 7% in a field entered for certification and 16% in a table stock field. Most growers do not treat. Black leg was more noticeable than usual in the tubers at digging time and bin inspection (B. Baribeau). Black leg was fairly general in N.B. and was more prevalent than last year. It caused the rejection of 16 fields (84 acres). Conditions favourable to the disease were a late spring frost, which caused in a few cases chilling of cut seed, and cool moist conditions, which prevailed during the growing season (C.H. Godwin). A trace was found in Canso in a commercial planting in York Co. (D.J. MacLeod). Black leg was found in 57 (1.0%) of the fields inspected in N.S. and 3 fields were rejected. Sebago was more frequently affected than any other variety (R.C. Layton). Black leg showed a big increase in P.E.I. over 1949; 245 fields (2.9%) were rejected in 1950 compared with 60 (0.7%) in 1949 (S.G. Peppin). Despite a dry planting season, black leg was very general in P.E.I. Up to 25% of the plants were found affected. In a general survey average infection was Sebago 7%, Katahdin 2%, Irish Cobbler 1.5%, and Green Mountain 0.5% (D. Robinson, R.R. Hurst). Black leg was present in half of the 30 fields visited in the Avalon Peninsula, Nfld., and a 20% loss occurred in a few fields. The disease was more prevalent than last year. Most farmers do not treat (G.C. Morgan).

WILT (Fusarium oxysporum) was found in 92 (9.2%) of the fields inspected in B.C. and caused the rejection of 2. The disease was much less prevalent than last year; the highest incidence was in the Okanagan, followed closely by the Cariboo (H.S. MacLeod). Wilt was somewhat more prevalent than last year in Alta., particularly in the south. It was found in 34 (11.7%) of the fields inspected (J.W. Marritt). Wilt was present in 18% of the fields inspected in Man. and 14% in n.w. Ont. (D.J. Petty). Very little wilt was seen in fields inspected in s.w. Ont. (F.J. Hudson). Two fields were rejected on account of wilt in district 2; very little stem-end browning has been found during bin inspections (W.L.S. Kemp). Wilt appeared to be more prevalent than usual in district 3; 5 fields were rejected (H.W. Whiteside). One field was rejected in e. Ont. (O.W. Lachaine). Wilt was less prevalent in Que. than usual, small amounts being present in a few fields mostly of Irish Cobbler and Green Mountain (B. Baribeau). A few cases were reported in N.B. (C.H. Godwin). A trace was

reported in a field of Green Mountain in Queens Co., P.E.I. (R.R. Hurst).

DRY ROT (Fusarium spp.) was more prevalent in s. Alta. than usual and was a problem in some districts particularly in stock grown on light soils about Rosemary and Vauxhall (H.W. Marritt). Storage rots of various types were prevalent in one large storage cellar at Lethbridge; F. caeruleum was the predominant isolate (M.W. Cormack). More fully matured crops with less mechanical bruising during harvesting and improved storage has lessened the loss caused by dry rot in district 2, Ont. Preventive measures are constantly being stressed (W.L.S. Kemp). Bruising caused about the usual amount of dry rot in district 3. However 3 specimens showing unusual dry rot symptoms were sent to Ottawa for examination. In the opinion of H.N. Racicot these specimens had been injured by fertilizer. It is believed that much of so-called bruising where a white or grey lesion extends into the tuber is caused by chemicals (See Fertilizer Burn) (H.W. Whiteside). In Que., storage rot has not been the problem it was in 1949; losses in 1950 are about 5% (B. Baribeau). Dry rot was again reported in odd lots from most parts of N.B., although it was less prevalent than in 1949. A loss of 15% was recorded in one bin of Katahdin in York Co. (C.H. Godwin). Storage rot is about as prevalent in P.E.I. in 1950 as in 1949; losses are mostly in Sebago and averaged about 1% of the crop. In table stock losses as high as 5% have been recorded (S.G. Peppin, R.R. Hurst). Storage rot was prevalent in potatoes stored at St. John's, Nfld. last winter; in one warehouse 20% of the tubers were affected (G.C. Morgan).

LENTICEL NECROSIS (Fusarium sp.) caused sl.-sev. damage in a number of seedling varieties at Fredericton, N.B. (J.L. Howatt).

RHIZOCTONIA (Pellicularia filamentosa (Rhizoctonia solani) infection was 531-sl. 220-mod. 18-sev./997 fields inspected in B.C.; it was about as prevalent as last year, but with a larger portion of the tubers showing a mod. development of sclerotia (H.S. MacLeod). Infection was mod. in 46 (15.9%) of the fields inspected in Alta. The tops were injured by an early frost and in consequence tubers harvested late bore sclerotia (J.W. Marritt). A sev. infection observed in a garden at Edmonton, Alta. (A.W. Henry). Infection was sl. in most fields to mod.-sev. in a few in Sask. The development of sclerotia on the tubers was heavier than usual in many lots of early potatoes (A. Charlebois). The cool moist weather prevailing in Sask. this past summer apparently favoured rhizoctonia; the disease was widespread and probably caused considerable loss (R.J. Ledingham). The development of the perfect stage was pronounced on 4-5% of the hills in a private garden at Saskatoon. The moist cool weather of mid summer probably favoured basidial development. Heavy development of sclerotia on the tubers was not correlated with basal stem lesions on the plants (T.C. Vanterpool). Most fields in Man. and n.w. Ont. were lightly infected (D.J. Petty). Only light infections were observed on the plants and tubers in s.w. Ont. (F.J. Hudson). Although rhizoctonia was less prevalent in district 2 than formerly, a portion of the tubers had to be graded out in a few crops, notably in York Co. (W.L.S. Kemp). Rhizoctonia was more prevalent than usual in district 3, particularly in Temiskaming and Cochrane areas; the

summer was cool and moist (H.W. Whiteside). Rhizoctonia was observed in 5/74 fields inspected in e. Ont. (O.W. Lachaine). Infection was mod. in the fields inspected in Que. and development of sclerotia was sl.-mod. in most lots of tubers; it was more prevalent than in 1949 (B. Baribeau). Rhizoctonia severely infected a Fredericton seedling tested at Ste. Clothilde; basidiospores were forming in profusion on the grey weft of mycelium on the stem above the ground line on 18 July (K.M. Graham). Rhizoctonia was fairly general in fields throughout N.B., but infection was sl. or sometimes mod.; a sl. development of sclerotia occurred in a few lots with negligible loss (C.H. Godwin). Infection was sl. to mod. in a few fields in N.S. where potatoes have been planted for several successive years on the same ground. Scurf development was also sl. (R.C. Layton). Rhizoctonia infection was very light in P.E.I. and damage was negligible (S.G. Peppin). Rhizoctonia was present in 30 (60%) of the fields visited in Nfld., infection being 15-sl. 8-mod. 7-sev. On the tubers sclerotium development was sl.-mod. (G.C. Morgan).

LATE BLIGHT (Phytophthora infestans) was reported in only 19 (1.9%) of the fields inspected in B.C. and in only one was the infection sev. Late blight was first reported on the Lower Mainland on 19 July over a month later than in recent years. The dry season was unfavourable for blight development. Late blight was sev. in unsprayed home gardens on Lulu Island. Where the haulms were removed early little tuber rot developed; where they were not removed, up to 50% of tubers were destroyed after a short storage period (I.C. MacSwan). Late blight appeared in Man. on 16 Aug. Spread was slow until after 1 Sept. when it was reported almost simultaneously from several points. It caused little damage except in an area just north of Winnipeg where damage to plants was severe. Considerable rotting of stored tubers was reported later from the area (J.E. Machacek).

Late blight was first observed in n.w. Ont. at Fort Frances on 24 July and was sev. in the district by late Aug. Mod. infections were noted in the Thunder Bay district (D.J. Petty). Late blight was found in many fields inspected in August in s.w. Ont., but most fields were carefully sprayed and very little tuber rot was observed on bin inspection (F.J. Hudson). A few tubers were found affected in 6 fields at Leamington in mid-July. Later the disease was prevalent in almost every field in s.w. Ont. (C.D. McKeen). Some shipments made by the S.W. Ont. New Potato Growers' Marketing Board in early August were found with tubers affected by late blight (one case 100%) when the crop reached towns in e. Ont. The presence of the fungus was verified (H.N. Racicot, K.M. Graham). Late blight caused little or no damage to the tops in fields regularly sprayed or dusted in district 2. Damage to the tops caused the rejection of 5 fields and a few blighted tubers were left in the field in roughly 20% of those passed (W.L.S. Kemp). Late blight was observed in the Niagara Peninsula from August onwards on most varieties regardless of the spray schedule. The tops were entirely killed in a field of Katahdin by mid-September and 10% of tubers were already infected (J.K. Richardson). Late blight was first observed about 10 Aug. in district 3 and it spread rapidly. Growers that followed an adequate spray schedule produced crops that suffered little from the disease (H.W. Whiteside). Late blight was sl.-mod. in 13 fields, sev. in one out of 74 inspected in e. Ont. (O.W. Lachaine).

Late blight was first observed in Que. on 28 July on tomatoes near Hull and on potatoes in Lotbiniere Co. and it appeared in most parts of Que. in the next three weeks. The disease was of little importance on the foliage in most parts of Que. except about Montreal and in the Eastern Townships and at St. Charles de Caplan, Bonaventure Co. At St. Charles, 37 seedlings were sev. defoliated out of 64 tested. A severe frost killed the tops in the Lake St. John and Lower St. Lawrence districts before much damage occurred; 0.5% of the tubers developed rot. About Montreal and in the Eastern Townships some fields were not harvested, 6 fields showed 100% tuber infection, 14, 50%, with average of 8-9% for 124 fields inspected (B. Baribeau).

Damage on tubers was most noticeable in regions where disease was severe on the foliage, particularly on heavy soils. It appeared that tubers well covered with soil did not show much disease despite sev. foliage infection. Well-sprayed fields showed traces of blight on the tubers, whereas in some unsprayed fields a 50% tuber loss resulted (H. Genereux).

Conditions were ideal for late blight development in N.B. It was first observed on 17 July and was present everywhere by mid-August. Late blight was found in nearly 75% of the fields inspected, infection being sl.-mod. in most fields and sev. in a few. Heavy rains in late August favoured the development of tuber rot, which caused some trouble during the fall shipping season although the loss was generally sl. (C.H. Godwin). Late blight was first found in N.S. in Kings and Cumberland counties on 20 July. Infection was unusually widespread and was mod.-sev. by 20 Aug. Little trouble from tuber rot occurred in fields of commercial growers as they continued spraying to the end of the season and killed the tops before harvesting. A 2% loss was about the highest. However along the south shore and in Yarmouth and Digby counties losses well over 50% were seen and as high as 75% were reported (R.C. Layton). A general epidemic developed after mid-August in P.E.I. when a period of heavy rains and very high humidity occurred. Average loss from tuber rot was estimated at 10% of the crop (L.C. Callbeck). Late blight was particularly sev. in Irish Cobbler (S.G. Peppin). Late blight was less prevalent in Nfld. than in 1949, the weather being very dry on the east coast. The disease did develop in widely scattered areas in the Avalon Peninsula, but heavy loss (75%) was seen in but one field of Green Mountain. Tuber loss was mod. in several stored lots of 1949 crop (G.C. Morgan).

LEAK (Pythium ultimum) was found affecting tubers in 3 lots at Lethbridge, Alta. (M.W. Cormack). The disease is still present in district 3, Ont., but it was less serious than in previous years. In general tubers are more mature at harvest time than formerly as a result of the increased use of vine killers (H.W. Whiteside). Leak was found affecting tubers sent in for examination from 2 Ont. points. Isolations were made from one sample (H.N. Racicot). Leak affected about half the tubers in a bushel lot of Sebago still in storage 1 June at Charlottetown. The organism was isolated and determined from a culture (D. Robinson, D.S. MacLachlan).

STEM ROT (Sclerotinia sclerotiorum). A few plants were found affected in plots at Comox, B.C. (W. Jones). Four plants were affected in a field of Green Mountain in Matane county, Que. (B. Baribeau).

SILVER SCURF (Spondylocladium atrovirens). A few infected tubers were found in storage at Lethbridge, Alta. (R. Stogryn, M.W. Cormack). This trouble was present in district 3, Ont., especially on tubers stored for some time in jute bags (H.W. Whiteside). Silver scurf was present in small amounts in a few lots of Warba, President, and Irish Cobbler sent in for identification in Que. (B. Baribeau). A tr. was observed on Irish Cobbler 4 Dec. 1949 and on Sebago 30 Oct. 1950 in Queens Co., P.E.I. In the latter case the tissues underlying the lesions were noticeably darkened (R.R. Hurst).

POWDERY SCAB (Spongospora subterranea) lightly infected a few tubers in a 3-acre field of Netted Gem table stock at Cloverdale, B.C. (I.C. MacSwan). The disease was noted in a few bins in Que. (B. Baribeau). In N.S., a 3% infection was observed on one lot of Bliss Triumph seed to date. In one field of table stock in Digby Co. 50% of the tubers were affected (R.C. Layton).

COMMON SCAB (Streptomyces scabies) has been decreasing in prevalence in B.C. each year since the flood of 1948. No fields were rejected for scab, but grading out of scabby tubers will cause some loss in several lots especially in the Cariboo district (H.S. MacLeod). Scab was mod.-sev. on smooth-skinned varieties being grown for seed in n. Alta. Scab was more prevalent than usual on Netted Gem, especially in the Lacombe district; the pustules are small and very shallow on this variety (J.W. Marritt). Only trace infections were observed in the variety plots at Beaverlodge, Edmonton, and Lacombe (T.R.D.). Scab was severe on some crops on bush soils in Sask., but in general the disease was much less prevalent than usual (A. Charlebois). Only light infections were observed in a few areas in Man. and n.w. Ont. (D.J. Petty).

No severe scab was observed in s.w. Ont. and only a few lots were mod. infected (F.J. Hudson). Scab was prevalent in many fields of early potatoes in the Harrow-Leamington district. An increase has been noted in the last 3 years; several crops were mod. infected (C.D. McKeen). Although scab damage was less than in 1949 in district 2, 50% of the tubers were affected in crops grown on sandy soils in Durham and Ontario counties. A 20-acre field of Ontario table stock was very clean compared to the badly scabbed crops of Katahdin formerly produced on this farm. No appreciable amount of scab developed on crops of Yampa, a scab-resistant variety being grown for table stock in s. Dufferin Co. (W.L.S. Kemp). The incidence of scab varied considerably in district 3, but was less prevalent than usual in Alliston area. Several crops of Ontario were almost free of scab and Keswick, Canso, and Sebago appear to have some resistance (H.W. Whiteside).

Scab was more prevalent than usual in the Lower St. Lawrence district, Que., affecting most lots. Some lots were quite sev. infected and will be difficult to grade. Infection was much lighter elsewhere in the province (B. Baribeau). Scab was present in scattered lots in N.B.; usually infection was sl.-mod., but in a few bins it was sev. (C.H. Godwin). Scab infection was

very slight this year in N.S. A single severe case was reported in one lot of Irish Cobbler in Antigonish Co.; infection has been severe on this farm for several years (R.C. Layton). Scab infection in P.E.I. was tr.-sev. on Irish Cobbler and Green Mountain, tr. on Houma and Katahdin and nil on Sebago. The average infection was 3% of the tubers (R.R. Hurst). Scab was less prevalent in 1950 in Nfld. than 1949 except in the Burin Peninsula. Fairly heavy infections were observed on Irish Cobbler, Warba, Arran Victory, and Kerr's Pink (G.C. Morgan).

WART (Synchytrium endobioticum). Losses from wart were not as heavy in Nfld. in 1950 as in 1949 because of the extremely dry season. Out of 100 fields visited in the Conception Bay area 84 were infected with wart and losses were 10-50% in the affected fields and averaged about 25%. In fact, wart appears to be much more prevalent, especially on the East Coast, than was formerly realized, although the Conception Bay area is one of the very worst. Arran Victory, probably the most popular variety in Nfld., is highly susceptible under Nfld. conditions as are Green Mountain, Irish Cobbler, Bliss Triumph, Early Rose, Arran Banner, Warba and Great Scot. In trials conducted at 3 places in the Conception Bay area, Keswick was immune to wart, Katahdin, Sebago (mauve flower), and Canso were highly resistant and Sebago (white blossom) showed some resistance. On the other hand Green Mountain (4 sources of seed), Irish Cobbler (4 sources), Arran Victory, Warba, Bliss Triumph, and Early Rose were highly susceptible and Chippewa, Garnet Chili, and Sequoia were only slightly less affected (G.C. Morgan).

WILT (Verticillium albo-atrum) affected 10% of the Katahdin plants in a plot on low-lying muck soil near Okanagan Lake, Summerland, B.C. The pathogen was isolated (G.E. Woolliams). A few plants diagnosed as having Verticillium wilt were found in fields of Green Mountain, Keswick, Irish Cobbler, Teton, and Warba in different districts of Que. Infection was sl., but the disease seems to be increasing (B. Baribeau). Wilt was reported in 45 (8%) of the fields inspected in N.S. and 2 were rejected. A sample was taken from each affected field for identification by the Laboratory at Kentville (R.C. Layton). Wilt caused the rejection of 124 (1.5%) of the fields inspected in P.E.I. in 1950 compared to 20 (0.2%) in 1949 (S.G. Peppin).

AUCUBA MOSAIC (virus). A unit of 3 plants showing a marked aucuba mosaic was found in a seedling planted in Temiscouata Co., Que. (B. Baribeau).

FOLIAR NECROSIS (virus). Two seedlings were found showing foliar necrosis in a test plot in York Co., N.B. The virus was identified as the D strain of Solanum virus 1 (D.J. MacLeod).

BUNCH or PURPLE TOP (virus) was present in small amounts in 21 (7.2%) of the fields inspected in Alta. (J.W. Marritt). Infection was 0.5-1.0% in 16% of the fields inspected in Man. and 0.5-3.0% in 22% of the fields in n.w. Ont. In addition 3 fields were observed in the Fort Francis area with infection up to 6% (D.J. Petty). Purple top was not seen in the London district (F.J. Hudson) and affected only the occasional plant in district 2 (W.L.S. Kemp).

The disease was less prevalent than last year in district 3; a small percentage of plants were affected (H.W. Whiteside). Purple top was found affecting 5% of the plants of Green Mountain 17 July at Collins Bay. Top symptoms were typical of purple top; the stem and roots were blackened as in black leg, but the tissues were sterile. It is believed that the infection was transmitted to the plants through the tubers (D.S. MacLachlan). Purple top was fairly general in fields of Katahdin in N.B., but infection was less than last year (C.H. Godwin).

Late leaf roll was found in the test plots in York Co. and in commercial fields of York, Carleton and Sunbury counties, N.B., in the varieties Irish Cobbler, Bliss Triumph, White Rose, Canso, Keswick, Sebago, Pontiac, Chippewa, and Kennebec. Infection ranged from a trace to 22%. Late leaf roll is the early primary symptom of the bunch-top virus (Cf. P.D.S. 29:64-65), which is visible while the virus is still confined to the top section of the plant. The bunch-top virus was identified in a representative number of plants.

The bunch or purple top disease (the secondary symptoms of the virus) was observed in commercial fields of Green Mountain, Katahdin, Kennebec, Irish Cobbler, Bliss Triumph, White Rose, Keswick, Canso, Pontiac, and Sebago in Carleton, York, and Sunbury counties. Infection ranged from a trace to 6%. Bunch top was also severe on 12% of the plants in a field of Keswick at Roseneath, P.E.I. The virus caused 0.1% misses in a field of Canso at Dorn Ridge. The virus was identified in a representative number of plants in each variety. The bunch top virus is either an aberrant strain of the aster yellows virus or an entirely different virus (Solanum virus 17).

Haywire, or the aggregate symptoms produced in plants from virus-infected sets, was found in commercial fields of Green Mountain and Katahdin in York Co., infection ranging from a trace to 2.5%. A trace of haywire was found in test plots at the laboratory, Fredericton, in Sebago, Kennebec, Canso, Keswick, Irish Cobbler, and Bliss Triumph. A trace-3% infection was also observed in 6 new potato seedlings under test. The bunch top virus was identified in a representative number of plants in each case (D.J. MacLeod).

Purple top was reported in 27 (5.0%) of the fields inspected in N.S., infection being tr.-2%. It was found chiefly in Katahdin, Sebago, and also in Keswick and Canso (R.C. Layton). Bunch top was about as prevalent as last year, some fields of Sebago showing 50% of the plants infected (S.G. Peppin). Purple top was noted in one field of Sebago on the Avalon Peninsula, Nfld.; it affected 5% of the tubers (G.C. Morgan).

LEAF ROLL (virus) was found in 244 (24.5%) of the fields inspected in B.C. and caused the rejection of 38. The disease was observed in fewer fields, but a greater number were rejected. It was particularly prevalent in the Okanagan this year, but few fields were affected in the Grand Forks area (H.S. MacLeod). Leaf roll was recorded in 41 (14.1%) of the fields inspected in Alta. and none were rejected. The disease was less prevalent than last year and there was no evidence of current season spread; even less leaf roll should appear in certified stocks next year (J.W. Marritt). Sl.-sev. infection was noted in garden plots at Edmonton. A trace was also found at Beaverlodge and

Lacombe (T.R.D.). Leaf roll was present in 21% of the fields inspected in Sask., but none were rejected (A. Charlebois). Infection was tr.-0.1% in 4% of the fields inspected in Man. but one field of Irish Cobbler from P.E.I. seed showed 1%. One field was infected (0.2%) in n.w. Ont. (D.J. Petty).

Leaf roll was found in several fields in s.w. Ont. and caused the rejection of 3 (F.J. Hudson). Leaf roll caused the rejection of 30 fields in district 2, compared with 35 fields rejected for other causes. Several growers of Chippewa and Warba were able to maintain their stocks only as long as tuber-indexing of foundation stock was continued at Guelph. When the service was discontinued the disease content of their crops rapidly increased and they were rejected (W.L.S. Kemp). Leaf roll caused the rejection of 11 fields mostly of Warba and Chippewa in district 3. Attempts are being made to revive tuber indexing especially for Warba. Stocks of both these varieties produced in Cochrane district are still free of leaf roll (H.W. Whiteside). Leaf roll caused 3 fields to be rejected in e. Ont. (O.W. Lachaine). Leaf roll was present in 489 (35.2%) of the fields inspected in Que. and 28 fields were rejected, compared with 5 in 1949 and 12 in 1948. The disease was much more prevalent in w. Que. than in the n.e. part (B. Baribeau). Leaf roll caused 49 fields to be rejected in N.B., an increase over last year. Although the percentage of affected plants was usually low, 9.3% were infected in one field (C.H. Godwin). Leaf roll was found in 220 (40%) of the fields inspected in N.S. and 4 were rejected (R.C. Layton). Leaf roll caused the rejection of 84 fields in P.E.I. compared with 15 in 1949 (S.G. Peppin). In a survey of 25 table stock fields in P.E.I. infection ranged tr.-4% in Irish Cobbler, tr.-7% in Green Mountain and tr.-9% in Sebago (R.R. Hurst). Leaf roll was found in 20 fields in Nfld., but infection was not over 5% (G.C. Morgan).

In a planting of Physalis angulata and P. floridana in the Laboratory disease garden, Fredericton, N.B., 2 plants of P. angulata and one of P. floridana showed typical symptoms of potato leaf roll. Also 2 plants of Datina stramonium were found affected. The presence of the virus was confirmed by standard methods (D.J. McLeod).

LEAF ROLL (Solanum viruses 14 and 17). Six plants of Keswick and 2 plants of Canso were found in commercial fields in York Co., N.B., showing typical secondary symptoms of leaf roll. It was demonstrated experimentally that the bunch top virus (Solanum virus 17) was present and the leaf roll virus (Solanum virus 14) was absent. The similarity the early secondary symptoms of the bunch top virus and the secondary symptoms of leaf roll virus in certain potato varieties causes some confusion in differentiating these two diseases under field conditions (D.J. MacLeod).

LEAF STREAK (Solanum virus 1, N strain) was found in 3 varieties in commercial fields in York Co., N.B., as follows: Katahdin, 4 plants; Keswick, 6; Canso 3. The disease was also found in 2 plants of Teton in a laboratory test plot. The virus was identified in each case by standard methods (D.J. MacLeod). A trace was found in 2 seedlings grown in Temiscouata and Lake St. John districts (B. Baribeau).

SIMPLE MOSAIC (Solanum virus 1, L strain) caused by a medium strain of Solanum virus 1 was in evidence in potato fields in York, Sunbury, Albert, Carleton and Victoria Counties, N.B. Infection was tr.-95%. The simple mottling associated with this medium strain was enhanced by the cool humid weather which continued for a period of 20-30 days in July and August. This mottling disappeared when weather conditions returned to normal. This simple mosaic was observed in the varieties Green Mountain, Irish Cobbler, Bliss Triumph, Pontiac, Katahdin, Warba, Chippewa, Netted Gem, Sebago, White Rose, and Canus (D.J. MacLeod).

MILD MOSAIC (Solanum virus 3) was observed in commercial fields in York, Carleton, Sunbury, and Victoria counties, N.B., in Green Mountain, Irish Cobbler, White Rose, and Bliss Triumph. Infection was tr.-30%. The top percentage was in a large planting of about 300 acres of Bliss Triumph. The cool humid conditions during August enhanced symptom expression of this virus, which under normal conditions shows only a very slight mottling in certain Bliss Triumph stocks. This lot of Bliss Triumph was rejected for certification on account of the mild mosaic (D.J. MacLeod).

MILD MOSAIC (Solanum virus 1, S strain) was in evidence in potato fields in York, Carleton, Victoria counties, N.B. Infection was tr.-3.5% in Katahdin, Chippewa, Canso, Keswick, and Sebago, the 2 highest infections being in Katahdin (3.5% and 2%) (D.J. MacLeod).

RUGOSE MOSAIC (Solanum virus 2). A 1.5% infection was recorded in a field of Pontiac in Carleton Co., N.B. (D.J. MacLeod).

CRINKLE MOSAIC (Solanum viruses 1, 2, and 3) was in evidence in table stock fields in York, Sunbury, Carleton and Albert Counties, N.B. Infections from tr. to 4% were recorded in Green Mountain, Bliss Triumph, and White Rose (D.J. MacLeod).

MOSAIC (virus) was found in 157 (15.7%) of the fields inspected in B.C. and it caused 16 fields to be rejected. Although fewer fields were infected, a greater number were rejected than last year (H.S. MacLeod). Only a mild mosaic was found in a tr. to small percentages in 17 (5.9%) of the fields inspected in Alta. (J.W. Marritt). Mosaic was found in a large percentage of the fields inspected in Sask., but it caused the rejection of only one field (A. Charlebois).

The late, wet spring delayed the planting of potatoes in Man. by nearly a month. Favourable weather during the summer allowed subsequently good growth, resulting in yields that were slightly above normal. Latent mosaic (simple mosaic) caused light mottling of the foliage throughout s. Man. and in some fields all plants were affected. The appearance of this mottling led to some confusion as it was difficult to distinguish from mild mosaic. The prevalence of the mottling caused some concern among growers of seed potatoes (J.E. Machacek). The cool weather in Man. caused potato virus X to be noticeable this year. Infection mostly of mild mosaic was tr.-0.5% in 18% of the fields inspected in Man. and tr.-0.3% in 20% of the fields in n.w. Ont. (D.J. Petty). A small percentage of diseased plants occurred in a few fields in s.w. Ont. (F.J. Hudson). The cool moist growing conditions in district 3 were ideal for

the detection of mosaic; 10 fields were rejected. Some of these fields were grown from stocks that had satisfactorily met the certification standards for many years and the crop showed no appreciable reduction in yields (H.W. Whiteside). Two fields were rejected for mosaic in e. Ont. (O.W. Lachaine). Mosaic was again much more prevalent in Que. than it had been for the past 5-6 years. It was found in 740 (53.3%) of the fields inspected and caused the rejection of 149. The increase is attributed to the dry, warm weather which favoured the aphid population in the late growing season in 1949. Mosaic, like leaf roll, was more prevalent in w. Que. than in the n.e. district (B. Baribeau).

Mosaic was noticeably more prevalent in N.B. than last year and caused the rejection of 143 (9.8%) of the fields inspected. A few large acreages of Bliss Triumph and several fields of Green Mountain had to be rejected. Smaller percentages were found in a few fields of Katahdin as well (C.H. Godwin). Mosaic was reported in 209 (38%) of the fields inspected in N.S. and caused 19 to be rejected. Mosaic has definitely increased in the last few years. It is suspected this increase may be due to the increasing use of the planter, if only indirectly, as it is harder to rogue mild mosaic from fields where tubers are not planted by tuber units than in those where tuber-unit planting is practised (R.C. Layton). Mosaic was far more prevalent in 1950 than in 1949 in P.E.I. for 456 (5.4%) of the fields were rejected for mosaic this year compared to 242 (2.9%) last year (S.G. Peppin). In 25 fields of table stock examined in P.E.I., mosaic infection was tr.-40% in Green Mountain, tr.-10% in Irish Cobbler and tr.-7% in Sebago (R.R. Hurst). Mild mosaic was seen in 75% of the fields examined in Nfld., infection being up to 90% (in Northern Beauty), average 25%. Traces of rugose mosaic were observed in 5 fields of Green Mountain (G.C. Morgan).

SPINDLE TUBER (Solanum virus 12) was only observed in table stock of Green Mountain, Irish Cobbler and Katahdin in Que. (B. Baribeau). A trace was reported in 3 lots in N.B. (C.H. Godwin). Spindle tuber was found in Green Mountain (2% infection) and Katahdin (0.5%) in the propogation plots at the Station, Fredericton, N.B. (D.J. MacLeod). One suspected case of spindle tuber was found in N.S.; infection 0.1% (R.C. Layton). There was a decided increase of spindle tuber in P.E.I., 57 fields being rejected in 1950 compared to 21 in 1949 (S.G. Peppin). Traces were found in 5 out of 10 fields of Irish Cobbler in the Avalon Peninsula, Nfld., and in 1 field of Sebago (G.C. Morgan).

TOP and TUBER NECROSIS (Solanum virus 4 or B virus). A severe necrotic disease (acronecrotic type), which eventually destroyed the tops of 2 plants, was found in Canso in a test plot at the laboratory, Fredericton, N.B. The tubers on these plants showed a severe necrosis of the surface and the flesh. The virus was identified as Solanum virus 4 (B virus). The Canso reacts in this violent manner to this virus because it is highly hypersensitive to it (D.J. MacLeod).

MILD FOLIAR NECROSIS (virus undetermined). Plants of Green Mountain and Irish Cobbler were found in the Laboratory plots, Fredericton, N.B., showing infection by leaf roll or bunch top and also displaying a superficial foliar necrosis. When scions of such plants were grafted on tomato (Bonny Best) an interveinal necrosis, a downward rolling of the leaves and a general dwarfing of the plants developed. This virus was transmitted also by Myzus persicae to tomato and Physalis angulata in which it produced a downward rolling of the leaflets and an interveinal foliar necrosis confined largely to the top leaves (D.J. MacLeod).

STREAK and ROLL (virus undetermined), described in P.D.S. 23:67, was found on Irish Cobbler, Katahdin, Chippewa, and Sebago in a test plot on a farm in York Co., N.B. Infection was 2-100%. Irish Cobbler appears to be exceedingly susceptible to this virus disease whereas Green Mountain and Bliss Triumph are apparently resistant (D.J. MacLeod).

WITCHES' BROOM (Solanum virus 15) was found in 174 (17.5%) of the fields inspected in B.C., an increase over 1949, and it caused 3 to be rejected. As in former years, the disease was more prevalent in the Cariboo district than elsewhere (H.S. MacLeod). The disease was found in 23 (7.9%) of the fields in Alta. (J.W. Marritt). A few infected plants were observed in plantings near Edmonton (T.R. Davidson). A few isolated cases were found in district 3, Ont. (H.W. Whiteside). Witches' broom, affecting 15% of the plants, was recorded in a field of Irish Cobbler in P.E.I. The virus was identified by standard methods (D.J. MacLeod).

YELLOW DWARF (virus) affected the odd plant in about 10% of the crops inspected in district 2, Ont. (W.L.S. Kemp). The disease was found only once in a field of Irish Cobbler at Burwash (H.W. Whiteside).

BLACK HEART (non-parasitic). Affected tubers were received from Megantic, Que. (B. Baribeau). Trace was observed in Sebago in storage in Queens Co., P.E.I. (R.R. Hurst).

ENLARGED LENTICELS affected about 7% of the tubers in a lot of a few seedlings planted in wet soil in Que. and 5% of a Green Mountain crop in one storage (B. Baribeau).

FERTILIZER BURN. Tubers submitted from Charlton, Ont., showed large, necrotic, shrunken areas with the periderm stretched over them. The cell walls were more or less completely dissolved away leaving the cells or starch grains free. The underlying tissues were white to dark grey in colour and almost sterile (H.N. Racicot). Fertilizer burn was observed in one field on light sandy soil in Lake St. John Co., Que., where the fertilizer was applied as a top dressing when the plants were 6-8 in. high. The stem was injured at ground level (B. Baribeau). Much damage was caused to potato crops in fields in the Avalon Peninsula, Nfld.; about half the crop was affected in 2 fields. The damage was no doubt the result of the common practice of placing the seed directly on top of the fertilizer in the rows. Since the past season was exceptionally dry, the fertilizer was slow in dissolving (G.C. Morgan).

FROST INJURY. Net necrosis, caused by frost killing the plants, was observed in slight amounts in the Cariboo and Okanagan districts, B.C. (H.S. MacLeod). Freezing temperatures occurred on several nights between 16-23 August, causing rather severe damage to potato fields in Sask. (A. Charlebois). An early frost in Durham and Ontario counties, Ont., froze tubers near the surface. Since most of these had been badly sunburned the added loss was not great (W.L.S. Kemp). Frost injured several fields in n. Que. and the tubers showed frost necrosis and typical breakdown at harvest (B. Baribeau). Several fields of Arran Victory were injured by frost in St. John's East, Nfld., and the tubers showed typical breakdown at harvest (G.C. Morgan).

GIANT HILL was reported in 236 (23.7%) of the fields inspected in B.C. and none were rejected (H.S. MacLeod). The trouble, in small amounts, was found in 23 (7.7%) of the fields inspected in Alta. (J.W. Marritt). Isolated cases of giant hill were observed in the southern part of district 3, Ont., but it appears to be increasing in prevalence in the North Bay section and northwards. Nearly 5% of the hills were affected in fields of Green Mountain at North Bay (H.W. Whiteside). Giant hill was more prevalent in Que. than in 1949; it was reported in many fields of Green Mountain (B. Baribeau).

HEAT and DROUGHT INJURY. Some net necrosis due to heat and drought caused by the extremely dry summer season, occurred in B.C., but it was not prevalent or severe (H.S. MacLeod). Some wilting and discoloration of potatoes were found in fields in Conception Bay, Nfld. (G.C. Morgan).

INTERNAL BROWN SPOT (non-parasitic) was common in a crop of Great Scot at Gordon Head, B.C. (W.R. Foster).

LIGHTNING INJURY. Three cases were investigated in Kings Co., N.S., of supposed late blight outbreaks in August; they proved to be lightning injury (K.A. Harrison).

LOW TEMPERATURE and FROST INJURY. Several samples, usually from car lots of potatoes, were received showing injury from exposure to low temperatures. Most of these potatoes originated in N.B. (H.N. Racicot).

MAGNESIUM DEFICIENCY severely affected 2% of the plants in a field of Irish Cobbler on sandy soil at Covehead, P.E.I. (R.R. Hurst).

NET NECROSIS. Except for a few lots of Green Mountain less than 0.5% of the tubers produced in Que. showed net necrosis (B. Baribeau). Small percentages were reported in a few bins in the Green Mountain growing areas in Victoria and Madawaska counties, N.B. (C.H. Godwin).

NO TOPS and SECONDARY TUBER FORMATION. A slight amount of this trouble was found in a field of Canso in Lake St. John Co. and in a Green Mountain field in Temiscouata Co., Que. (B. Baribeau).

SEED-PIECE DECAY. On account of the unusual dry weather experienced in late May and June seed-piece decay was severe in P.E.I. Many fields had to be replanted, some being replanted the second time or sown to grain (R.R. Hurst).

STEM-END DISCOLORATION. Some vascular darkening was observed in tubers in district 3, Ont., where tops were killed by vine killers. Seed growers have used calcium cyanamide and apparently avoided this trouble (H.W. Whiteside). A few cases of stem-end discoloration were observed in Green Mountain, Canso, Katahdin, and Teton in Que. (B. Baribeau).

SUN BURN. About 10% of the tubers are graded out annually in district 2, Ont., from Katahdin crops on account of sun burn. This variety produces its tubers on long stolons with tubers being formed on the top or side of the hills. We constantly advocate deeper planting and early and improved moulding of the soil up over the row to combat the trouble (W.L.S. Kemp).

RADISH

CLUB ROOT (Plasmodiophora brassicae) affected 30% of the plants in a planting at St. Leonard, Jacques-Cartier Co., Que. (E. Lavallee). An occasional plant was infected in a garden in Queens Co., P.E.I. (R.R. Hurst).

RHUBARB

CROWN GALL (Agrobacterium tumefaciens). A single plant found infected in a home garden at Summerland, B.C. (G.E. Woolliams). An occasional plant was found affected in a planting of Macdonald in Kings Co., N.S. (J.F. Hockey). In another planting a single plant of Early Surprise was severely affected while the rest were healthy (K.A. Harrison).

RED LEAF (cause unknown). In the plantings at the Station, Lacombe, Alta., the plants of Coulter, Ruby, Ruby Select, and Valentine have been wiped out. Although the plants of Canada Red, Macdonald, Early Sunrise, New Zealand, and Plum Hutt appeared clean when inspected, plants of these varieties have been lost in the past. Macdonald is perhaps the most resistant (T.R. Davidson).

SPINACH

MOSAIC (Cucumis virus 1) affected all the plants of Long Standing Bloomsdale in the plots, Division of Horticulture, C.E.F., Ottawa, Ont., and caused severe damage (K.M. Graham).

SQUASH

BACTERIAL WILT (Erwinia tracheiphila). Several Hubbard plants were dying from wilt in a garden at Gaspereaux, N.S. (K.A. Harrison).

MOSAIC (virus) affected 20% of the plants in one variety in the plots, Division of Horticulture, C.E.F., Ottawa, Ont. The symptoms were vein-banding, yellow and interveinal mottle, followed by necrosis. Cucumber mosaic was present in the area and cucumber beetles were noted feeding (K.M. Graham).

SWEET CORN

RUST (Puccinia sorghi). A trace was seen on most leaves in a planting at Altona, Man. (B. Peturson). Rust was more severe on sweet corn in 1950 in the Niagara Peninsula, Ont., than I have ever seen it. The leaves in many plantings were literally covered with pustules, but loss from the disease was not apparent (J.K. Richardson).

SMUT (Ustilago maydis) was reported at Sedgewick, Alta. (A.W. Henry). Specimens were received from 2 plantings at Medicine Hat (M.W. Cormack). Specimens were collected in 3 fields in Jacques-Cartier and Laval counties, Que.; it is a number of years since any enquiry has been received concerning smut (E. Lavallee). A single sample was received from Annapolis Co., N.S. (K.A. Harrison).

TOBACCO

The diseases of tobacco were summarized in a special report by R.H. Stover.

Seedbed Diseases

BLUE MOULD (Peronospora tabacina). Since the last general outbreak of 1947, blue mould has declined in importance as a seedbed disease. Again in 1950, most infections were limited and occurred after the planting season. Scattered infections were reported in both the Old and New Belts, but the disease was not general and very little injury resulted. Blue mould was first reported on 11 May, in the Langton district of Norfolk County. There was no evidence of a spore shower; overwintering was indicated. (See Sci. Agr. 31, 1951. In press).

YELLOW PATCH (excessive nutrients) and DAMPING-OFF (Rhizoctonia and Pythium spp.) were no more prevalent in the Old Belt than usual. COLD INJURY, expressed in the form of bud chlorosis and mild leaf distortion, was widespread in the Old Belt during the latter half of May in both cotton and glass-covered seedbeds. CREOSOTE FUMES from treated greenhouse timbers caused the destruction of seedlings in an entire seedbed at Leamington. In general, there were few seedbed failures in 1950, and the supply of seedlings was ample.

Field Diseases

BLUE MOULD (Peronospora tabacina). The fungus caused spotting on the lower leaves of tobacco in most areas of the New Belt during July. Scattered field infections were also observed in the Old Belt. In most cases no serious injury resulted.

BROWN ROOT ROT (a root-rot complex in which nematodes are a primary etiological agent) was not prevalent in the burley tobacco areas, and only mild infection was observed on susceptible tobacco varieties following corn in most of the brown root-rot experimental plots at Harrow.

A survey of the New Belt is planned to ascertain the importance of brown root rot in flue-cured varieties. Because of the widespread occurrence of black root rot in the flue-cured areas, and the similarity of the above ground symptoms of both black and brown root rots the latter disease may often be obscured. From field survey evidence, it appears that black root rot is the most serious disease in the New Belt, and that in most areas brown root rot is of minor importance. However, brown root-rot experimental plots on the flue-cured soils of Norfolk County would contribute considerably to our knowledge of the disease in that area.

BLACK ROOT ROT (Thielaviopsis basicola) was the most serious disease affecting tobacco in 1950. Its severity was correlated with the general use of susceptible flue-cured varieties and a cool, wet growing season (See U.S.D.A. Pl. Dis. Reporter, 34(12):387-391. 15 Dec. 1950). Most of the injury occurred in the New Belt, although the relatively small dark tobacco area in Kent County was severely affected. Where the variety Delcrest, which is resistant to black root rot, was grown in the New Belt very little injury was caused. This reduced injury can be attributed in part to the less virulent nature of strains of T. basicola in the New Belt, a situation that may change with time. (See Can. J. Research C. 28(16):726-738. 1950). Black root rot contributed to reduced yields, delayed maturity, and lowered quality of flue-cured tobacco in 1950.

VIRUS DISEASES have been epidemic in the Old Belt since 1947. In that year there occurred in Ontario the first infestation of aphids on tobacco. Since then virus disease epidemics have been associated with the wide-spread occurrence on tobacco of the peach aphid, Myzus persicae. To ascertain the viruses involved in these epidemics, a large collection of representative specimens was made in 1950 and these were transferred to differential hosts

in the greenhouse for analysis. A brief preliminary report on some of the virus diseases found in the Old Belt of Ontario is presented here. The list includes the following in order of their relative abundance:-

(1) Tobacco etch (Nicotiana virus 7) at least three field strains. (2) Tobacco mosaic (Nicotiana virus 1) at least five field strains. (3) Cucumber mosaic (Cucumis virus 1) several strains. (4) Tobacco streak (Nicotiana virus 8). (5) Tobacco ring spot (Nicotianaia virus 12). (6) Potato virus Y. (Solanum virus 2).

Although the tobacco etch virus has not been previously reported in Canada, results of this year's survey indicate that it is now the most prevalent virus on tobacco in the Old Belt. It is found in all fields in the Leamington-Harrow district and in 60-70% of the fields in other districts of the Old Belt. The general occurrence of the etch virus in this district can be attributed to its transmission by the peach aphid; that the virus is transmitted by the peach aphid has been demonstrated in greenhouse experiments. It appears also that viruses other than etch are transmitted by insects. These viruses (cucumber mosaic, ring spot, streak, and potato virus Y) are not noticeable to any extent until the tobacco plants are approaching the early flower bud stage. They appear at this time often in the absence of any mechanical operations. The mid-summer increase in the insect population in and around tobacco fields, including leaf hoppers and scattered colonies of aphids, usually accompanies the rapid and widespread appearance of these viruses. This evidence indicates that insects are the main vectors of viruses in tobacco previous to the mechanical operations of topping and suckering. The high incidence of tobacco mosaic in most fields after the topping stage can be attributed to these mechanical operations. Cases of overwintering of tobacco mosaic and field infections resulting from seed-bed sources are easily recognized early in the season.

The symptoms of the tobacco etch virus will be described in detail in another publication and will be mentioned only briefly here. Pronounced vein clearing, with or without necrosis, on the lower and middle leaves is usually the first symptom of infection in the field. This virus alone causes very little stunting and leaf distortion. However, after the topping stage, chlorosis, "burning", and various patterns of mottling and necrosis are evident in the upper and middle leaves of the plant. The injury is most severe on burley varieties. On flue-cured and dark varieties, the symptoms consist mainly of a mottle and necrosis is less severe than in burley; chlorosis and "burning" are usually absent. There are several strains of this virus that cause very mild mottles and only slight leaf necrosis. The most severe outbreaks of etch occur in the vegetable growing districts of Essex County.

Tobacco mosaic and certain other viruses are often associated with the etch virus. The indications are that injury is more severe where two or more viruses are present together than when they occur singly. The tobacco mosaic virus is present to some extent in nearly all fields by the end of the season. Several strains of tobacco mosaic have been collected in the field, including two strains that give a necrotic response, often with systemic necrosis, on

varieties carrying the n' gene (Green Briar, flue-cured varieties, Greenwood, Halley's Special, etc.). Strains that cause "burning" of the upper leaves of cigarette burley varieties have also been identified.

Tobacco streak is usually the first virus to be observed throughout the Old Belt district. As high as 8% infection was observed in some fields in Dover Township, Kent Co., in 1950. The reservoir of inoculum appears to be some of the forage legumes grown in and around the tobacco fields. Streak is rarely found in the New Belt.

The cucumber virus, although common, is not as prevalent as the etch or tobacco mosaic viruses. The ringspot virus can be found in most districts of the Old Belt, but its incidence is usually less than .01% in any field. The potato Y virus has only been recently identified in a collection from tobacco. The mild veinbanding symptom expression on certain tobacco varieties in the greenhouse indicates that it may be easily overlooked in the field. However, further work needs to be done with this virus including its possible iteraction with the other viruses.

Control of virus diseases in Ontario depends on the control of insects feeding on tobacco, and elimination of the overwintering hosts. in regard to overwintering, a survey needs to be made of the perennial hosts of the viruses in Ontario, their abundance, virus content, and location.

Tobacco Decays

During the curing season for burley tobacco, wet weather favoured the development of organisms causing barn burn ("sweat" or pole burn). These organisms (moulds and bacteria) attack the yellowing leaves when conditions are such that the air in the curing barn remains saturated with moisture and evaporation from the leaf surface is hindered. Numerous crops were reduced three to five grades in quality because of barn burn. Also, this decay resulted in a much higher percentage of trash or nondescript tobacco than usual. Because of the severity of injury this year, information regarding the cause, nature, and prevention of barn burn should be made available to the burley growers.

Other Observations

MOSAIC (virus). Rate of infection was heavier than usual in the Joliette area of Que. (F. Godbout).

TOMATO

EARLY BLIGHT (Alternaria solani) was sev. on Early Chatham (both foliage and fruit) and sl. on Stokesdale growing in adjacent rows at Metchosin, B.C. (W. Jones). Infection was in general more severe than usual in both early and late tomato crops in Essex Co., Ont. Extensive defoliation occurred in many of the canning crops (C.D. McKeen). Early blight caused a rot in about 20% of

the fruits of a fall greenhouse crop in Montreal, Que., 2-3 days after picking; the disease was also observed on the leaves (L. Cinq-Mars). Early blight was seen in tomato fields in Laval Co., but infection was not severe (E. Lavallee). Moderate infections were also observed in the Hull district (H.N. Racicot). Early blight was unusually severe in tomato plots in Kings Co., N.S., on land in tomatoes in 1948 and 1949, with most of foliage destroyed by 19 September. Two rows grown on land not previously used for this crop remained almost free until mid-September (K.A. Harrison). A tr.-mod. infection was seen in gardens at Charlottetown, P.E.I. (R.R. Hurst). Traces of early blight were observed in Nfld. (G.C. Morgan).

GREY MOULD (Botrytis cinerea) is always present when the foliage remains heavy during September. This year there was hardly a plant in the plots at Kentville, N.S., that did not have at least one fruit infected by the end of the month (K.A. Harrison).

LEAF MOULD (Cladosporium fulvum). D.L. Bailey (Can. J. Res. C, 28:535-565. 1950) reports that he has identified 7 races of Cladosporium fulvum in s.w. Ont., of which 5 apparently arose, probably through mutation, during the period of study. Stimulus for mutation seems to be somehow related to colonization of an incompatible host. Mutants in culture have unchanged or reduced pathogenicity and usually have reduced ability to produce spores. In mixed cultures of races 1 and 5 or 1 and 7, both components survived several transfers in vitro or on the host. No perfect stage has been induced (D.B.O.S.).

A severe infection of leaf mould developed on Washington State and Vetomold in a greenhouse at Haney, B.C., when the temperature was increased and ventilation reduced in an attempt to reduce injury from Verticillium wilt (I.C. MacSwan). Leaf mould was found on a fall greenhouse crop at Summerland (G.E. Woolliams). Although only a few greenhouse crops were examined in Essex Co., Ont., the disease was nowhere serious. The variety Improved Bay State was resistant where it was grown (C.D. McKeen). A trace was seen in a garden in Charlottetown, P.E.I. (R.R. Hurst).

ANTHRACNOSE (Colletotrichum phomoides) continues to be one of the most important diseases, particularly in the canning crop, throughout Ont. Individual growers have suffered severe losses when picked tomatoes were held for even short periods before processing now that grading at the factory determines the price to the grower (J.K. Richardson). During the last 3-4 years anthracnose has been increasingly severe on both early and late tomato crops in Essex Co., Ont. In 1950 a high percentage of the fruit ripening after 1 Sept. were severely infected in many fields of canning tomatoes (C.D. McKeen). Anthracnose caused mod.-sev. damage to Bounty tomatoes in the plots, Division of Horticulture, C.E.F., Ottawa (K.M. Graham). A mod. infection occurred on over-ripe fruit of Stokedale in the plots, Kentville, N.S., on ground bearing tomatoes for the third successive year (K.A. Harrison). A light infection was observed in a crop in Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL CANKER (Corynebacterium michiganense). Damage was sl.-sev. in several fields at Medicine Hat, Alta. In one sprinkler-irrigated field over 50% of the fruits developed a secondary soft rot. (M.W. Cormack). Diseased specimens were received from Leslie, Sask. (T.C. Vanterpool). Bacterial canker severely damaged half a dozen early tomato crops in the Kingsville-Leamington district, Ont. (C.D. McKeen). During the past summer, a severe epidemic of bacterial canker occurred at Ste. Anne de la Pocatiere, Que., and neighboring towns. The disease was first observed in late July and progressed rapidly during August. Most of the plants in the area are distributed as seedlings by one grower. It is suspected that the organism was introduced on the seed (C. Perrault). Bacterial canker was first observed in a ½ acre field at Waterville, N.S., on 20 July and caused later almost complete loss of crop. Of the varieties grown, Bounty was most severely affected (K.A. Harrison).

FUSARIUM WILT (F. lycopersici). Damage was spotty in several fields at Medicine Hat, Alta., and in the variety plots at Taber (M.W. Cormack). No wilt was found in the tomato crops in Essex Co., Ont., in 1950 except what occurred in the plot of infested soil at the Laboratory at Harrow (C.D. McKeen). Wilt affected 80% of the plants in a field at Ste. Dorothee, Que.; loss was severe (E. Lavallee). A mod. infection was reported in a greenhouse crop at North Sydney, N.S. Isolations yielded the organism and its pathogenicity was proved (K.M. Graham).

PHOMA ROT (P. destructiva) caused mod. damage to fruits close to the soil in a planting at Sidney, B.C. The weather was dry, but the dew was heavy at night. Spots bearing pycnidia also occurred on the leaves (W. Jones). A sl. infection was recorded in a garden in Vancouver (N.S. Wright).

LATE BLIGHT (Phytophthora infestans) was common in gardens after heavy rains in late September in North Saanich, B.C. (W. Jones). The pathogen was isolated from diseased fruits from the Winnipeg-Selkirk district, Man. (H.N. Racicot). Late blight was found affecting both the early and late field crops of tomatoes as well as the fall greenhouse crop in Essex Co., Ont. Near Kingsville a field of early tomatoes was found heavily infected on 5 July. The grower stated that the disease was affecting the plants before they were set in the field. The blight was present in the greenhouse crop in the fall of 1949 and apparently had overwintered in the greenhouse to attack the young plants in the early spring. Sporadic outbreaks of late blight appeared in the county during August and then the disease became widespread in canning tomato fields in early September. During the fall months late blight invaded a high percentage of the greenhouses and caused severe losses in many cases (C.D. McKeen). Not a crop of tomatoes was seen free from late blight in Lincoln and Wentworth counties and many growers lost a large proportion of their crop. All above-ground parts of the plant were affected (J.K. Richardson). Diseased fruits and stems were received from places in the Ottawa valley. (H.N. Racicot).

Late blight was severe on tomato fruits in the Eastern Townships, on Jesus Island, about Joliette, and in the Baie des Chaleurs regions, Que., causing an average loss of 25% of the crop. In trials conducted at St. Charles de Caplan, Bonaventure Co., and at Lennoxville, the percentage of affected fruits varied widely depending on the variety. Precipition was exceptionally high in the Eastern Townships and was above normal in the other districts mentioned (H. Genereux). Specimens were received from Fredericton, N.B. (H.N. Racicot). Late blight infected about 50% of the fruits in the untreated plots at the Station, Kentville, N.S., by 20 Sept. The disease was fully controlled by many farmers through their spray program (K.A. Harrison). Late blight was in general severe on tomatoes in P.E.I. late in the season and damage was heavy in some plantings (R.R. Hurst).

BUCK-EYE ROT (Phytophthora parasitica) developed in a low-lying field at Vernon, B.C. It started in a small patch of plants and then spread out in a circle. This is the first time the disease has been observed in the field in the Okanagan. The weather of April and May was exceptionally cool (G.C. Woolliams).

DAMPING-OFF (?Rhizoctonia solani) caused severe damage to plants of Bonny Best in late May in a greenhouse in Queens Co., P.E.I. (R.R. Hurst). Mod. losses were observed in 3 out of 5 greenhouses that produce tomatoes in Nfld. (G.C. Morgan).

LEAF SPOT (Septoria lycopersici) caused much defoliation in many crops of early tomatoes in Essex Co., Ont. (C.D. McKeen). Leaf spot was more prevalent than usual in Lincoln Co. It was observed in several seed beds and caused severe defoliation in a number of fields (J.K. Richardson). Tr.-sl. infection was observed at Hull and Perkins, Que. (K.M. Graham). Two plants of a new seedling were found infected in the trial plots at Kentville, N.S. (K.A. Harrison). Leaf spot caused sl. defoliation in early tomato crops in the Conception Bay area, Nfld. (G.C. Morgan).

WILT (Verticillium albo-atrum) affected 10-15% of the plants in a greenhouse at Haney, B.C. The grower increased the temperature of the house to 70-72°F. at night and 90-100°F. in the day. After 10 days the plants seemed to recover and grow normally but leaf mould (q.v.) developed rapidly (I.C. MacSwan). A late cold spring favoured wilt development in greenhouses at the Coast. Best control appears to be achieved by the buried tile method of stem sterilization of the soil (W.R. Foster). Wilt was found affecting up to 100% of the plants in the field in many localities in the Okanagan and Thompson Valleys. Amount of damage was not determined (G.E. Woolliams). Wilt was affecting 10% of the tomatoes and 75% of the eggplants in a field at Iberville, Que., on 10 August. Soil was heavily infested because it has been cropped to the same crops year after year (L. Cinq-Mars). Specimens sent in for identification were received from greenhouse growers in Kings, Hants, Pictou, and Cumberland counties, N.S. (J.F. Hockey).

BACTERIAL SPOT (Xanthomonas vesicatoria). Specimens were received from Picton, Ont. (E.H. Garrard).

BUNCH or PURPLE TOP (Solanum virus 17) was found affecting 5 plants in a plot at the Station, Fredericton, N.B. (D.J. MacLeod).

LEAF ROLL (Solanum virus 14). A few plants were found infected with what appeared to be leaf roll in a planting of Bonny Best in Queens Co., P.E.I. (R.R. Hurst).

MOSAIC (virus) affected 1-15% of the plants of Vetomold, 10% of Washington State, 5% of Potentate and Dominant in a greenhouse at Haney, B.C. Symptoms varied considerably with the variety (I.C. MacSwan). Mosaic was common in early and late tomato crops in Essex Co., Ont. Mosaic also affected many fall greenhouse crops at an early stage. Many growers in the Leamington district have been making the mistake of starting plants for the fall crop outdoors beside the greenhouse. Much less disease has been noted where the plants are started indoors and kept free of insects (C.D. McKeen). Mosaic seemed to be more prevalent this past summer in the fields observed in the Niagara peninsula than in most seasons. Severe infections were noted in several plantings particularly in staked crops. "Shoestring" plants were more numerous than usual (J.K. Richardson). Tobacco mosaic affected 50% of the plants in the Horticulture greenhouse, Ottawa, on 17 July, whereas less than 1% were affected in the field at Smithfield (D.S. MacLachlan). Mosaic severely affected 3 fields at Ste. Dorothee and one at St. Martin, Que. (E. Lavallee). Although many tomato fields were visited in N.S. this summer, the worst outbreak of mosaic observed was in a field of Early Harkness where 25% of the plants were affected by tobacco mosaic (K.A. Harrison). Traces were observed on Earliana and Break o'Day in a planting in Queens Co., P.E.I. (R.R. Hurst). A few plants were affected in a greenhouse at St. John's, Nfld. (G.C. Morgan).

STREAK (virus) affected 5% of the plants of Washington State at Haney, B.C. (I.C. MacSwan). About 100 plants were found affected in each of two commercial greenhouses at Summerland (G.E. Woolliams). Typical symptoms of double streak were observed in a greenhouse at Medicine Hat, Alta. (M.W. Cormack). A single plant affected by double streak was noted in a planting at Brighton, Ont. (K.M. Graham). Three diseased plants were received from Kings Co., N.S.; the fruit symptoms were typical of single virus streak (K.A. Harrison).

YELLOWS (Beta virus 1). A slight infection occurred in only a few fields mostly in the s. Okanagan valley, B.C., chiefly in Earliana and Clark's Early (G.E. Woolliams).

BLOSSOM-END ROT (non-parasitic) caused moderate damage to Burpee and Clinton hybrids at the Station, Saanichton, B.C. (W. Jones). The trouble was common in s.w. Ont. in canning tomatoes that ripened in early August, but it was less severe than usual (C.D. McKeen). Blossom-end rot caused mod. damage to tomatoes about Ste. Anne de la Pocatiere, Que., particularly in the Laboratory plots in early September (L.J. Coulombe). Blossom-end rot was less severe in N.S. than in 1949. However, one truss on each plant was severely affected in the plots

at the Kentville Station (K.A. Harrison). The trouble caused a marked reduction of the crop in P.E.I. in 1950 (R.R. Hurst). Blossom-end rot was more common in the Conception Bay area, Nfld., this year than in 1949, probably as a result of the hot summer weather (G.C. Morgan).

BLOTCHY RIPENING (non-parasitic). The immature fruit of the first truss were quite disfigured in a planting of the hybrid, Stokesdale x Chatham, at Waterville, N.S., as the brown vascular bundles showed through the flesh. As the fruit ripened they were not so noticeable and the affected fruit were marketed. The plants were very vigorous and were planted on a low piece of ground. Following a rain the plants had "wet feet" for a few days. It is suspected that this condition favoured the development of the trouble, which is well described by J.D. Atkinson et al. in Tomato diseases and pests in New Zealand and their control. Inf. Series 2, Dept. Sci. & Ind. Res. Wellington, N.Z. 1949 (K.A. Harrison). A tr. to 15% of the fruit were affected in several gardens in Queens Co., P.E.I. (R.R. Hurst).

2,4-D INJURY is becoming increasingly common in B.C. from drifting spray, and use of improperly washed sprayers. Injury from applying too concentrated solutions of hormones also occurs (W.R. Foster). A number of cases of injury were observed in Kings Co., N.S. In several cases it was impossible to find a near by field where 2,4-D had been used. Apparently wind currents had carried the spray at least a $\frac{1}{2}$ mile (K.A. Harrison).

PHOSPHORUS DEFICIENCY. A case was observed in a small stand of 15 plants on a high calcium soil in Queens Co., P.E.I. No confirmatory tissue tests were made (R.R. Hurst).

SKIN CRACKING was quite evident in tomatoes on the Avalon Peninsula, Nfld., after a dry July and August followed by heavy rains in late August and again in early October (G.C. Morgan).

TURNIP

SOFT ROT (Erwinia carotovora) caused the total loss of a Laurentian swede turnip crop at St. Alban, Que. The rot appears to follow severe brown heart. Experiments have shown that the amount of soft rot is proportional to the severity of the brown heart. Nothing is left of the root except the cortex, which cracks open when the root is lifted and freed of soil (R.O. Lachance). Soft rot caused sl. damage to a crop of white turnips at New Minas, N.S. (C.L. Lockhart). A very slight infection was seen in a field of Laurentian in Kings Co., P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe polygoni). A sl. infection was reported at Craigmyle, Alta. (A.W. Henry). A heavy infection was observed in several fields late in the season in P.E.I. (R.R. Hurst).

DOWNY MILDEW (Peronospora brassicae) was general on the foliage in a field crop of swede turnips at Courtenay, B.C. (W. Jones). The disease was quite prevalent and caused defoliation in several seed crops of Ditmar in Digby Co., N.S. (K.A. Harrison).

BLACK LEG (Phoma lingam). A trace infection was seen in a field of Ditmar in Queens Co., P.E.I. (R.R. Hurst).

CLUB ROOT (Plasmodiophora brassicae) was heavy on spring maturing turnips in Chinese market gardens on muck soil near Vancouver, B.C. (H.N.W. Toms). Club root was reported to be severe in a field of rutabaga at Riviere Bois Clair, Que. (H.N. Racicot). A light infection was noticed scattered through a field of Ditmar at Barton, N.S. It was found later at the Kentville Station (K.A. Harrison). Club root was recorded in all 3 counties in P.E.I.; damage was sl. to very sev. (R.R. Hurst). A mod. infection was found on Erysimum cheiranthoides and a very light one on Capsella bursa-pastoris. In the latter case club root was heavy on swede turnip (J.E. Campbell). Club root is quite prevalent on turnip in certain sections of Nfld., but causes less injury than to cabbage. Farmers growing Wilhelmsburger swede turnip have little or no loss from club root, but many of the subsistence farmers who purchase seed of Danish or Dutch origin have suffered heavy losses.

STORAGE ROT (Rhizoctonia solani). In one small lot of Ditmar grown and stored in Digby Co., N.S., 30% of the roots yielded pure cultures of R. solani. In other lots of affected roots, a large number of organisms were isolated, but R. solani was the commonest isolate (K.A. Harrison).

STORAGE ROT (Sclerotinia sclerotiorum). About 2% of 10,000 stecklings were rotted in one storage in Digby Co., N.S. (K.A. Harrison).

BLACK ROT (Xanthomonas campestris). A diseased specimen was received from B.C. from W.R. Foster (J. Sibalis). A few affected roots were observed in one storage in Queens Co., P.E.I. (R.R. Hurst).

MOSAIC (virus) has spread considerably in Ont. since it was first encountered in the Walkerton district in 1946 (P.D.S. 26:63). It is now found in Waterloo and Oxford. Turnips infected early in the season are stunted and measure 2-3 in. in diameter compared to the 5-6 in. of normal turnips. The Laurentian variety, the principal variety grown, is more susceptible than Purple King (G.H. Berkeley).

BROWN HEART (boron deficiency) caused the total loss of a planting of Laurentian at St. Alban, Portneuf Co., Que. The symptoms were as severe as those observed in sand cultures with 0.10-0.25 p.p.m. of boron (R.O. Lachance). Only 20 bu. of sound roots were harvested from a field at Melvem Square, N.S. Most growers do not plant without using boron; occasionally one still takes a chance (K.A. Harrison). Traces were found in a few fields in Queens Co., P.E.I., and no severely affected fields came to our attention (R.R. Hurst). Brown heart caused sl.-mod. damage in many fields in Trinity Bay and Conception Bay, Nfld.; the season was very dry (G.C. Morgan).

ROOT BURN (heat and drought) was fairly prevalent in P.E.I. Heat and lack of moisture did not permit sufficiently rapid growth of the roots (R.R. Hurst).

2,4-D INJURY caused severe distortion of about 75% of the roots in a field of Ditmar at Charlottetown, P.E.I. The surrounding grain fields had been sprayed with 2,4-D (D. Robinson).

VEGETABLE MARROW

MOSAIC (Cucumis virus 1). About 3% of the plants of Long White Bush in the Horticulture plots, C.E.F., Ottawa, Ont., were affected. The symptoms were typical of cucumber mosaic. The seed was produced at the Station, L'Assomption, Que., and the disease appeared to be seed-borne (H.N. Racicot).

WATERMELON

ANTHRACNOSE (Colletotrichum lagenarium) was severe in most plantings in the Harrow-Leamington area, Ont., and much fruit infection was noted late in the season. The disease was first noticed in plots at the Harrow Laboratory late in June (C.D. McKeen).

IV. DISEASES OF FRUIT CROPS

A. POME FRUITS

APPLE

CROWN GALL (Agrobacterium tumefaciens) was seen on a few young trees at the Experimental Station, Scott, Sask. (T.C. Vanterpool).

FRUIT ROT (Botrytis cinerea). Several reports of a calyx-end rot of Delicious were received at harvest time from the Creston Valley, B.C. In early November there were further reports of the rot developing in storage. Isolations yielded B. cinerea consistently. The weather was warm and moist at harvest time (M.F. Welsh).

FIRE BLIGHT (Erwinia amylovora). Specimens were received from London, Ont. (E.H. Garrard), and on Wealthy and a crab apple from St. Lambert, Que. (H.N. Racicot). Blight was seen on Sandow at Hemmingford and crab apples at Berthierville (F. Godbout). The neglected apple trees at one time planted along highways in Quebec are certainly a source of outbreaks of fireblight; but no great number of complaints was received this year (O. Caron). Blight was heavy in an abandoned orchard in Queens Co., P.E.I. New infections were not numerous, but the accumulated effect of several seasons' infection was severe. The disease does not seem to be found outside neglected orchards in P.E.I. (R.R. Hurst).

FRUIT ROT (Gloeosporium album). Infection was slight in December in many varieties stored at the Experimental Station, Fredericton, N.B. (J.L. Howatt). G. album caused 91% of the infection in Northern Spy with storage rot at the Station, Kentville, N.S., in April 1950 (K.A. Harrison).

RUST (Gymnosporangium spp.). G. sp. was reported to be fairly common on Cortland, Delicious, Northwest Greening and Wealthy in Prince Edward Co., Ont. (G.C. Chamberlain). Fruits with sterile infections were received from Almonte (H.N. Racicot, K.M. Graham). G. clavipes was seen at Ste. Anne de la Pocatiere, Que., in many locations, after a lapse of 8 years. Bethel Crab, Golden Russett, Greening, Melba, and Yellow Transparent were most affected (A. Payette). Infection by G. clavipes ranged from 0 to 60% in orchards surveyed in Kings and Annapolis Co., N.S. Aecia were found in several heavily infected orchards. This was the most severe outbreak recorded in 26 years by this laboratory (J.F. Hockey).

EUROPEAN CANKER (Nectria galligena). A single dead tree of King with many cankers was seen at Coldbrook, N.S. (C.L. Lockhart).

POWDERY MILDEW (Podosphaera leucotricha). Seedlings at Kentville, N.S., that were 100% affected in 1949, showed 30% infection in 1950. The disease usually persists only 2-3 years (J.F. Hockey).

BLACK ROT CANKER (Physalospora obtusa). Diseased twigs were received from near London, Ont. (G.C. Chamberlain).

CANKER (Tympanis conspersa Fr.) was found on Ben Davis and Black Twig in a neglected orchard near Kentville, N.S. The conidial (Pleurophomella) stage was present and was identified by J.W. Groves who is familiar with the fungus on Malus and Sorbus (K.A. Harrison, C.L. Lockhart).

SCAB (Venturia inaequalis) was very light in Creston Valley, B.C., but there was some late infection and a danger of storage scab following a very wet harvest. In the moister parts of the Kootenays, around Nelson, scab was severe. Fruit infection was 100% in unsprayed McIntosh. Damage was lighter but still severe in other varieties (M.F. Welsh).

Scab was fairly heavy in Norfolk, Elgin, York and Peel Co., Ont., and light in the Georgian Bay area. A few orchards were heavily scabbed in the Niagara Peninsula. In the laboratory orchard, St. Catharines, infection was 3-20% on sprayed and 60-80% on unsprayed trees. Most of this scab was late, pin-point infection resulting from nearly continuous rain 25 Aug. to 1 Sept. McIntosh in Louth Twp., Lincoln Co., showed heavy fruit infection and very heavy infection of terminal leaves, followed by scorching, on 19 July (G.C. Chamberlain).

In Missisquoi Co., Que., fruit infection was about 10% in well-sprayed orchards. Primary infections began to show at the pre-pink stage. Frequent rains favoured infection until mid-summer, necessitating 9-11 sprays (R. Desmarteau). In Rouville and adjacent counties ascospores matured very early, but cold, dry weather delayed their release and checked tree growth. A 45 hour rain on 18-19 May caused primary infections, which were visible on 7 June. Intermittent rain from 30 May to 1 June brought a second, much heavier, infection during bloom, which resulted in much foliage scab about 15 June. Rapid leaf growth at this time allowed much leaf infection, but the slower-developing fruit escaped infection in well-sprayed orchards. Continued rain in June and July made 5 to 8 cover sprays necessary. Adequately protected orchards had 10-20% fruit infection, but in others up to 90% of fruit was scabby. Growers who tried to check scab with lime sulphur after it was established only caused injury to the trees. Microfine sulphurs and ferbam gave better results (L. Cinq-Mars). The season was one of the worst on record for scab in south-western Que. Abundant mature ascospores at bud break, prolonged ascospore discharge, cool weather with frequent rain, and hindrance to spraying by high wind all contributed to the epidemic (F. Godbout). Infection about Quebec City was moderate to severe. Adequate spraying gave good control, about 5-6 applications being needed (O. Caron). Infection was moderate and damage slight on Cortland, Fameuse and McIntosh in Nicolet Co.; infection was traced to prolonged rain, 10-11 June, but subsequent sprays of lime-sulphur checked the spread (C. Perrault). Cool, wet weather at Ste. Anne de la Pocatiere in late June brought on a scab epidemic in unsprayed orchards, but initiation of spraying even at that time allowed clean fruit to be harvested (A. Payette).

On 11 May apple scab spores began to mature in the old leaves on the ground at Fredericton, N.B., and a slight discharge of spores was recorded. Apple bud development at this time varied according to variety from delayed dormant to early pre-pink. On 17 May a slight to moderate ascospore discharge was recorded during the early pre-pink stage. The weather was extremely warm

from 23 to 28 May inclusive, and bud development was very rapid. Most orchards were in partial to full bloom on 28 May and the leaves developed very rapidly following bloom. Hot, dry weather, unfavourable to scab, continued until 15 June. Secondary infection was first seen on 10 July (S.F. Clarkson). Infection was very slight to severe in orchards, according to the effectiveness of spraying. In general, control was good in well-sprayed orchards (J.L. Howatt).

No serious scab infection periods occurred in N.S. until the end of the bloom period, when prolonged rain occurred during a week-end when a spray should have been applied. All materials used at this stage are protectant fungicides only, so it was natural that a heavy scab development took place. McIntosh appeared to suffer the most. Before the end of June many blocks of McIntosh had from 15% - 40% foliage infection. Several additional infection periods were experienced during June and early July. Growers who applied protective sprays to their orchards at frequent intervals during the early summer were successful in harvesting good commercial crops, but many others suffered appreciable losses from scab. It is interesting to note that good control of scab was obtained by the use of eradicant fungicides (Tag and Phygon) applied after heavy infection periods (J.F. Hockey).

MOSAIC (virus). An orchard at Woodville, N.S., showed over 20% infection. It had been frameworked in 1949 from Stark to Cortland and Northern Spy. The Starks were apparently infected prior to frameworking (J.F. Hockey).

BITTER PIT (physiological). Infected fruits of Cox Orange were brought in from a home garden at Vancouver, B.C. The fruit was very large for the variety. The owner stated that in 1949, when the fruit was smaller, no bitter pit was present. Nearly all the fruit on a single tree was infected (I.C. MacSwan). Bitter pit infection ranged from 2 to 5% in 5 orchards in the Niagara Peninsula, Ont. Baldwin, Cortland, Delicious, Northern Spy, Northwest Greening and Wolf River were affected (G.C. Chamberlain). A small percentage of pitting was noted in a few stored lots of Cortland and Northern Spy in N.B. (J.L. Howatt). It was seen at harvest in a number of varieties in N.S., but infection was usually less than 5% (J.F. Hockey).

DROUGHT SPOT, etc. (boron deficiency). Symptoms of boron deficiency are now seldom seen in the Okanagan Valley, B.C., but indications of boron toxicity are becoming more common. The injury is usually caused by uneven application of boric acid, and is most commonly seen in one-and two-year-old trees (C.G. Woodbridge). A few affected fruits were seen on McIntosh trees in part of an orchard at Cambridge, N.S. (J.F. Hockey).

CHLOROSIS (?lime-induced iron deficiency) is found in tree fruits in areas of poor soil drainage in the Okanagan Valley, B.C. The lack of drainage causes a high soluble salt content. Chlorotic plants may have a normal iron content, but the iron is evidently unavailable for physiological processes (C.G. Woodbridge).

INTERVEINAL CHLOROSIS (manganese deficiency) was seen for the first time in the Okanagan Valley, B.C. It was widespread but caused slight damage. The response to sprays containing manganese was marked. Fruit size and total crop did not seem to be affected (C.G. Woodbridge).

FRUIT MALFORMATION (low temperature injury). Flattened fruits occurred in a few orchards in N.B. as a result of low temperatures during bloom (J.L. Howatt).

LEAF SCORCH (?magnesium deficiency) has been seen for several years in the Okanagan Valley, B.C. It is extensive in some orchards, and is most severe in heavy crop years. Up to 90% defoliation may occur in August or early September; the fruit then fails to size and the crop may be a total loss. Delicious, Jonathon, McIntosh, and Newton are most affected (C.G. Woodbridge).

LENTICEL SPOTTING (physiological). Several specimens of Talman Sweet were received in December, 1949, from Chatham and Guelph, Ont., with red spotting about the lenticels, believed due to conditions in common storage (G.C. Chamberlain). In late February, 1950, affected, over-mature McIntosh were received from cold storage at Belleville. No micro-organisms were associated (H.N. Racicot).

JONATHON SPOT (physiological). Specimens of affected Jonathon, shipped from Leamington, Ont., to Quebec City were sent in for diagnosis; symptoms were typical and no micro-organism was associated (H.N. Racicot).

LITTLE LEAF and ROSETTE (zinc deficiency) has been seen in the Okanagan Valley, B.C., for several years. Response to zinc sprays is often slow, and dormant applications of 20 lb. zinc sulphate in 100 gal. water for 3 years may be needed to cure the disorder. The common symptoms on apple are small leaves on two- and three-year-old wood, rosette due to shortened internodes on one-year-old wood, and interveinal necrosis. The trouble has also been seen on stone fruits (C.G. Woodbridge).

SPRAY INJURY. The use of Bordeaux mixture, in cool, humid weather, for the pre-blossom and first cover sprays caused slight to moderate russetting in many orchards in N.B., but high colour at picking time tended to obscure the blemish (J.L. Howatt).

SUN SCALD was quite common on Newton in many parts of the Okanagan Valley, B.C. (C.G. Woodbridge). Affected Duchess fruit were seen in an orchard in Grantham Twp., Lincoln Co., Ont. (G.C. Chamberlain).

PEAR

FIRE BLIGHT (Erwinia amylovora). In the Creston Valley, B.C., the provincial Department of Agriculture made thorough inspections and enforced winter cutting where possible. A dry blossom-period further aided control. In some areas incidence was much below that of 1949. However, in the main block of orchards, where several growers managed to evade the control measures, blight was as severe as in 1949 although it started late. Several small blocks and many individual trees have been removed, and many more will be cut out this winter (M.F. Welsh). Specimens were received from Sarnia and Oakville, Ont. (E.H. Garrard). A scattered infection was found in 3 small plantings of Bartlett in Grantham Twp., Lincoln Co., Ont. Infection was mainly in twigs, but had passed down some spurs into limbs (G.C. Chamberlain).

SCAB (Venturia pirina) was moderate on leaves and fruit of Flemish Beauty in the laboratory orchard, St. Catharines, Ont., but less severe than usual (G.C. Chamberlain). Infection was 0.5% on Clapp's Favourite at Greenwich, N.S., with lesions on the under sides of the leaves and over $\frac{1}{4}$ in. diam. on fruit. Infection was also 0.5% on Flemish Beauty at the Station, Kentville (C.L. Lockhart).

STONY PIT (virus). Fruit of one tree of Clapp's Favourite in Pictou Co., N.S., was a complete loss. Specimens received were apparently infected with this disease (K.A. Harrison).

BITTER PIT (?physiological). Fruits of Bartlett brought in from a home garden at Vancouver, B.C., were normal on the outside but showed internal dead tissue very similar to that of bitter pit in apple (I.C. MacSwan). A form of bitter pit has been seen in the Okanagan Valley for many years. In 1950 it increased in severity, 0 to 70% of the fruit of d'Anjou being affected. The symptoms are similar to those in apple and the same correlation between fruit size and occurrence has been found. D'Anjou is most severely affected, but the trouble occurs in other varieties (C.G. Woodbridge).

BLACK END (cause unknown) affected 0 to 100% of the fruit of Bartlett in the Okanagan Valley, B.C. The degree of injury varies from year to year, but once a tree has become affected it seldom produces a perfectly sound crop. The trouble is suspected to be due to incompatibility of root and scion (C.G. Woodbridge).

QUINCE

LEAF BLIGHT (Fabraea maculata). Infection was 100% in a short row of Quince A budding stock at Aldergrove, B.C. (H.N.W. Toms).

B. STONE FRUITS

APRICOT

CORYNEUM BLIGHT (Clasterosporium carpophilum) caused moderate damage in unsprayed orchards in the Kootenays, B.C., but the number of commercial plantings not receiving sprays is now very low (M.F. Welsh).

WILT (Verticillium albo-atrum) affected 10% of Moorpark and Perfection growing in low-lying muck soil near Okanagan L. at Summerland, B.C. The pathogen was isolated (G.E. Woolliams).

CHERRY

BLACK KNOT (Dibotryon morbosum). Affected specimens of May Day Tree, Prunus padus var. commutata, were brought in from E. Aylmer, Que. (H.N. Racicot).

SHOT HOLE (Higginsia hiemalis) was seen on all varieties, especially Black Republican, in the West Kootenays, B.C. Infection was moderate, but started late (M.F. Welsh). Shot hole was of little importance in the Niagara Peninsula, Ont. A moderate infection with some defoliation was seen in one orchard of Bing sweet cherry (G.C. Chamberlain).

POWDERY MILDEW (Podosphaera oxyacanthae) is rarely seen on cherry in the Okanagan Valley, B.C., but it was common in 1950 on nursery stock and on succulent shoots on winter-injured trees. In the Kootenays mildew is always present, but generally causes little damage. This year, with many winter-injured trees producing succulent growth it caused considerable injury (M.F. Welsh). It was common on vigorous young trees of Montmorency in Grantham Twp., Lincoln Co., Ont. (G.C. Chamberlain).

BLOSSOM BLIGHT and BROWN ROT (Sclerotinia fructicola and S. laxa). S. fructicola caused almost complete loss of crop from 25 trees of Bing and Lambert at Hatzic, B.C. Heavy rains before harvest and close spacing with consequent poor air drainage contributed (I.C. MacSwan). All varieties were affected by S. fructicola and S. laxa, mainly as brown rot, in the Kootenays; but as most damage was in the little cherry areas the monetary loss was minor (M.F. Welsh). Blossom blight due to S. fructicola was serious and widespread in the Niagara Peninsula, Ont., owing to several days with heavy fog during bloom. Up to 90% of bloom was destroyed (G.C. Chamberlain). S. fructicola caused heavy twig and blossom blight on a single Hansen's bush cherry, Prunus besseyi, at West Hill, York Co., Ont. (H.N. Racicot). Brown rot caused considerable loss on the trees and in storage at the Station, Kentville, N.S. (C.O. Gourley).

WITCHES' BROOM (Taphrina cerasi) was severe on a few trees in a garden at Brentwood, B.C. (W. Jones).

GREEN-RING YELLOWS (virus). Of 5362 trees in the sour cherry orchards under survey in the Niagara Peninsula, Ont., 13 (Montmorency and Early Richmond) were infected. Several trees are under observation in other orchards. A newly

observed symptom, associated with this disease but not with the commoner cherry yellows, was the presence of fruits that ripened unevenly, were bumpy, showed internal (mainly vascular) browning, and hung on the trees until September. A somewhat similar symptom was also seen in widely separated orchards on two trees that showed no foliage symptoms of green ring yellows. The possibility that it may be caused by viruses other than that of green-ring yellows is being investigated (R.S. Willison).

LITTLE CHERRY (virus). The presence of the virus in wild Prunus emarginata var. mollis in the Kootenays, B.C., appears to be fairly conclusively demonstrated. The new commercial variety Van appears to be a symptomless carrier of the virus (M.F. Welsh).

MILD RUGOSE MOSAIC (virus). Three trees in one sweet cherry orchard in Lincoln Co., Ont., showed symptoms suggestive of this disease (R.S. Willison).

MOTTLE LEAF (virus). A single affected tree of Bing sweet cherry was found at Erickson, in the Creston Valley, B.C. The tree was removed. This is the first record of the disease in the Creston Valley, although it has been known in the West Kootenay for 20 years (M.F. Welsh).

NECROTIC RING SPOT (virus). In the 5362 sour cherry trees surveyed in the Niagara Peninsula, Ont., only two cases of severe shock were seen, suggesting that the disease is reaching saturation in these orchards. There were 15 cases of mild shock, including some that repeated; a recurrent form of this disease is reported from Wisconsin and Pennsylvania. Etching was seen on 53 trees and probably occurred on others (R.S. Willison).

RING SPOT (virus) was seen on Deacon, Napoleon, and Schrecken Bigarreau, and was suspected on Lambert in a survey of the Station orchard, Kentville, N.S. (C.O. Gourley).

SMALL BITTER CHERRY (virus). Symptom expression was very mild this year in the southern Okanagan Valley, B.C., even in trees that had been infected for several years (T.B. Lott).

TATTER LEAF (virus) was seen in 24 of 26 orchards of sweet cherry surveyed in the Niagara Peninsula, Ont. Infection averaged 7.6% definite and 3.6% suspected, and ranged from 0 to 34%. This disease generally shows annually recurrent symptoms, but in some trees symptoms may appear in one year and not in another. The explanation of symptom expression is obscure. More than one virus may be involved. In a single case a Montmorency sour cherry inoculated with buds from sweet cherry with tatter leaf developed symptoms of green-ring yellows, but this is not the usual reaction (R.S. Willison).

YELLOWS (virus) infection varied from 2.5 to 74% in the 26 sour cherry orchards surveyed in the Niagara Peninsula, Ont. Of the 5362 trees 20.4% showed definite and 8.0% slight symptoms; 7.2% (25.6% of those affected) showed symptoms for the first time. Many trees show symptoms every year, but others show them erratically. The variation is suspected to be due to several strains of the cherry yellows virus being involved, and possibly to some other viruses causing similar symptoms. Symptom expression was delayed in 1950. It is believed that cool weather during leaf development, followed by hot weather in June, favours symptom expression; whereas hot weather immediately after bud break or cool weather in June tend to reduce severity of symptoms (R.S. Willison). Yellows was found in Dyehouse, Empress Eugenie, English Morello, Large Montmorency, Montmorency and Suda Hardy sour cherries in the Station orchard, Kentville, N.S., and was suspected in Noble, Orel.No. 24, and Windsor (C.O. Gourley).

CRINKLE (bud sport) and PSEUDO-CRINKLE (cause uncertain) ranged from 0 to 22.8%, av. 5.4%, in the 2806 trees of the surveyed sweet cherry orchards in the Niagara Peninsula, Ont. True crinkle is seen mostly in Black Tartarian, Bing, and Hedelfingen. In addition a condition resembling it and tentatively called pseudo-crinkle has recently been recognised. It may also be associated with low productivity and available information suggests that it may spread from tree to tree. It is widespread on various varieties and is sometimes difficult to diagnose (R.S. Willison).

GUMMOSIS and DIE-BACK (cause unknown) occurred on trees of Black Tartarian sweet cherry in Grantham Twp., Lincoln Co., Ont. The lesions suggest parasitic attack, but isolations have not yielded any probable pathogen consistently and most platings have been sterile. The trees are vigorous but for the dead branches and show little or no crown damage although some nearby trees show crown and possibly root injury (R.S. Willison).

MOTTLE (?virus) of sweet cherry showed on 33.2% of the 2806 trees in the surveyed orchards in the Niagara Peninsula, Ont. The condition is distinct from the mottle-leaf of the Pacific coast. As far as possible physiological mottles were discounted in making the survey. The mottle was associated in 5% of the trees with ring patterns and in another 5% with line patterns (R.S. Willison).

RASP LEAF (cause unknown). Five affected trees of Montmorency were seen in the sour cherry orchard survey in the Niagara Peninsula, Ont. Cock's comb enations, similar to those of sweet cherry rasp leaf occurred on the under leaf surface. The trees have been indexed to see if a virus is involved (R.S. Willison).

?RUSTY MOTTLE (cause unknown). Five of a block of 33 sweet cherry trees in Niagara Twp., Lincoln Co., Ont., have shown a June drop of yellow leaves yearly since first seen in 1948, with symptoms varying in intensity but resembling those described for rusty mottle (R.S. Willison).

PEACH

SCAB (Cladosporium carpophilum) was moderately heavy on the fruit of young Early Red at Grand Pre, N.S., that had received only a dormant spray (C.O. Gourley).

CORYNEUM BLIGHT (Clasterosporium carpophilum) was general on 31 Aug. on Fisher, Pacific Gold, Rochester, and Vedette at Chilliwack, B.C., and caused severe fruit spotting (I.C. MacSwan).

DIE-BACK (Cytospora leucostoma) caused considerable damage to young peaches at the Station, Kentville, N.S. (C.O. Gourley).

BROWN ROT (Sclerotinia fructicola) varied from light to moderate on Fisher, Pacific Gold, Rochester, and Vedette at Chilliwack, B.C. No varietal differences could be seen. No brown rot was seen until the onset of warm, wet weather on 25 Aug. (I.C. MacSwan). Blossom blight was very severe in varieties in bloom at the critical period in the Niagara Peninsula, Ont., in orchards bordering L. Ontario where persistent fogs occurred for several days in May. Brown rot was serious during the harvest of mid-season varieties, owing to nearly continuous rain 26 Aug. to 1 Sept., and losses were heavy, especially near the lake where the fruit matured rapidly. Dealers reported heavy losses in shipment. There was much less rot in the later varieties (G.C. Chamberlain, R.S. Willison). After a 24-hour rain, overwintered mummies and blighted twigs of Rochester peaches and Lombard plums were placed in a moist chamber in late May; a further 48-60 hours were needed to produce spores on the fruit. More sporodochia formed on plum than on peach mummies. Sporulation occurred on only 2/10 twigs, usually at pedicels, and not on the larger ones. In spray tests in the laboratory orchard, St. Catharines, the organic sprays, glyoxalidine, phenyl mercury acetate, and Phygon, were about equal in performance to sulphur, but treatments and controls varied too much to give much indication of control value. Sulphur cover sprays, with no pre-pick spray, conspicuously reduced loss from brown rot in Rochester, but infection was nevertheless heavy because this variety ripened in wet weather. Dryer harvesting weather for Elberta allowed much less brown rot to develop, and spray tests did not indicate any conspicuous reduction in infection (R.S. Willison).

LEAF CURL (Taphrina deformans) caused heavy defoliation of Vedette at Chilliwack, B.C. Infection was general in Fisher, Pacific Gold and Rochester, but defoliation was light (I.C. MacSwan). Infection of all varieties was light in the Creston Valley and moderate in the West Kootenay (M.F. Welsh). Infection was light at Port Williams and Wolfville, N.S. (C.O. Gourley). Several reports of from a trace to 25%, mostly on unsprayed trees, were received from Kings Co. (J.F. Hockey).

WILT (Verticillium sp.). Four instances of typical wilt were seen in 2- and 3-year-old vigorous trees of Golden Jubilee in Lincoln Co., Ont. In each case tomatoes had preceded the peaches or bean used as an intercrop (G.C. Chamberlain).

WESTERN X DISEASE (virus). Symptom expression was very mild in the southern Okanagan Valley, B.C., even in trees previously known to be infected (T.B. Lott).

PLUM

BLACK KNOT (Dibotryon morbosum). Infection was slight on Mallard at the Station, Saanichton, B.C., and on a damson in a garden at Sidney (W. Jones). Infection was general in plantings in the lower mainland, and was heavier on plums than on Italian prune (I.C. MacSwan). Black knot was abundant in 5 wild plum trees in a vacant lot at St. Catharines, Ont. Every branch bore at least one knot (G.C. Chamberlain). An orchard at Chateauguay, Que., was so heavily infected as to be absolutely worthless (F. Godbout). A specimen was received from St. Romuald, Levis Co. (H.N. Racicot).

SHOT HOLE (Higginsia hiemalis) was severe in a specimen from St. Sauveur des Montagnes, Terrebonne Co., Que. (H.N. Racicot).

BROWN ROT (Sclerotinia fructicola) was common on several varieties at the Station, Saanichton, B.C. (W. Jones). A specimen was received from Mair, Sask. (T.C. Vanterpool). Brown rot was quite common in the Niagara Peninsula, Ont., on Grand Duke, Monarch, and Yellow Egg (G.C. Chamberlain). It was heavy on all varieties at the Station, Kentville, N.S., causing considerable loss on the trees and in storage (C.O. Gourley).

PLUM POCKET (Taphrina communis). All the fruit on one tree in a garden at North Vancouver, B.C., was affected (I.C. MacSwan). Specimens were received from Chelan, Sask., with the statement that this was the third year of occurrence (T.C. Vanterpool). Infection was a trace at Port Williams, N.S., on a young tree of Burbank that had received a very late dormant spray of Bordeaux mixture (C.O. Gourley).

RUST (Tranzchelia pruni-spinosae) was common in a neglected orchard at Mill Bay, B.C. (W. Jones).

WILT (Verticillium sp.). Thirty per cent of a block of Italian Prune in Grantham Twp., Lincoln Co., Ont., were dead or dying on 25 Aug. (R.S. Willison).

BACTERIAL BLIGHT (Xanthomonas pruni). At the Station, Kentville, N.S., the shot-hole phase was heavier, in Japanese varieties, on trees with many cankers than on those with few or none (C.O. Gourley).

PRUNE DWARF (virus). One tree of Italian prune in an orchard of several hundred in Lincoln Co., Ont., was infected. The foliage was seriously dwarfed and the crop very light (G.C. Chamberlain).

SHIRO LINE-PATTERN MOSAIC (virus) appeared in July in Lincoln Co., Ont., on Shiro trees top-worked to Red June (G.C. Chamberlain). A line-pattern mosaic was found only in Mammoth Japanese plum of the 75 varieties at the Station, Kentville, N.S. (C.O. Gourley).

CHLOROSIS (lime-induced) was severe on plum at Gimli, Man., and on Greengage plum and Opata plum x cherry hybrid at Rivercrest (W.L. Gordon).

SHRIVELLING (cause unknown). Shrivelling of the fruit of Italian prune at the stem end was common in many orchards in the Niagara Peninsula, Ont. The cause is unknown (G.C. Chamberlain).

SPRAY INJURY. Some plum and prune orchards in the Niagara Peninsula, Ont., showed considerable defoliation attributed to copper and arsenical injury. Japanese plums in some instances suffered nearly complete defoliation. Plums are subject to injury from copper fungicides used in summer with an oil emulsion for mite control (G.C. Chamberlain).

C. RIBES FRUITS

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola). At the Station, Saanichton, B.C., infection was slight on Boskoop and Buddenburg. No rust occurred on adjacent Coronet and Crusader. Boskoop is being widely grown for its rust resistant quality (W. Jones). Infection was general and moderately heavy on Boskoop in Creston Valley, but appeared too late to cause much defoliation (M.F. Welsh). Rust was general on Boskoop and Black Giant in nurseries at Fenwick, Port Burwell, Hamilton, Gilford and Stayner, Ont., and it caused defoliation of bushes at Goderich (G.C. Chamberlain). Rusted specimens of black currant were received from St. Hilaire, Que. (H.N. Racicot). Rust caused complete defoliation of black currants at Port Williams, N.S. Infection was moderate, but damage slight, on Black Victorian, Climax, Clipper, Magnus and Saunders at the Station, Kentville (C.O. Gourley). Infection was 50% on black currant at Southport, P.E.I. (J.E. Campbell). A new rustless black currant, O-396, which is to be named Consort, was released in 1949 by the Division of Horticulture for trial; it can set fruit with its own pollen and without the help of insects. It has the further advantage that it can serve as a pollinator for Crusader and Coronet, the rust-immune varieties released previously.

CANKER (Nectria cinnabarina) caused considerable die-back in a small planting of red currants in Grantham Twp., Lincoln Co., Ont. (G.C. Chamberlain). Infection was light in a small plot of black currants at Port Williams, N.S. (C.O. Gourley).

POWDERY MILDEW (Sphaerotheca mors-uvae). Infection was 50% in a small row of red currants at Point Grey, Vancouver, B.C. It was heavy on Coronet (O-393) in a commercial nursery at Aberdeen (H.N.W. Toms). Damage was severe on specimens of Crusader from Barrie, Ont. (H.N. Racicot). By mid August about half the new shoots on two varieties of black currant in a garden at Ottawa were heavily blighted and perithecia were abundant (I.L. Conners). Infection was heavy and damage moderate on Coronet and Crusader at the Station, Kentville, N.S. (C.O. Gourley).

GOOSEBERRY

WHITE PINE BLISTER RUST (Cronartium ribicola) was heavy on O-273 and O-274 at the Station, Kentville, N.S. (C.O. Gourley).

SEPTORIA LEAF SPOT (Mycosphaerella grossulariae) was light on O-275 at the Station, Kentville, N.S. (C.O. Gourley).

RUST (Puccinia pringsheimiana) was light and damage nil on Captivator at the Station, Kentville, N.S. (C.O. Gourley).

POWDERY MILDEW (Sphaerotheca mors-uvae) was moderately heavy, but caused slight damage, on Young and Fredonia at the Station, Kentville, N.S. (C.O. Gourley).

D. RUBUS FRUITS

BLACKBERRY

CANE GALL (Agrobacterium rubi) is reported from B.C. on Evergreen by E.K. Vaughan et al. U.S.D.A. P.D.R. 35:34-37. 1951.

ORANGE RUST (Gymnoconia peckiana) was heavy on wild blackberries at the Station, Kentville, N.S. (C.O. Gourley).

BOYSENBERRY

CANE GALL (Agrobacterium rubi) was general on canes in a garden at Nanaimo, B.C. (W. Jones).

MOSAIC (virus) is reported as severe, with dwarfing, at Pitt Meadows, B.C., by E.K. Vaughan et al. U.S.D.A. P.D.R. 35:34-37. 1951.

FROST INJURY. Loss of canes in March, 1950, at Duncan, B.C., was about 80% in one planting. Damage to other Rubus spp., including raspberry, was minor (W. Jones).

LOGANBERRY

CANE GALL (Agrobacterium rubi) caused considerable damage in a planting at Keating, B.C. (C. Coleman).

RASPBERRY

CROWN GALL (Agrobacterium tumefaciens). Infection was 60% and loss 40% in a mixed planting at Lennoxville, Que. (H. Genereux). Infection was 75% and damage 50% in the varieties under test at Ste. Anne de la Pocatiere; Viking showed some resistance (A. Payette). More specimens were received from Kings Co., N.S., than for many years. The disease is apparently quite common, but is not often seen in fruiting plantations (K.A. Harrison). Crown gall was seen at Kentville and specimens were received from Truro and Brooklyn (J.F. Hockey). Infection was heavy and damage severe in Cuthbert and Viking in Queens Co., P.E.I. (R.R. Hurst).

CANE BLIGHT (Botrytis cinerea). Infection was trace to 10% in Gatineau, Rideau, Trent, and Washington at Kentville, N.S., and in Madawaska, Trent, and Viking at Truro (J.F. Hockey).

SPUR BLIGHT (Didymella applanata) was light on specimens from Mindemoya, Manitoulin I., Ont., and on specimens of Taylor from Guelph. It was severe in material of Madawaska from Stayner. It was moderate in Cuthbert from Campbellford and unidentified plants from Manotick (H.N. Racicot). In the Leamington area spur blight was very severe and, combined with winter injury, caused the loss of many acres. In the London area it occurred frequently, but caused little damage. It was abundant in the Niagara Peninsula (A.T. Bolton). Infection was 30% in a weedy patch of Madawaska at Sparta. It was also found at Goderich, mainly on the Ottawa varieties; heavy growth and poor air drainage contributed to unusually heavy infection of Madawaska, Muskoka, Trent, and Van Dyke (G.C. Chamberlain). Traces were seen by Mr. J. Ringuet on Newburg in a nursery at St. Lazare, Vaudreuil Co., Que.,

and by Mr. D. Leblond in nurseries at St. Alphonse de Caplan, Bonaventure Co., and Trois Pistoles, Riviere du Loup Co. (L. Cinq-Mars). Infection was trace to 2% of canes of Newburg and Viking at the Station, Kentville, N.S. Small amounts were seen in some commercial plantings and it was heavy in specimens from Halifax Co. (K.A. Harrison). Damage to Viking in Queens Co., P.E.I., was slight in early Aug., but there was a sharp increase late in the season (R.R. Hurst).

ANTHRACNOSE (Elsinoe veneta) is reported on Washington and Lloyd George at Huntingdon, B.C., by E.K. Vaughan et al. U.S.D.A. P.D.R. 35:34-37 1951 (D.B.O.S.). It was moderate on canes and leaves from Mindemoya, Manitoulin I., Ont., and severe on Taylor from Guelph (H.N. Racicot). Anthracnose caused some damage to new canes in the Leamington area. It was the principal disease in the London area, killing considerable numbers of canes in some plantings. It was not serious in the Niagara Peninsula (A.T. Bolton). A moderate infection was seen on Morrison at Port Burwell. It was seen in many plantings of red raspberries in the Niagara Peninsula but it was less important than usual (G.C. Chamberlain). Infection was 2% in a Newburg nursery planting at St. Lazare, Vaudreuil Co., Que. (J. Ringuet). Anthracnose is causing increasing damage near Quebec City, notably in the northern parts of Levis and Bellechasse Co. Dormant lime sulphur has given good control locally for several years (O. Caron). Infection was seen on all of 1000 canes of Taylor newly planted at Port Williams, N.S. (K.A. Harrison). In Queens Co., P.E.I., infection was Viking 11%, Lloyd George 17%, Madawaska 27%, and Trent 63%; damage was moderate to heavy (R.R. Hurst).

CANE BLIGHT (Leptosphaeria coniothyrium). Two specimens of Viking were brought in from Cambridge, N.S., on 21 Aug. The canes were dying after harvest (K.A. Harrison).

SEPTORIA LEAF SPOT (Mycosphaerella rubi) was light on leaves sent in from Mindemoya, Manitoulin I., Ont. (H.N. Racicot). Infection was general in several plantings of Viking at Penetanguishene (G.C. Chamberlain).

YELLOW RUST (Phragmidium rubi-idaei) was common on Washington at Duncan and Nanaimo, B.C., but caused slight damage (W. Jones).

LATE YELLOW RUST (Pucciniastrum americanum) was found in Viking at Goderich and Penetanguishene, Ont., and caused considerable leaf fall at the latter locality. It was common in a planting of Cuthbert at Port Burwell (G.C. Chamberlain). A light infection was seen in a planting at Brighton (D.S. MacLachlan). Infection was general in red raspberry varieties in Kings Co., N.S. (J.F. Hockey). It was light on Latham and heavy on Viking in Queens Co., P.E.I., destroying 85% of the crop of the latter (R.R. Hurst).

POWDERY MILDEW (Sphaerotheca humuli) was very common in Latham plantings throughout central Ont. and the Niagara Peninsula. At Campbellford a 1½ acre planting was severely stunted and had spindly cane tips and mottled foliage (G.C. Chamberlain).

VERTICILLIUM WILT (V. albo-atrum). Specimens were received from Prince Albert, Sask., with moderate damage reported (R.J. Ledingham). Wilted cane tips, perhaps affected by this disease, were sent in from Creelman (T.C. Vanterpool). Scattered infections, av. 3%, were seen in young Viking plantations in the Niagara Peninsula, Ont. (G.C. Chamberlain).

LEAF CURL (virus). Badly stunted plants of Taylor and Cuthbert were found at Port Stanley, Sparta and St. Catharines, Ont. It was also found in Chief at Port Stanley (G.C. Chamberlain). Several infected plants of Taylor and Viking were found in various plantations in Kings Co., N.S. (K.A. Harrison).

MOSAIC (virus) was reported to be moderately severe on Latham at Pitt Meadows and Lulu Island, B.C., Newburg at Langley, Taylor at Mission, and New Munger black raspberry at Vancouver, by E.K. Vaughan et al., U.S.D.A. P.D.R. 35:34-37. 1951 (D.B.O.S.). Infection by green mottle mosaic was 60% in a planting of Starlight at Kenwood, Ont. Infections of 1-3% were found in Chief, Latham, and Viking grown for certification (G.C. Chamberlain). Trace to 2% infections were seen in several nursery plantings of Newburg and Viking in s.w. Que. (L. Cinq-Mars). Infection was 21% in a Lloyd George planting in Queens Co., P.E.I. Mosaic if often found to be the explanation of unthrifty plantations in the province (R.R. Hurst).

YELLOW MOSAIC (virus). Several conspicuous cases of this disease were found in Taylor entered for certification at Penetanguishene, Gilford, and London, Ont. Infectior was 0.5-1.0% and affected plants were seriously stunted (G.C. Chamberlain).

STUNTING (?virus). In 1949 a grower at Summerland, B.C., noticed a few canes in his planting of Lloyd George with stunting and severe leaf distortion. In 1950 the disease spread throughout the patch and was found in two other local plantings. It is under study at the Vancouver Laboratory (M.F. Welsh).

CHLOROSIS (lime-induced iron deficiency) was seen at the Station, Scott, Sask., and in several gardens at Saskatoon. Injury appeared to be slight (R.J. Ledingham). Interveinal chlorosis, probably due to iron deficiency was seen at Saskatoon (T.C. Vanterpool). In a planting of Marcy at Belleville, Ont., there was complete bleaching of apical leaves and interveinal chlorosis of lower ones on fruiting canes on 30 June, but new growth was still normal (K.M. Graham).

ROOT ROT (cause unknown) at Burnaby, B.C., killed 10-15% of Lloyd George in 3 rows of 6-year-old plants and of 3 rows planted from them in 1949 (I.C. MacSwan).

WINTER INJURY caused considerable losses in the Leamington and Niagara districts, Ont. (A.T. Bolton). Light snow cover and strong winds contributed to winter injury in P.E.I. The loss was 11% in one plantation of Viking in Queens Co. (R.R. Hurst).

E. OTHER FRUITS

BLUEBERRY

CANKER (Godronia cassandrae) was general in a 4-acre planting of 4-year-old seedlings on Lulu Island, B.C. (I.C. MacSwan). Specimens were received from Vancouver with the statement that many shoots were affected early in spring and some of the older wood was dying in June (H.N. Racicot).

LEAF RUST (Thekopsora vacciniorum) was quite general at the blueberry substation, N.B., in early Sept. Slight defoliation had started (J.F. Hockey).

WINTER INJURY caused widespread die-back in plantings on Lulu Island, B.C., up to 50% of twigs and 30% of branches being killed. The fast-growing varieties Jersey and Dixie suffered much more than the slow-growing Atlantic and Pemberton (I.C. MacSwan).

GRAPE

DEAD ARM (Fusicoccum viticola) was quite common in Concord vineyards in the Niagara Peninsula, Ont., up to 30% of the vines being affected in some rows. Affected vines lose fruiting wood and may be killed outright or seriously weakened. The disease was also seen on Agawam, Niagara, President, and Seneca (G.C. Chamberlain).

DOWNY MILDEW (Plasmopara viticola). A few fruit clusters were destroyed in an unsprayed planting of Fredonia in Lincoln Co., Ont. (G.C. Chamberlain). A 25% premature fruit drop of American varieties at Rougemont, Que., was tentatively ascribed to downy mildew, but no leaf infection was seen (L. Cinq-Mars).

POWDERY MILDEW (Uncinula necator) developed late in the season on Concord in Lincoln Co., Ont., following very wet weather in late Aug. and early Sept. (G.C. Chamberlain).

CHLOROSIS, perhaps due to iron deficiency, was pronounced on Worden and Concord throughout the Niagara Peninsula, Ont. Affected vines later became more normal in colour, but were less vigorous than unaffected plants. Worden in a vineyard in Grantham Twp., Lincoln Co., had completely chlorotic foliage with marginal scorching and considerable stunting; adjacent Concord and Fredonia were unaffected (G.C. Chamberlain).

CHEMICAL INJURY. About 5 tons of grapes were greatly delayed in ripening in a vineyard in Welland Co., Ont., near a power-line right of way that was sprayed with 2,4-D. Vines showed the typical stunted and malformed apical leaves. Where injury was most severe the fruit never ripened (G.C. Chamberlain). Minor damage, mainly to European varieties and giving a mosaic effect on the leaves, resulted at Rougemont, Que., from the sprayer being previously used for 2,4-D (L. Cinq-Mars).

STRAWBERRY

LEAF BLIGHT (Dendrophoma obscurans). Some infection was seen on Premier in the Leamington, London, Waterford, Simcoe, and Niagara districts, Ont. Infection became heavier late in the season. It was also seen on Valentine in the Waterford, Simcoe, and Niagara districts; on British Sovereign in Leamington; on Senator Dunlap in Niagara; and on Mackenzie and Tupper in the London district (A.T. Bolton).

LEAF SCORCH (Diplocarpon earliana) was seen on Valentine in the Leamington, Waterford and Niagara districts, Ont.; on British Sovereign in Leamington; on Senator Dunlap in Niagara; and on Redwing in the London district; but none was recorded on Premier (A.T. Bolton). Leaf scorch infection was 5% in Redwing at Charlottetown, P.E.I., on 25 July. In August in the replicated variety plots infection was: none - Crimson Glow, Herman; trace - Dresden, Louise, Maytime, 57-35-C47, USDA 2312; light - Borden, Catskill, Culver, Fairfax, King, Massey, O-294; moderate - July Morn, Mackenzie, 37-52-C62; severe - Premier, Senator Dunlap (R.V. Clark).

LEAF SPOT (Mycosphaerella fragariae) was present, and often severe, on Valentine in the Leamington, Waterford, Simcoe, and Niagara districts, Ont. It was also recorded on British Sovereign, Senator Dunlap, Dorset, Louise, Tupper, and Redwing in various districts, but none was found on Premier. Infection was moderate at Leamington on an unnamed variety, which was, however free from leaf scorch and leaf blight (A.T. Bolton). Infection was 5-10% and damage very slight in several fields of Senator Dunlap near Montreal, Que. (L. Cinq-Mars). It was reported to be severe at Paquetteville, Gloucester Co., N.B. (J.E. Jacques). Leaf spot was light on most varieties in Kings and Annapolis Co., N.S., but it was heavy on unsprayed plantings of Louise (J.F. Hockey). In the replicated plots at Charlottetown, P.E.I., infection in August was: none - Borden, Catskill, Dresden, July Morn, Mackenzie, Premier; trace - Crimson Glow, Culver, Fairfax, Senator Dunlap; light - King, Maytime, Redwing, Tupper, Valentine, 57-35-C47, 37-52-C62, O-294, USDA 2312; moderate - Herman; severe - Louise (R.V. Clark).

RED STELE (Phytophthora fragariae) was severe in a runnerless everbearing variety in a garden at Sidney, B.C. Oospores were present in the roots. The plants had been grown from seed (W. Jones). A few infected plants of Premier and Senator Dunlap were found in wet areas at Berwick, N.S. (J.F. Hockey).

POWDERY MILDEW (Sphaerotheca humuli) was general on 1 Aug. in 3 acres of a 20 acre field of British Sovereign at Bradner, B.C. (I.C. MacSwan).

DECLINE (?virus). Many thousands of certified strawberry plants from coastal B.C. were planted in the Wynndel district, Creston Valley, in the spring of 1949. There was no obvious difference that year between the certified and locally grown plants; but in 1950 the certified plants were three times the size of the local ones and gave six pickings against two. The local plants appear to be infected by a serious, unidentified virus (W.R. Foster).

YELLOWS (virus). British Sovereign still shows no sign of degeneration in the field in B.C. although it has been proved susceptible by inocultion. Marshall is seriously affected (R.E. Fitzpatrick).

JUNE YELLOWS (genetic breakdown) was found in a few fields of Premier in the St. Catharines area, Ont. Growers claimed that it decreased the crop by 50% (A.T. Bolton). Plantings of Premier in the Berwick area, N.S., showed up to 75% of plants affected (J.F. Hockey).

ROOT ROT (cause unknown) was the most serious disease of strawberries in southern Ont. in 1950 (A.T. Bolton). Infection of a single long row of Premier in a garden near Ottawa, Ont., was about 50%. A few plants of various varieties were affected at L'Assomption, Que. (H.N. Racicot). Root rot affected all varieties at Ste. Anne de la Pocatiere, but damage was much less than in 1949 (A. Payette).

WINTER INJURY killed 40% of the plants in unprotected fields near Quebec City, Que., and caused further serious loss of crop from the remaining plants (O. Caron). A trace to 50% of plants of Senator Dunlap were affected at Charlottetown, P.E.I., with subsequent crown rot (R.R. Hurst). At Brackley Beach 5% of Senator Dunlap were affected, with death of roots, browning of crown, reddening of leaves and reduction of crop (J.E. Campbell).

V. DISEASES OF TREES AND SHRUBS

ABIES - Fir

Witches' Broom (Melampsorella cerastii) was seen at L. Ainslie, N.S. (V.J. Nordin).

Timber Rot. Ganoderma lucidum and Polyporus abietinus were collected at Green River, N.B., and Stereum sanguinolentum at Margaree Forks, N.S. (V.J. Nordin).

ACER - Maple

Timber Rot. The following organisms were noted: Daedalea unicolor, in A. rubrum, New Jersey, N.B.; Fomes connatus, in A. rubrum, Penniae; F. igniarius, in A. rubrum, New Jersey; F. fomentarius, in A. saccharum, Whycocomagh, N.S.; Ustulina vulgaris, in A. saccharum, Glendale (V.J. Nordin).

Tar Spot (Rhytisma acerinum) was unusually prevalent in the Montreal district, Que., owing to the cool, wet season (F. Godbout). It was again heavy in a planting of A. rubrum at Ste. Anne de la Pocatiere, but did not cause premature leaf-fall (A. Payette). A. punctatum was seen on A. rubrum at Acadia, N.B. (V.J. Nordin)

Wilt (Verticillium sp.) seriously damaged single trees of A. rubrum and A. saccharum at Charlottetown, P.E.I., in June (R.R. Hurst).

Chemical Injury. Tips of A. negundo became distorted, elongated, and pale green in late June and early July at Saskatoon and elsewhere in Sask. This was reported last year (P.D.S. 29:94) as heat injury, but it is now believed to be due to a fine mist of 2,4-D resulting from the large amounts of this herbicide being used throughout the province (T.C. Vanterpool).

AESCULUS - Horsechestnut

Coral Spot (Nectria cinnabarina) was found on a young tree in a nursery at Berthier, Que. (J.E. Jacques).

Timber Rot (Ustulina vulgaris) attacked A. hippocastanum at Liverpool, N.S. (V.J. Nordin).

ALNUS - Alder

Catkin Deformation (Taphrina robinsoniana) was seen at Penniae, N.B., and St. Peter, N.S. (V.J. Nordin).

AMELANCHIER

Black Leaf Curl (Apiosporina collinsii) was severe in the Edmonton district, Alta., and slight at Alliance and Grande Prairie (T.R. Davidson). It was severe on several clumps of Amelanchier in fence-rows at Aylesford, N.S. (J.F. Hockey).

BETULA - Birch

Timber Rot. The following organisms were identified: Fomes applanatus, in B. lutea, Whycocomagh, N.S., and B. papyrifers, Green River, N.B.; F. fomentarius, in B. lutea, Alma, and B. papyrifera, Green River, N.B.; F. igniarius, in B. lutea, Whycocomagh, N.S., and B. papyrifera, Green River, N.B.; Poria obliqua, in B. lutea, St. Margaret's Bay, and B. papyrifera, Dalhousie, N.S.; Ustulina vulgaris, in B. lutea, Whycocomagh, N.S. (V.J. Nordin).

CARAGANA

Leaf Spot (Septoria caraganae). Infected pods were received from Indian Head, Sask. At Winnipeg, Man., it was heavy on the leaves, but did not cause defoliation (W.E. Sackston).

COTONEASTER

Die-Back (Cytospora sp.) caused moderate damage at Edmonton, Alta. (A.W. Henry).

Dark Berry (Phytophthora cactorum) is found in nearly every planting of C. horizontalis on Vancouver I., B.C. The infected fruits, with abundant oospores, make good class material (W.R. Foster).

EUCALYPTUS

Winter Injury. A single tree at Saanichton, B.C., which had survived the two preceding winters, was killed by frost in Jan. 1950 (W. Jones).

EUONYMUS

Crown Gall (Agrobacterium tumefaciens). Many diseased plants of E. fortunei var. vegetus were found by the Plant Protection Division in a nursery at Sheridan, Ont. The galls ranged up to 4 in. diameter (J. Sibalis).

FAGUS - Beech

Bark Canker (Nectria coccinea (Pers.) Fr. var faginata Lohm., Wats. & Ayres) was seen on F. grandifolia at Penniae, N.B. (V.J. Nordin). See discussion by Wehmeyer (Fungi of New Brunswick, Nova Scotia and Prince Edward Island. Ottawa 1950).

Timber Rot. The following organisms were noted from F. grandifolia: Fomes fomentarius, Big Intervale, and Hericium laciniatum and Ustulina vulgaris, Whycocomagh, N.S. (V.J. Nordin).

FRAXINUS - Ash

Leaf Spot (Cylindrosporium (Piggotia) fraxini) was very heavy on 17 Sept. on small trees of F. pennsylvanica at Shirley Bay, near Ottawa, Ont., causing curling and shedding of leaves. Both spore stages were abundant (D.B.O. Savile).

Rust (Puccinia sparganioides) was prevalent on a tree at Longueuil, Que. (J.E. Jacques).

JUGLANS

Die-Back (Melanconis juglandis). The conidial stage was present on a few affected limbs of butternut, J. cinerea, at Kentville, N.S. Fruit-bodies of Schizophyllum, Trogia, and Polyporus tulipiferae were also present (K.A. Harrison).

Bacterial Blight (Xanthomonas juglandis) was severe on trees of English walnut, J. regia, in a garden at Saltair, and was abundant, but not serious, elsewhere on Vancouver I., B.C. (W. Jones).

LARIX - Larch

Needle Cast (Hypodermella laricis) occurred at Acadia, N.B. (V.J. Nordin).

MALUS - Apple

Timber Rot (Daedalea unicolor) was seen on M. pumila at Fredericton, N.B. (V.J. Nordin).

PICEA - Spruce

Rust (Chrysomyxa spp.). C. empetri was abundant on 4 Sept. at Churchill, Man., on P. glauca and Empetrum nigrum. At this time C. ledi var. rhododendri could be found without difficulty on Rhododendron lapponicum, but in the brief time available it was not found on spruce. It now seems probable that this rust is widespread in the country west of Hudson Bay, but it has not yet been proved to occur on Picea (D.B.O. Savile). Cone rust, C. pyrolae, was found at St. Margaret's Bay, N.S., on P. rubens (V.J. Nordin).

Timber Rot. Fomes pini was recorded in P. rubens from Green River, N.B., and St. Margaret's Bay, N.S.; and F. pinicola from Alma, N.B. (V.J. Nordin).

PINUS - Pine

Mistletoe (Arceuthobium americanum) is abundant on P. banksiana between Primrose L. and Meadow L., in western Sask., and is doing great damage to young trees. In two colonies the mistletoe is heavily parasitised by Wallrothiella arceuthobii, but it is not clear yet whether the fungus is exercising any important control of the mistletoe. Specimens collected in November and January revealed the fungus to be in good fruit (W. MacNeill, I.L. Conners).

Canker (Caliciopsis pinea) was found on P. strobus at Fredericton, N.B. (V.J. Nordin).

Rust (Coleosporium solidaginis) was seen on P. resinosa at Fredericton, N.B. (V.J. Nordin).

Rust (Cronartium spp.). C. harknessii was heavy on 10-15-year-old P. contorta in a peat-sphagnum bog on Lulu Island, B.C.; aecia were present mainly on the lateral branches (H.N.W. Toms). C. comandrae was collected at Gillam, Man., by W.B. Schofield (D.B.O. Savile). At Ste. Anne de la Pocatiere, Que., many trees of P. strobus have degenerated following infection by C. ribicola (A. Payette). Infection of P. contorta by C. cerebrum and C. comptoniae was seen at Acadia, N.B., and of P. banksiana by C. comptoniae at Chatham. C. ribicicola was recorded on P. strobus at Fredericton, Ribes glandulosum at Upsilquitch, R. triste at Bathurst, N.B., and R. nigrum at Kentville, N.S. (V.J. Nordin). C. ribicola was found fruiting on one tree of P. strobus at the Station, Kentville, N.S. (C.O. Gourley).

Twig Blight (Dermatea pinicola). The perfect stage of the fungus was present in May on a 12-foot tree of P. strobus at Kentville, N.S., killed by this disease. The imperfect stage was found on the same tree in September (C.O. Gourley).

Needle Blight (Hypodermella ampla) occurred on P. banksiana at Sussex, N.B. (V.J. Nordin).

Needle Blight (Lophodermium pinastri). The fungus was present on dead needles of P. banksiana sent in from Meadow Lake, Sask. (E.T. Reeder). It was seen on P. strobus at Fredericton, N.B., and P. resinosa at Acadia, N.B., and Bridgetown, N.S. (V.J. Nordin).

Timber Rot. Polyporus schweinitzii was noted at L. Ainslie, N.S., and Stereum sanguinolentum at Fredericton, N.B., both on P. strobus (V.J. Nordin).

POPULUS - Popular

Timber Rot (Daedalea unicolor) occurred on P. balsamifera at Fredericton, N.B. (V.J. Nordin).

Canker (Dothichiza populea) was heavy on 1000/2000 Lombardy poplar, P. nigra var. italica, intercepted at Niagara Falls, Ont., in a shipment from Shenandoah, Iowa (J. Sibalis). Nearly 90% of P. simonii were infected in the city nursery, Montreal, Que. (J.E. Jacques).

Leaf Spot (Marsonina populi) caused 25% defoliation of P. alba at Lunenburg, N.S., at the end of July (J.F. Hockey).

PRUNUS

Black Knot (Dibotryon morbosum). A single knot was found at Barry's Bay, Renfrew Co., Ont., on a small shrub of P. susquehanae. This seems to be the first Canadian record on this host, although there is a specimen on the related P. pumila from Port Franks, Lambton Co. (F. Roll-Hansen, D.B.O. Savile). Traces of black knot occurred at Contrecoeur, Vercheres Co., Que., on Prunus sp. (J.E. Jacques). It was seen on Prunus sp. at New Jersey, N.B. (V.J. Nordin).

Powdery Mildew (Podosphaera oxyacanthae) was heavy on the lower leaves of P. melanocarpa in moist woods along the Saskatchewan R., Saskatoon, Sask. (E.T. Reeder).

Leaf Curl (Taphrina cerasi). Occasional branches of P. pensylvanica were infected and the leaves killed in June. Sometimes only one twig of a tree was affected. Other Prunus spp. were not attacked (A. Payette).

QUERCUS - Oak

Canker (Phomopsis sp.) was seen on Q. borealis at Millford, N.S. (V.J. Nordin).

Leaf Blister (Taphrina coerulescens) was general in September on Q. garryana in the Metchosin district, B.C. (W. Jones).

RHAMNUS - Buckthorn

Rust (Puccinia coronata) was heavy on several plants of R. alnifolia at Lac Disparu, a sphagnum bog at Ste. Anne de la Pocatiere, Que. The first pycnia were seen 2 June on R. cathartica at Ste. Anne. R. frangula was, as usual, free from rust (A. Payette). Only a few pustules were found in the known buckthorn colonies in N.B. Only a trace of P.c. var. agrostis occurred on R. frangula at Fredericton (J.L. Howatt).

SALIX - Willow

Scab (Fusicladium saliciperdum). The old French willows at Grand Pre, N.S., were properly sprayed this year. Consequently very little scab developed and the trees fully recovered from the defoliation that occurred in 1949 (K.A. Harrison).

Blight (Physalospora miyabeana) became very serious in the old French willows at Grand Pre, N.S., in 1949, due to several periods of weather favourable to infection. Thorough spraying in 1950 practically eliminated the disease, however (K.A. Harrison).

SORBUS - Mountain Ash

Fire Blight (Erwinia amylovora). Specimens were received from Montreal West, Que., and $\frac{1}{4}$ of the twigs on 2 trees were said to be blighted (H.N. Racicot). Blight occurred on several isolated trees at Montreal (J.E. Jacques).

TSUGA - Hemlock

Timber Rot. Ganoderma lucidum was found at Fredericton, N.B., and L. Rosignol, N.S., and Polyporus sulphureus at St. Margaret's Bay, N.S. (V.J. Nordin).

ULMUS - Elm

Dutch Elm Disease (Ceratostomella ulmi). In Que. during 1950 the scouting and control work was confined, as in 1949, to the outer counties of the infected area. A considerable increase in the number of diseased trees, as compared with 1949, was found to have occurred in many of the counties scouted but extension of the diseased area was mainly in a southerly direction towards the border of the United States. Here diseased trees, though only a few in number, were found in three counties where the disease had not previously been reported, namely: Brome, Iberville, and Napierville.

In Ontario, a thorough survey for diseased trees was undertaken in the eight counties in the angle of the St. Lawrence and Ottawa Rivers, Prince Edward county, and a belt 15 miles deep along the St. Lawrence River and Bay of Quinte including several large islands near Kingston. A more general survey covering the elms along the main and secondary roads and in the villages, towns, and cities was made in the southern part of the province from Oshawa to Goderich and Windsor with more extensive work being done in Essex and Kent counties. The results of these surveys showed a new outbreak of the disease centering around Windsor in Essex county where 91 trees were found to be infected. A few diseased trees were discovered in other counties as follows: Carleton 5, Leeds 1, Prince Edward 1; and a few trees in which the fungus was living saprophytically in insect galleries, namely: Frontenac 1, Glengarry 2, Peel 1, Prescott 1, Welland 3. With the exception of Carleton and Prescott, this is the first time the fungus has been found in these Ontario counties.

In Quebec, the native elm bark beetle, Hylurgopinus rufipes, is the principal vector of the fungus. In the Windsor area, the European elm bark beetle, Scolytus multistriatus, is also present (Ruth Macrae).

Leaf Spot (Gnomonia ulmea). Infected leaves were sent in From St. Basile le Grand, Chambly Co., Que. (J.E. Jacques).

Timber Rot (Polyporus squamosus) was seen at Fredericton, N.B. (V.J. Nordin).

Twig Blight (Thyrostroma compactum). Twigs of U. pumila, with the pathogen in good fruit, were received from Madoc, Ont., in late May (J.D. MacLachlan, I.L. Conners). Already reported from Ont. and Que. (P.D.S. 17:68. 1938).

Coral Spot (Tubercularia ?ulmea) occurred on U. americana at Middleton, N.S. (V.J. Nordin).

VI. DISEASES OF ORNAMENTAL PLANTS

ACHILLEA

Rust (Puccinia millefolii) appeared at least two weeks earlier than usual (13 July) on A. ptarmica at Ste. Anne de la Pocatiere, Que., just before bloom commenced; but thereafter it spread slowly. Later it was again found on A. millefolium (A. Payette).

ALTHAEA - Hollyhock

Rust (Puccinia malvacearum) was found in most parts of the interior of B.C., but a warm, dry season caused infection and damage to be much less than usual (G.E. Woolliams). Rust was heavy on young plants at Winnipeg, Man. (A.M. Brown). It was very common in the St. Catharines district, Ont., in most cases causing serious defoliation before bloom (G.C. Chamberlain). Damage was severe at Brighton, the lower leaves being shed in late July (K.M. Graham). Specimens were received from St. Hyacinthe, Que., where the disease was said to be severe (J.E. Jacques). Infection was 5% and damage slight at Charlottetown, P.E.I. (R.V. Clark).

ANTIRRHINUM - Snapdragon

Blight and Wilt (Botrytis cinerea). A severe outbreak occurred in late November, 1950, in a large greenhouse planting at Brampton, Ont. When it was examined on 7 Dec. about 50% of the plants were diseased or dead. Infected plants bore cankers and basal lesions, and the leaves were severely wilted. Stem cankers seldom extended more than 3-4 in. above the soil. The basal parts were overrun by the mycelium and conidiophores of B. cinerea. Individual flowers of several plants were blighted. The variety Cornwallis was most severely damaged (J.D. Gilpatrick).

Rust (Puccinia antirrhini) was general at Elk Lake, near Victoria, B.C., on susceptible varieties, with severe damage, but was only a trace on the resistant Shasta Major (W. Jones). Rust occurred on 2 volunteer plants in a garden at Vancouver (H.N.W. Toms). Little rust occurred in the Okanagan Valley, owing to a warm, dry summer (G.E. Woolliams).

Bunch Top (Solanum virus 17). One plant at the Station, Fredericton, N.B., showed severe dwarfing, rolling and distortion of leaves, reddening of stems and leaves, and distorted axillary shoots, but the blossoms were not distorted. The virus was transmitted by means of dodder to tomato and proved to be that of potato bunch top (D.J. MacLeod).

Mosaic (Cucumis virus 1) was heavy in the fall of 1950 in a greenhouse at Clarkson, Ont. Inoculations indicated the virus to be a strain of the cucumber mosaic virus. The plants had been growing outside next to a row of watermelons heavily infected with mosaic. This was evidently the source of infection, for a later sowing, started indoors, was healthy. The most heavily

infected varieties were Christmas Star, Ball's Yellow Hybrid, Gold Mine, and Ball's Hybrid Red. The least affected were Margaret Yodders 33, Mary Ellen, and, especially, Dorcas Jane. The heaviest loss was 30% in one bed. The outbreak was brought under control by rogueing (J.D. Gilpatrick).

AQUILEGIA - Columbine

Powdery Mildew (Erysiphe polygoni). About 75% of the plants in the Okanagan Valley, B.C., showed leaf infection (G.E. Woolliams).

ASTER

Downy Mildew (Basidiophora entospora) was light on a few plants of the native A. douglasii at Sidney, B.C.; first report on this host (W. Jones, W. Orchard).

Rust (Coleosporium solidaginis) was heavy on A. novae-angliae at Contrecoeur, Vercheres Co., Que. (J.E. Jacques).

Powdery Mildew (Erysiphe cichoracearum) was heavy at the Botanical Garden, Montreal, Que. (J.E. Jacques).

BEGONIA

Basal Rot (Botrytis sp.). Several tuberous begonias in a house at Yorkton, Sask., were attacked and some were killed. Botrytis sp. was isolated (E.T. Reeder).

Powdery Mildew (?Erysiphe cichoracearum). Specimens were received from St. Albert and Penhold, Alta. (A.W. Henry). A specimen was sent in from Summerberry, Sask., in August (T.C. Vanterpool). A group of plants of B. socotrana became heavily infected in November at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Bacterial Leaf Spot (Xanthomonas begoniae). A specimen was received from Toronto, Ont. (E.H. Garrard).

BERBERIS - Barberry

Rust (Puccinia graminis). The first pycnia were seen on 14 June at Ste. Anne de la Pocatiere, Que., on B. vulgaris. Infection was sparse both there and at St. Roch des Aulnaies (A. Payette). Only a trace of rust was seen on the known barberries in N.B. (J.L. Howatt).

Wilt (Verticillium sp.) severely damaged 2% of the plants of B. thunbergii in a hedge at Charlottetown, P.E.I., in late June. The affected parts of the hedge were under trees (R.R. Hurst).

CACTUS

Oedema (physiological). Badly affected specimens were received from St. Jean, Que., in April (J.E. Jacques).

CALENDULA

Yellows (Callistephus virus 1) was severe at the Station, Fredericton, N.B. Infection was 100% in two beds (D.J. MacLeod). On 8 Sept. half a bed of 25 plants at Kentville, N.S., were infected, and all showed the disease by mid Oct. (K.A. Harrison).

CALLISTEPHUS - China Aster

Wilt (Fusarium oxysporum f. callistephi). Patches of diseased plants of Artemisia biennis were found by J.E. Machacek at Melita, Man., which showed symptoms of wilt and root rot. Isolations from stem and base yielded a form of F. oxysporum resembling f. callistephi. Its pathogenicity has not yet been tested (W.L. Gordon).

Yellows (Callistephus virus 1). A trace was seen at Beaverlodge, Alta. Half the plants in a bed at Edmonton were severely injured (T.H. Davidson). Infection was 75% and 85% in 2 beds at the Station, Fredericton, N.B. (D.J. MacLeod). Yellows was severe in gardens in Kings Co., N.S., late in the season. Infected Plantago and Leontodon were found in lawns adjacent to the beds (J.F. Hockey).

CAMELLIA

Mosaic (?virus). Mosaic symptoms were seen on a few plants at Port Dover, Ont., on 30 Oct. The plants were unthrifty and had poor root development. A virus was suspected (J.D. Gilpatrick).

CAMPANULA

Wilt (Sclerotinia sclerotiorum) caused slight damage in a commercial planting of Canterbury bell, C. medium, at Elk Lake, B.C. (W. Jones).

CATTLEYA

Mosaic (virus). Mottling of petals and sepals disfigured 2% of the plants in a greenhouse at Brampton, Ont., on 7 Dec. (J.D. Gilpatrick).

CHRYSANTHEMUM

Grey Mould (Botrytis cinerea) was reported by growers throughout Ont. as common on blossoms of plants in cloth houses in the fall of 1950. Generally blighting was confined to the outer rays. The lesions bore abundant conidiophores of B. cinerea in periods of high humidity (J.D. Gilpatrick). At Greenwich, N.S., the rays of nearly 20% of open heads were blotched, following unseasonably warm, rainy weather. A return to normal weather prevented further spread (J.F. Hockey).

Powdery Mildew (Erysiphe cichoracearum). Traces were seen at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Root Knot (Heterodera marioni), in association with a trace of root rot (?Verticillium sp.) and what seemed to be non-parasitic leaf lesions, caused premature defoliation of plants in a greenhouse at New Westminster, B.C., in early Dec. (H.N.W. Toms).

Wilt (Verticillium dahliae). Infection was 15% on Silversmith and also heavy on another variety in a greenhouse at Brampton, Ont., on 7 Dec. (J.D. Gilpatrick).

Stunt (virus). Infection was 50% on Christmas Star in a greenhouse at Brampton, Ont., on 7 Dec. Infected plants were shorter by 12 or more inches than healthy ones, bloomed earlier and had smaller leaves. It was also serious on Minstrel (J.D. Gilpatrick). This disease, so prevalent 5 years ago, could only be found in the occasional plant in N.S. this year. Selection and careful propagation has nearly eliminated it (J.F. Hockey).

Oedema (physiological) was quite prevalent in Sept. in a greenhouse at Montreal, Que. (J.E. Jacques).

COREOPSIS

Yellows (Callistephus virus 1). A trace was seen at the Station, Fredericton, N.B. (D.J. MacLeod).

CYCLAMEN

Stunt (Ramularia cyclaminicola Trel.). Light infections occurred at the Notre Dame and Montreal Botanical Gardens, Montreal, Que. (J.E. Jacques). Baker, Dimock and Davis have recently shown (Phytopath. 40:1027-1034. 1950) that stunt, a leaf disease, and a wilt are all due to R. cyclaminicola, of which Cladosporium cyclaminis is a synonym (I.L.C.).

DAHLIA

Crown Gall (Agrobacterium tumefaciens). Specimens were received from Bowmanville, Ont. (E.H. Garrard).

DELPHINIUM

Powdery Mildew (Erysiphe polygoni). Traces occurred at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Bacterial Blight (Pseudomonas delphinii) was sent in from Ganonoque, Ont. (E.A. Garrard).

Chlorosis (iron deficiency) was common at Saskatoon, Sask., on soils of high pH. It was remedied by spraying with 1% iron sulphate (T.C. Vanterpool).

DIANTHUS

Grey Mould (Botrytis cinerea). Carnations with blighted petals were received in Sept. from a greenhouse at St. Catharines, Ont. (J.D. Gilpatrick).

Wilt (Fusarium sp.). Several carnation plants were infected in greenhouses at Brampton and St. Catharines, Ont. (J.D. Gilpatrick). Wilt, and crown and root rot caused 10% loss of carnations in a greenhouse at Rougemont, Que., where it is a persistent problem for which no adequate control has been obtained (L. Cinq-Mars).

Stem Rot (Rhizoctonia solani) attacked a few scattered plants in a greenhouse at Brampton, Ont. (J.D. Gilpatrick).

Bacterial Leaf Spot (Pseudomonas woodsii). Carnation specimens were received from Parry Sound, Ont. (E.H. Garrard).

Rust (Uromyces caryophyllinus) was heavy on carnation var. Olivette in a greenhouse at Brampton, Ont., but other varieties were almost free from infection (J.D. Gilpatrick). Rust was moderately heavy on carnation in 2 commercial greenhouses at Quebec, Que. (J.E. Jacques).

Mosaic, Streak and Yellows (virus). It is believed that most florists' stocks of carnation in Ont. are carrying virus. Mosaic was seen in all greenhouses examined in 1950 (J.D. Gilpatrick).

GAILLARDIA

Yellows (Callistephus virus 1). Infection was about 5% at Elk Lake, B.C., in plants of G. pulchella var. picta being grown for seed (W. Jones). Two severely infected plants of G. aristata were found at the Station, Fredericton, N.B. (D.J. MacLeod).

GARDENIA

Bud Drop (?physiological) caused 50% loss of bloom in Dec. in a greenhouse at Brampton, Ont. A bacterium was associated with bud drop in a few plants at the Laboratory, St. Catharines, Ont. (J.D. Gilpatrick).

GLADIOLUS

Fasciation (Corynebacterium fascians). A corm with malformed shoots was received in the fall from Nipawin, Sask., through Prof. T.C. Vanterpool. Because of the resemblance to a photograph published by Lacey (Ann. App. Biol. 23:750. 1930) isolations were made. The resulting bacterium caused fasciation of sweet pea seedlings and, later, caused distortion of gladiolus shoots when a sprouting corm was inoculated (J. Sibalis). This is the first fully confirmed record of this organism in Canada.

Soft Rot (Erwinia carotovora). L.W. Koch (A bacterial soft rot of gladiolus. Sci. Agr. 30:483-487. 1950) has recently described a disease that was destructive in s.w. Ont. in 1949, especially to plants from which the flower stalks had been cut. Brown discoloration ran down from the cut toward the corm. Sometimes all leaves turned yellow and died. Superficial brown or black lesions were formed in Sept. on corms of some infected plants. Diseased plants produced few if any cormels. The pathogen agreed closely with E. carotovora culturally, in host range and in pathological histology.

Dry Rot (Fusarium oxysporum var. gladioli). Badly diseased corms were seen from a garden at Montreal, Que. (J.E. Jacques).

Yellows (Fusarium orthoceros var. gladioli) was a trace to 20% in stands examined throughout P.E.I., and 32 enquiries about this disease were received. There is notably less of the disease on rotated land than where gladioli are repeated (R.R. Hurst).

Storage Rot (Penicillium gladioli) caused considerable loss in a collection of corms stored under poor conditions at Montreal, Que. Humidity was too high, ventilation nil and temperature above 50°F. (J.E. Jacques). Seven cases were noted in P.E.I. Infection was 7% in one lot in Queens Co. (R.R. Hurst).

Scab (Pseudomonas marginata). At least 10% of the corms of a grower at Chambly, Que., were infected (J.E. Jacques). Infection was 6% in a lot in Queens Co., P.E.I. (R.R. Hurst).

Core Rot (Sclerotinia draytoni). A single corm was received from Sicamous, B.C., with no data on the rate of infection (D.B.O. Savile). Leaf and blossom spotting was severe in low-lying fields at Burlington, Ont., on 18 Sept., following a week of cold, wet weather, but the damage came too late to cause serious loss, provided it did not lead to serious storage rot (J. Sibalis). A few plants in Kings Co., N.S., showed a stalk rot at the flower nodes, due to S. draytoni (J.F. Hockey, J.W. Groves). Core rot destroyed 52% of one lot of corms in Queens Co., P.E.I., in early Feb. Several enquiries about this disease were later received (R.R. Hurst).

Dry Rot (Sclerotinia gladioli). Some affected plants were seen in most plantings in s. and e. Ont., but losses were light, especially in young stock (J. Sibalis).

Mosaic (virus). At the St. Catharines Laboratory, Ont., strains of the tobacco ring-spot virus have been isolated repeatedly from mottled gladioli. A plant of Mrs. Mark's Memory that showed bright chlorotic ring and lime patterns yielded a strain of tobacco ring-spot virus and a strain of tobacco mosaic virus. It is not yet known whether the combination of these viruses caused the unusual symptoms. One plant also yielded a strain of cucumber mosaic virus. G.H. Bridgmon (Phytopath. 41:5. 1951) has recently reported isolating tobacco

ring-spot and cucumber mosaic viruses from gladiolus. F.P. McWhorter et al. (Science 105: 177-178. 1947) had previously shown gladiolus to be an important source of bean yellow mosaic virus (G.H. Berkeley). Mosaic (?Phaseolus virus 2) was seen at the Botanical Garden, Montreal, Que. A grower from St. Francois du Lac, Yamaska Co., who brought in mottled plants, said that his plants were almost 100% infected (J.E. Jacques). Phaseolus virus 2 caused a faint mottle in 1% of the plants in a garden at Fredericton, N.B. Adjacent Kentucky Wonder beans showed yellow mosaic (D.J. MacLeod). Mosaic is increasing in N.S., up to 25% of plants being infected in some gardens (J.F. Hockey). A mild mottle affected 15% of several varieties in a garden at Charlottetown, P.E.I. (R.R. Hurst).

Chemical Injury. Too high a concentration of mercuric chloride caused pitting of 10% of an unknown variety in Queens Co., P.E.I., and resulted in a poor stand of weak plants (R.R. Hurst).

Curing Injury. Corms of Snow Princess received in Jan., 1950, from Mr. M.W. Hambleton, Montreal, Que., showed a curious superficial browning of an unfamiliar type. Mr. Hambleton later showed some of these corms to Dr. McLelland of Beltsville, Md., and Dr. Magie of Bradenton, Fla., who diagnosed the trouble as due to excessive heating in curing, with consequent injury from esters evolved from the corms. The percentage of corms affected was high, but the damage appeared to be very slight (D.B.O. Savile).

Freezing Injury. Loss was 100% in one storage in Queens Co., P.E.I. Four cases of freezing were reported to us (R.R. Hurst).

GYPSOPHILA

Root Rot (Fusarium sp.). F. sp. was isolated from severely damaged plants from a garden at Medicine Hat, Alta. (M.W. Cormack).

HEDERA - Ivy

Bacterial Leaf Spot (Xanthomonas hederae) affected many hundreds of potted plants out of over 100,000 in a greenhouse at London, Ont. (E.H. Garrard).

HYACINTHUS - Hyacinth

Bulb Nematode (Ditylenchus dipsaci). Of two plantings inspected on Vancouver I., B.C., one was free, and the other showed a general, moderately severe infection (R.P. Messum).

HYDRANGEA

Powdery Mildew (?Erysiphe cichoracearum) affected several plants in a greenhouse at St. Catharines and is apparently general throughout Ont. (J.D. Gilpatrick). Specimens were received from St. Zenon, Berthier Co., Que., and the disease was seen in commercial greenhouses in Montreal and at the Botanical Garden (J.E. Jacques).

IRIS

Bacterial Leaf Blight (Bacterium tardicrescens) was prevalent at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Leaf Spot (Didymellina macrospora). Traces were recorded in 7.7% of the plantings inspected on Vancouver I., B.C., and in a few on the mainland (R.P. Messum). It was general, and occasionally disfiguring, in plantings at the University of British Columbia, Point Grey (H.N.W. Toms). Leaf spot was found in most parts of the interior, but infection nowhere exceeded 5% owing to the dry season (G.E. Woolliams). Light infections were seen at Beaverlodge, Edmonton and Alliance, Alta. (T.R. Davidson). A heavy infection caused severe scorching of leaves in a bed at St. Catharines, Ont. (G.C. Chamberlain). This disease was severe at St. Roch, Richelieu Co., Contrecoeur, Vercheres Co., and Mont Rolland, Terrebonne Co., Que. (J.E. Jacques).

Soft Rot (Erwinia carotovora) caused moderate damage to leaves and rhizomes in a garden at Saskatoon, Sask. (T.C. Vanterpool).

Mosaic (virus) was found in 30.8% of the plantings inspected on Vancouver I., B.C., ranging from a trace to 22.5%. Only a trace was found in a single plot on the mainland (R.P. Messum).

LATHYRUS

Root Rot (Pythium ultimum) caused slight damage to L. odoratus at Saskatoon, Sask. (T.C. Vanterpool).

Leaf Spot (Ramularia deusta (Fckl.) Baker, Snyder & Davis). K.F. Baker, W.C. Snyder and Lily H. Davis (Mycol. 42:403-422. 1950) have shown that leaf spot of sweet pea, formerly called white mould and the pathogen termed Cladosporium album Dowson, and for which Erostrotheca multiformis was erroneously claimed to be the perfect stage, is caused by a true Ramularia. The pathogen, which attacks various L. spp. was first described as Scolecotrichum deustum by Fuckel in 1869. It has since received many other names. The fungus attacking sweet pea is recognised as a physiologic form, R. deusta f. odorati Baker, Snyder & Davis (I.L.C.).

LIATRIS

Basal Rot (Sclerotinia sclerotiorum). The pathogen was isolated from a specimen of L. sp. sent in from Wetaskiwin, Alta. (A.W. Henry).

LIGULARIA

Nematode Blight (Aphelenchoides ritzema-bosi). A badly diseased specimen was brought in from Montreal in March (J.E. Jacques).

LUPINUS - Lupine

Eye Spot (Ovularia lupinicola) caused considerable foliage damage to Russell lupines, L. polyphyllus, and to wild plants at Metchosin and Comox, B.C. (W. Jones).

MAHONIA

Rust (Cumminsiella sanguinea). Every plant of M. aquifolium in a shipment from Belgium examined at St. Catharines, Ont., on 5 April showed trace to 20% of the leaf surface infected (R.G. Atkinson). Examination of three plantings in the Arboretum, Ottawa, in May, showed no trace of rust (I.L. Conners). Infection was light at Ste. Anne de la Pocatiere and St. Roch des Aulnaies, Que., and damage negligible (A. Payette).

MATTHIOLA - Stock

Damping-Off (Rhizoctonia solani) caused heavy damage at Whonock, Fraser Valley, B.C. Soil sterilization was apparently not thorough enough (H.N.W. Toms).

MYOSOTIS - Forget-me-not

Leaf Blight (Alternaria sp. associated) was a trace in Queens Co., P.E.I. (R.R. Hurst).

NARCISSUS

Bulb Nematode (Ditylenchus dipsaci) was present to varying degrees in 28.6% of fields inspected on Vancouver I., B.C. It was not a problem in plantings entered for certification on the mainland but was heavy in 3 commercial fields (R.P. Messum).

Basal Rot (Fusarium spp.). Two per cent was seen in one stock entered for certification on Vancouver I., B.C., and it is known to have been present in one stock on the mainland (R.P. Messum).

Smoulder (Sclerotinia narcissicola). Only 14.3% of plantings inspected on Vancouver I., B.C., showed any infection, all in trace amounts only. On the mainland it was recorded in 65.9% of plantings on first inspection with an average of 0.47% infection. Only 14.3% of fields showed the disease on second inspection, but in these the average incidence was 4.1%, owing to a few growers failing to remove plants with primary lesions (R.P. Messum).

Scorch (Stagonospora curtisii) was of minor importance in B.C. because dry weather checked secondary infection. No measurable amount was present in fields examined on Vancouver I. On the mainland it was present in 72.7% of plantings, but the average infection was only 0.46% (R.P. Messum).

Decline (virus) was present in every planting of King Alfred on Vancouver I., B.C. In only 28.5% of plantings was the infection less than the 2.5% maximum allowed for certification on second inspection. On the mainland decline could be seen in only 5% of plantings during first inspection in April and May. On second inspection, starting in the second week of June it was seen in 82.5% of plantings and varied from 0.2 to 9.0%, av. 2.6%. More decline showed up after second inspection and it is doubtful whether any plantings were rogued completely clean. These figures, it must be noted refer to rogued plantings. The foliage symptoms are characteristic when they first appear, but they develop appreciably only late in the season. The following data, from inspection records, illustrate the short period for accurate diagnosis: In a block of King Alfred stock, known to be 100% infected, no symptoms could be observed on 19 April. By 9 May white-streak symptoms started to show clearly. The apparent incidence almost doubled between 18 and 27 May. It was late June before all plants showed infection. The multiplicity of symptoms suggest that more than one virus may be involved. Physiological disorders complicate diagnosis (R.P. Messum). See P.D.S. 29:108.

Mosaic (virus). On Vancouver I., B.C., the first inspection, 5-15 April, gave the following results: 28.6% of plantings free; 28.6% with less than 0.25%; 21.4% with less than 0.5%; and 21.4% with over 0.5% to a maximum of 4.3%. In 1949 only a trace of mosaic was recorded in mainland plantings, but it was suggested in the report that this condition was due to late inspection. This suspicion was proved correct in 1950 when inspections were made 2-3 weeks earlier (3-4 weeks earlier in seasonal development), at a stage when mottling is still distinct. At first inspection mosaic was found in 50% of fields, av. 0.82%. At second inspection it was found in 25% of fields, av. 0.98%. The highest infection was 2.7% (R.P. Messum).

Asphyxiation (winter flooding). Specimens were received from Alexandria, Ont., on 29 Mar. 1950. Seventy-five per cent of the planting was destroyed, all tissue in the bulbs being killed. Heavy rains in Dec. and Jan., with enough frost to hinder drainage, caused the bed to be under water for prolonged periods. The same condition has occasionally been noted in iris (D.B.O. Savile).

PAEONIA - Peony

Blight (Botrytis paeoniae). Severe crown rot occurred in plantings at Edmonton, Alta. (A.W. Henry). Damage was heavy at Brooks and Lethbridge (M.W. Cormack). Crown rot was seen in a garden at Saskatoon, Sask. Blossom blight (B. cinerea) was commoner than usual at Saskatoon (T.C. Vanterpool). Blossom blight killed 50% of blooms at Charlottetown, P.E.I. (R.V. Clark).

PELARGONIUM - Geranium

Grey Mould (Botrytis cinerea) caused heavy spotting of flowers, leaves and stems, in one corner of a greenhouse at Charlottetown, P.E.I., in May (R.R. Hurst).

Crown Gall (Agrobacterium tumefaciens). Large galls were found on about half the plants of Goodendhorst at the Laboratory and at the Station, Ste. Anne de la Pocatiere, Que. Infected plants were greatly weakened (A. Payette).

Cane Blight (Botrytis cinerea). A blighted cane, with B. cinerea fruiting sparsely on it, was received in Oct. from Dr. H.T. Gussow, Victoria, B.C. Blackened areas suggested the start of sclerotium formation. The condition suggests that occurring in raspberries in N.S. (D.B.O. Savile).

Black Spot (Diplocarpon rosae) was very common in gardens at St. Catharines, Ont., causing serious defoliation in Aug. It was also prevalent in the rose garden at Niagara Falls (G.C. Chamberlain). It was reported to be prevalent on about 30 varieties in a garden at Ottawa (J.E. Jacques). More specimens than usual were received from N.S., perhaps because of increased planting of hybrid teas (J.F. Hockey).

Leaf Spot (Mycosphaerella rosicola). Specimens of climbing roses were sent in from Sorel, Que. (J.E. Jacques).

Rust (Phragmidium sp.) was heavy on several varieties in Queens Co., P.E.I., in Oct. (R.R. Hurst).

Powdery Mildew (Spaerotheca spp.). S. sp. was heavy on several Crimson Glory ramblers in a garden at St. Catharines, Ont. Mildew was also found on Dorothy Perkins rambler and various hybrid polyanthas in the district (G.C. Chamberlain). S. pannosa was generally troublesome during the fall on greenhouse roses throughout Ont. Though largely checked, it was still causing damage in some houses in Dec. (J.D. Gilpatrick). Specimens of S. pannosa were received from Terrebonne, St. Aime, and Laval sur le Lac, Que. It was also seen on a few varieties at the Botanical Garden, Montreal (J.E. Jacques). S. pannosa was quite common on ramblers near Kentville, N.S. (J.F. Hockey). S. sp. was heavy on Dorothy Perkins and very heavy on Crimson Rambler at Charlottetown, P.E.I., in late Aug. Twelve specimens were later brought in (R.R. Hurst).

Leaf Drop (cause unknown). Premature dropping of lower leaves occurred in a large greenhouse planting in Ont., during the fall. The leaves showed angular apical or lateral marginal dead areas with a yellow zone between the dead and normal tissue (J.D. Gilpatrick).

SENECIO - Cineraria

Nitrogen Deficiency caused moderate damage to two plants of S. cruentus brought in for examination from Queens Co., P.E.I. (R.R. Hurst).

SPIRAEA

Leaf Spot (Cylindrosporium spiraeicola) was seen on a few plants of S. discolor at Metchosin, B.C. (W. Jones).

SYRINGA - Lilac

Powdery Mildew (Microsphaera alni) was reported to be severe on a group of trees at Montreal, Que., on 1 Sept. (J.E. Jacques). Most lilacs in the Montreal district had their leaves covered by mildew by 20 Sept. (F. Godbout).

TULIPA - Tulip

Fire (Botrytis tulipae). Infection was nil in 60.9%, slight in 26.6% and moderate to severe in 12.5% of plantings inspected on Vancouver I., B.C. On the mainland, primary lesions were found in 23.4% of plantings, infection averaging 2.5%. Secondary infection was seen in 72.3% of fields, of which 78.6% were classed as slight to moderate and the rest as severe (R.P. Messum). The pathogen was isolated from specimens from a florist at Edmonton, Alta. (T.R. Davidson). Fire caused unthrifty growth and petal spotting of Darwin tulips in a garden at St. Catharines, Ont. (G.C. Chamberlain). Specimens were received from St. Vincent de Paul, Que., in May, where 12,000 plants were said to be diseased. Fire was also reported to be severe in a planting of 500,000 bulbs at Levis. Many varieties were discarded at the Botanical Garden, Montreal, because of fire (J.E. Jacques). Fire damaged 75% of Orange King at Kentville, N.S.; it was also noticed on other varieties (J.F. Hockey).

Break (virus). Some yellow and white varieties on Vancouver I., B.C., seem to carry a small percentage from year to year; but in most forcing varieties break is not a serious problem. On the mainland it was noted in 31.9% of plantings entered for certification with the average 0.79% (R.P. Messum). Break was widely distributed in many varieties, in commercial and home plantings, in the B.C. interior (G.E. Woolliams).

Streak (Nicotiana virus 11). Two bulbs sent in for examination from Charlotte Co., N.B., produced weak plants with severe necrotic lesions on the leaves. This necrosis caused early collapse and death of the tops. The bulbs were also severely necrotic. The virus produced reddish local lesions on Phaseolus vulgaris and was identified as Nicotiana virus 11, the tobacco necrosis virus (D.J. MacLeod).

Chalkiness (?Penicillium sp.). In Oct. a condition was seen in Wm. Copeland from Greenwich, N.S., which resembled chalkiness except that the affected scales were not hard. P. sp. was readily isolated from these scales (J.F. Hockey).

Frost Injury. Forced plants in a greenhouse showed considerable injury in March, 1950, following frost damage when the bulbs were in flats outdoors (J. Bosher).

VERBENA

Powdery Mildew (Oidium sp.) was fairly general on Spectrum Red in a seed planting at Elk Lake, B.C. (W. Jones).

VIOLA

Crown and Stem Rot (Myrothecium roridum). Infections of 10 and 50% caused considerable damage to two plantings of pansy on Vancouver I., B.C. (W. Jones).

Powdery Mildew (Sphaerotheca humuli) caused considerable damage in a commercial planting of pansies at Elk Lake, B.C. (W. Jones).

Rust (Puccinia violae) caused slight damage in a commercial planting of pansies at Elk Lake, B.C. (W. Jones). It caused severe spotting of pansy leaves in a garden at Vancouver (I.C. MacSwan).

YUCCA

Leaf Spot (Coniothyrium concentricum). Specimens of Y. filamentosa were received from Port Burwell, Ont., in Aug. (J. Sibalis).

ZINNIA

Damping-Off (Botrytis sp.) was 100% in flats of seedlings in a commercial greenhouse at Charlottetown, P.E.I. (R.R. Hurst).

Yellows (Callistephus virus 1). Six plants at the Station, Fredericton, N.B., were severely affected. The virus was identified as the western strain (D.J. MacLeod).

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